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## **CORSO DI LAUREA MAGISTRALE IN MEDICINA E CHIRURGIA**

### **Tesi di Laurea**

# **“LA GESTIONE CHIRURGICA DELLA TORSIONE OVARICA E TUBARICA IN ETÀ PEDIATRICA: UPDATE E REVISIONE DELLA LETTERATURA”**

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## RIASSUNTO

La torsione degli annessi uterini è un'emergenza chirurgica definita come la rotazione parziale o totale dell'ovaio, della tuba uterina o di entrambi intorno al proprio asse vascolare con conseguente compromissione del flusso sanguigno a loro afferente<sup>1</sup>. Generalmente coinvolge entrambe le strutture, ma tale fenomeno può interessare il solo ovaio e più raramente la sola tuba<sup>2, 3</sup>. L'espressione "torsione isolata della tuba" (isolated tubal torsion, ITT) è utilizzata quando la torsione tubarica non è associata alla torsione dell'ovaio. La torsione, quale che sia la struttura interessata, richiede un immediato riconoscimento e trattamento al fine di preservare il potenziale riproduttivo futuro, specialmente nelle bambine. Ad oggi il trattamento conservativo è considerato la migliore procedura chirurgica da attuare in caso di torsione per il mantenimento della funzione ovarica.

Scopo della tesi è illustrare sistematicamente l'approccio più adeguato da seguire in caso di sospetta torsione degli annessi uterini nei soggetti in età pediatrica. Il lavoro si basa sulla valutazione degli ultimi aggiornamenti in ambito clinico, laboratoristico e strumentale ottenuti dalla letteratura più recente (2013-2015), fino a considerare il trattamento chirurgico più adeguato, elaborato e maturato nel corso dell'esperienza chirurgica al Dipartimento di Chirurgia Pediatrica dell'Università di Pisa e dell'Ospedale Meyer, Università di Firenze. Particolare attenzione è posta all'outcome chirurgico e alle prospettive di trattamento future, ad oggi formulate solo in via sperimentale, che potrebbero migliorare ulteriormente l'approccio conservativo alla patologia e la prognosi delle pazienti.

# CAPITOLO I

## SVILUPPO E ANATOMIA DEGLI ANNESSI

### UTERINI

#### 1.1 Embriologia

Benché il sesso dell'embrione sia determinato geneticamente al momento della fecondazione, le gonadi non acquistano le caratteristiche maschili o femminili prima della settima settimana di sviluppo. Le gonadi inizialmente si presentano come un paio di creste longitudinali, le creste genitali o gonadiche, e sono formate da una proliferazione dell'epitelio celomatico e da una condensazione del parenchima sottostante. Le cellule germinali non compaiono nelle creste genitali fino alla sesta settimana di sviluppo. Negli embrioni umani, le cellule germinali primitive compaiono in uno stadio di sviluppo precoce tra le cellule endodermiche della parete del sacco vitellino presso l'allantoide<sup>4</sup> (Fig. 1a) . Esse migrano con movimenti ameboidi lungo il mesentero dorsale dell'intestino posteriore (Fig. 1b) e, all'inizio della quinta settimana, arrivano alle gonadi primitive e, successivamente, alla sesta settimana, colonizzano le creste genitali. Se le cellule non raggiungono le creste, non si ha sviluppo delle gonadi. In questo modo le cellule germinali primitive hanno un'influenza induttiva sullo sviluppo delle gonadi in ovaio o testicolo. Poco prima e durante l'arrivo delle cellule germinali primordiali, l'epitelio celomatico della cresta genitale prolifera, e cellule epiteliali penetrano nel sottostante mesenchima. Qui esse si organizzano in un certo numero di cordoni di forma irregolare, i *primitivi cordoni sessuali*<sup>4, 5</sup> (Fig.2) . Sia

nell’embrione maschile, sia in quello femminile, questi cordoni sono collegati all’epitelio superficiale, ed è impossibile distinguere tra gonade maschile e femminile. Per cui la gonade è detta indifferenziata.

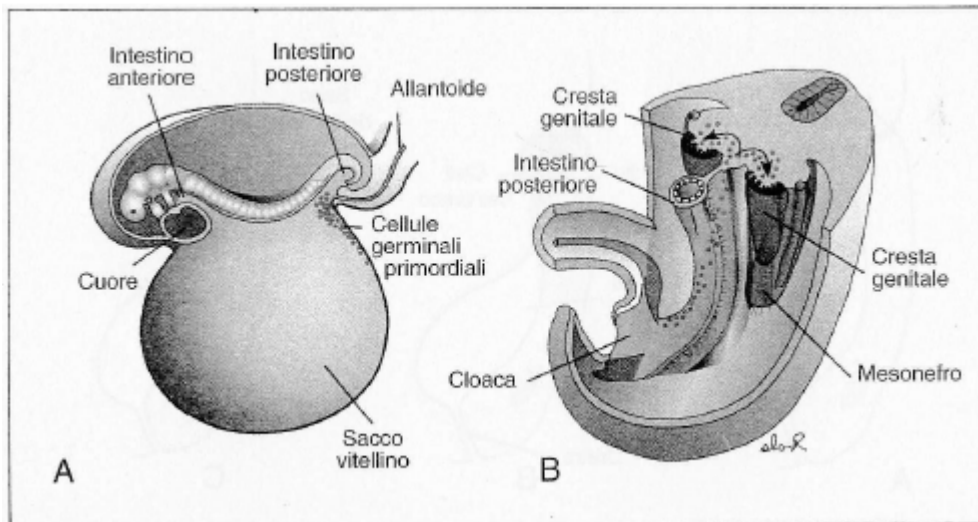


Fig. 1a: Disegno schematico di un embrione alla terza settimana che mostra le cellule germinali nella parete del sacco vitellino, vicino all’attacco dell’allantoide. Fig 1b: Disegno che illustra la via migratoria delle cellule germinali primordiali lungo la parete dell’intestino posteriore e del mesentere dorsale fino alle creste genitali<sup>4</sup>.

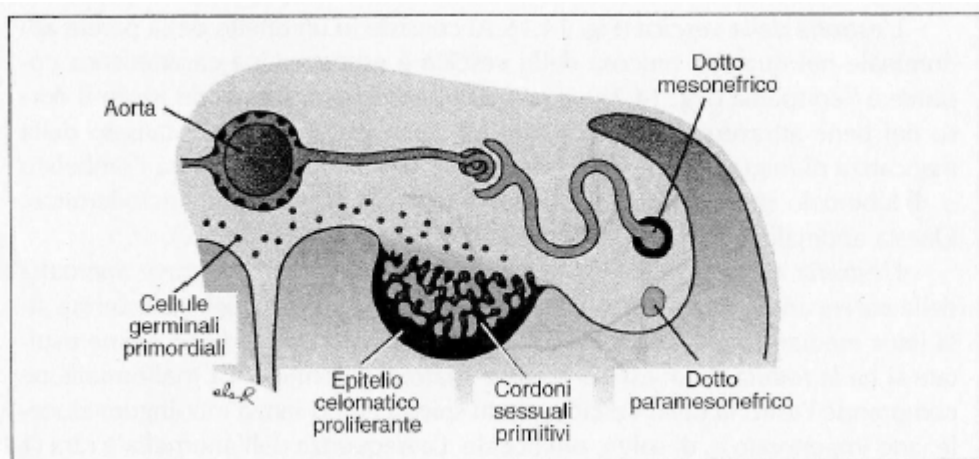


Fig. 2: sezione trasversale schematico della regione lombare di un embrione alla sesta settimana, indicante la gonade indifferenziata con i primitivi cordoni sessuali. Alcune cellule primordiali sono circondate dalle cellule dei primitivi cordoni sessuali<sup>4</sup>.

Negli embrioni femminili con un corredo di cromosomi sessuali XX, i cordoni sessuali primordiali si separano in una serie irregolare di ammassi cellulari. Questi ammassi, contenenti gruppetti di cellule germinali primordiali, sono posti nella porzione midollare dell'ovaio. In seguito essi regrediscono e vengono sostituiti da uno stroma vascolare che formerà la midollare dell'ovaio. L'epitelio superficiale della gonade femminile, diversamente da quella maschile, continua a proliferare. Alla settima settimana darà origine ad una seconda generazione di cordoni, i cordoni corticali, che penetrano nel sottostante mesenchima ma rimangono vicini alla superficie. Al quarto mese, questi cordoni si dividono in nidi di cellule isolate, che circondano una o più cellule germinali. Le cellule germinali successivamente si sviluppano in oogoni, mentre le cellule epiteliali che li circondano, derivate dall'epitelio superficiale, formano le cellule follicolari<sup>4</sup>.

Inizialmente sia gli embrioni maschili sia quelli femminili possiedono 2 paia di condotti genitali: i dotti mesonefrici (o di Wolff) e quelli paramesonefrici (o di Muller). Il condotto paramesonefrico ha origine come un'invaginazione longitudinale dell'epitelio celomatico dalla superficie anterolaterale della cresta genitale.<sup>4,6</sup>

Nella femmina, non c'è produzione di MIS (sostanza inibente mulleriana, prodotto dalle cellule di Sertoli) e in sua assenza il sistema dei dotti paramesonefrici viene mantenuto (Fig.3). I fattori che controllano questo processo non sono chiari, ma possono comprendere gli estrogeni prodotti dalla placenta materna e dalle ovaie fetali. Dato che la sostanza induttiva maschile è assente, il sistema dei dotti mesonefrici, invece, regredisce. In assenza di androgeni, i

genitali esterni indifferenziati vengono stimolati dagli estrogeni e si differenziano nelle grandi labbra, piccole labbra, clitoride e una parte della vagina<sup>4</sup>.

I condotti paramesonefrici si sviluppano nei condotti genitali principali della femmina. Inizialmente in ogni dotto si riconoscono tre parti: una porzione craniale verticale che si apre nella cavità celomatica, una porzione orizzontale che incrocia il dotto mesonefrico e una parte verticale caudale che si fonde con quella del lato opposto. Con la discesa dell'ovaio, le prime due parti si sviluppano nella tuba uterina, e le porzioni caudali si fondono per formare il canale uterino. Quando la seconda porzione dei dotti paramesonefrici si sposta in direzione mediocaudale, le creste urogenitale gradatamente si dispongono in un piano trasverso. Dopo che i dotti si sono fusi lungo la linea mediana, si costituisce un'ampia piega pelvica. Questa piega, che si estende dai margini laterali dei dotti paramesonefrici fusi alla parete delle pelvi, è nota come legamento largo dell'utero. Nel suo margine superiore si trova la tuba uterina, e sulla sua superficie posteriore è appoggiato l'ovaio. L'utero e i legamenti larghi dividono la cavità pelvica in un cavo retto-uterino e in uno utero-vescicale. I dotti paramesonefrici fusi danno origine al corpo e al collo dell'utero. Essi sono circondati da uno strato di mesenchima che formerà la componente muscolare dell'utero, il miometrio, e il suo rivestimento peritoneale, il perimetrio<sup>4, 5</sup>.



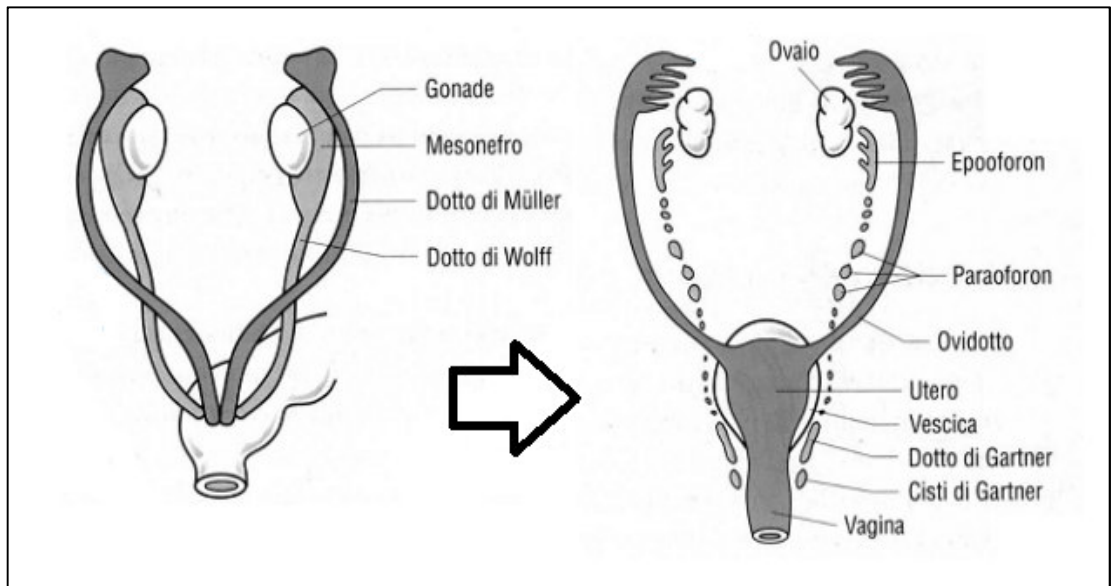


Fig. 3: disegno schematico che illustra la regressione dei dotti di Wolff e lo sviluppo dei dotti di Müller. [http://digidownload.libero.it/citistembrio/10B-APP\\_GEN.pdf](http://digidownload.libero.it/citistembrio/10B-APP_GEN.pdf)

## 1.2 Anatomia chirurgica dell'ovaio e delle tube uterine

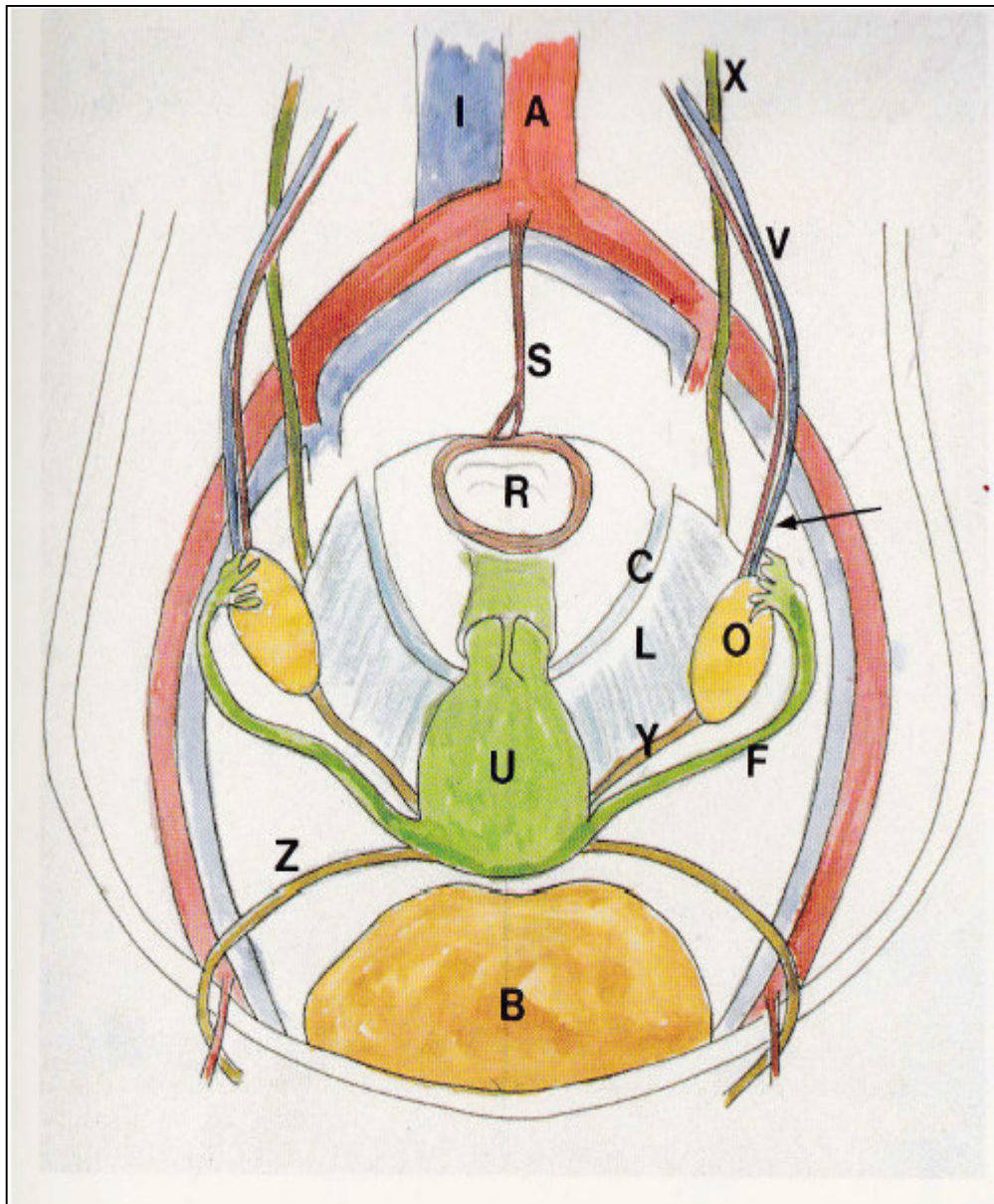


Fig. 4: schema della pelvi femminile che mostra la biforcazione dell'aorta (A), della vena cava (I), e la vescica nella metà inferiore (B). L'utero (U) è colorato di verde così come le tube uterine (F). Il legamento rotondo (Z) dell'utero è indicato nel suo passaggio attraverso l'anello inguinale interno, adiacente all'arteria epigastrica inferiore. Le ovaie (O) sono visualizzate con la corrispondente vascolarizzazione; i vasi ovarici (V) incrociano l'uretere (X) e, giacendo sotto il peritoneo, si portano alla sommità del legamento largo così come il legamento sospenditore (freccia); il legamento ovarico si porta dal polo inferiore dell'ovaio all'angolo superiore dell'utero. Il legamento largo (L) dell'utero è colorato di blu. I legamenti di MacKenrodt (C), il retto (R) e l'arteria sacrale mediana (S), sono riportati in figura<sup>7</sup>.

Le ovaie rappresentano le gonadi femminili e sono responsabili della produzione delle cellule germinali aploidi, gli oociti, e degli ormoni sessuali femminili, principalmente estrogeni e progesterone, che preparano la mucosa dell'utero all'impianto embrionale e mantengono la gravidanza, se si verifica, ma anche androgeni, inibina, activina e relaxina.

Le vie genitali iniziano a livello delle tube uterine nelle quali l'oocito, espulso dall'ovaio al momento dell'ovulazione, va a localizzarsi e dove ha luogo la fecondazione e si svolgono le prime fasi di sviluppo dello zigote (segmentazione). Le tube uterine sboccano nell'utero, organo della gestazione<sup>8</sup>.

Le ovaie sono organi pari e sono localizzate nella piccola pelvi, addossate alle sue pareti laterali in corrispondenza di una piccola depressione che prende il nome di fossetta ovarica (o fossetta di Krause), la quale è delimitata in alto dai vasi iliaci esterni, in avanti dal legamento largo, inferiormente dall'arteria ombelicale e dall'arteria uterina e posteriormente dall'uretere. Si trovano davanti al retto e al di dietro dei legamenti larghi e delle tube uterine in essi contenute (Fig. 4). Ciascun ovaio è posto circa 1,5-2 cm davanti all'articolazione sacroiliaca e circa 1 cm sotto lo stretto superiore del bacino; questa posizione è peraltro variabile dato che l'ovaio segue l'utero nei suoi spostamenti durante la gravidanza e può quindi modificarsi nella donna multipara. L'ovaio ha la forma di una mandorla, o di un ovoide leggermente appiattito in direzione mediolaterale. L'ovaio di destra, nella maggior parte delle donne, risulta più voluminoso rispetto a quello di sinistra<sup>8,9</sup>. Nella neonata la loro lunghezza varia tra i 15 e i 20 mm, la larghezza tra i 3 e i 5 mm e lo spessore tra 2.5 e 3 mm, con un peso di circa 0.5 gr ciascuna<sup>9</sup>. Dimensioni e peso aumentano progressivamente fino a raggiungere il

loro completo sviluppo nel periodo prepuberale con una lunghezza di 25-35 mm, una larghezza di 10 mm, uno spessore di 5–10 mm e un peso di 6-7 gr. L'ovaio è un organo extraperitoneale, per tale motivo la sua superficie risulta opaca rispetto al peritoneo contiguo, ed è rivestito da epitelio germinativo. Forma e dimensioni variano durante la vita: nella bambina appare più piccolo, bianco-rosato, con superficie liscia e consistenza elastica; nel corso della vita fertile si ingrossa e la superficie, rossastra, si fa irregolare per la presenza di follicoli evolutivi, corpi lutei e cicatrici; dopo la menopausa l'ovaio tende ad atrofizzarsi e nella senescenza le dimensioni diminuiscono e l'ovaio si fa nuovamente liscio, di consistenza lignea e di colorito grigio giallastro<sup>8</sup>.

La sua posizione è pressoché sagittale e vi si possono distinguere due facce, mediale e laterale, due margini, anteriore e posteriore, e due poli, superiore ed inferiore. La faccia mediale dell'ovaio guarda verso la cavità pelvica ed è parzialmente coperta anteriormente dalla tuba e dal mesosalpinge. La faccia laterale è in contatto con la parete laterale della piccola pelvi e corrisponde alla depressione del peritoneo detta fossetta ovarica, profondamente alla quale decorrono il nervo ed i vasi otturatori. Il margine anteriore, ilo dell'ovaio, corrisponde alla pagina posteriore del legamento largo, cui è unito tramite un breve raddoppiamento peritoneale, il mesovario. Il margine posteriore, leggermente convesso, è libero e appare spesso addossato al margine libero del colon pelvico. Tra la tuba uterina con il suo mesosalpinge, che si spingono sulla faccia mediale dell'ovaio, e la parete laterale della piccola pelvi in corrispondenza della fossetta ovarica, viene a delimitarsi una sorta di tasca o borsa peritoneale incompleta, aperta all'indietro, la borsa ovarica, all'interno della quale è contenuto l'ovaio; il mesovario divide sagittalmente tale borsa in due compartimenti, uno

mediale e uno laterale. Il polo superiore dell'ovaio dà attacco al legamento sospensore ed è unito all'infundibolo della tuba uterina ad opera della fimbria ovarica. Il polo inferiore si collega all'utero grazie al legamento uteroovarico<sup>8</sup>.

Le tube uterine, o salpingi, sono organi pari, localizzati nella piccola pelvi tra le ovaie, poste lateralmente, e l'utero, situato centralmente. Sono gli organi in cui avviene la fecondazione e la prima segmentazione dell'embrione: pertanto danno passaggio sia agli spermatozoi, che sono risaliti attraverso le vie genitali per raggiungere l'oocito, sia alla cellula uovo fecondata, la quale deve raggiungere la cavità uterina per impiantarsi. Ogni tuba, di lunghezza variabile da 10 a 14 cm, decorre dal polo superiore dell'ovaio all'angolo superiore dell'utero, accolta nel margine superiore del legamento largo; vi si possono distinguere quattro porzioni: infundibolo, ampolla, istmo e porzione intramurale, che differiscono tra loro per calibro e direzione. L'infundibolo, o padiglione, lungo circa 1-2 cm, è la porzione più vicina all'ovaio, ha la forma di un imbuto a parete sfrangiata, in quanto il suo orifizio (ostio addominale della tuba) è circondato da una serie (dodici-quindici) di linguette o fimbrie, che possono raggiungere anche 10-15 mm di lunghezza. Una di queste, la fimbria ovarica, più lunga, collega l'infundibolo con l'ovaio, al quale si fissa grazie al legamento tubovarico. In prossimità dell'estremità delle fimbrie possono essere frequentemente riscontrate vescicole peduncolate, contenenti un liquido trasparente (appendici vescicolose o idatidi di Morgagni) che rappresentano un residuo embrionale (epooforon). L'ampolla della tuba è il tratto più lungo e tortuoso (circa 7-8 cm) e ha uno spessore variabile da 4 mm (istmo) 10 mm (in prossimità dell'infundibolo). Inizialmente forma un'ansa (ansa tubarica) che sormonta il polo superiore dell'ovaio; quindi piega in basso,

decorrendo, quasi verticalmente, sulla faccia mediale di quest'ultimo, in prossimità del margine mesovarico; infine assume un decorso orizzontale descrivendo, al limite tra parete laterale della piccola pelvi e pavimento pelvico, un angolo aperto medialmente e percorre il margine superiore del legamento largo in direzione dell'utero. L'istmo rappresenta la porzione più ristretta della tuba uterina, ha una lunghezza di 3-6 cm, un decorso rettilineo e una maggiore consistenza; raggiunge il margine laterale dell'utero, al limite tra corpo e fondo, dove è in continuità con la porzione intramurale, che attraversa la parete uterina, per aprirsi, tramite l'ostio uterino, nella cavità dell'utero. La tuba uterina decorre nella piccola pelvi compresa e sospesa tra l'angolo tubarico dell'utero e il legamento sospensore dell'ovaio. Nella porzione istmica e ampollare appare rivestita da peritoneo e costituisce l'ala media del legamento largo dell'utero, il mesosalpinge, una piega peritoneale all'interno della quale decorrono i vasi ed i nervi. La tuba possiede comunque una notevole mobilità, particolarmente nel corso della gravidanza, durante la quale segue l'utero in cavità addominale; altri movimenti possono essere dovuti a spostamenti o stiramenti del legamento sospensore dell'ovaio, della fimbria ovarica o del legamento largo. Questa mobilità, unitamente ai movimenti attivi delle fimbrie sulla superficie ovarica al momento dell'ovulazione, rendono possibile la raccolta della cellula uovo espulsa dal follicolo maturo<sup>8</sup>.

- MEZZI DI FISSITA' dell'ovaio

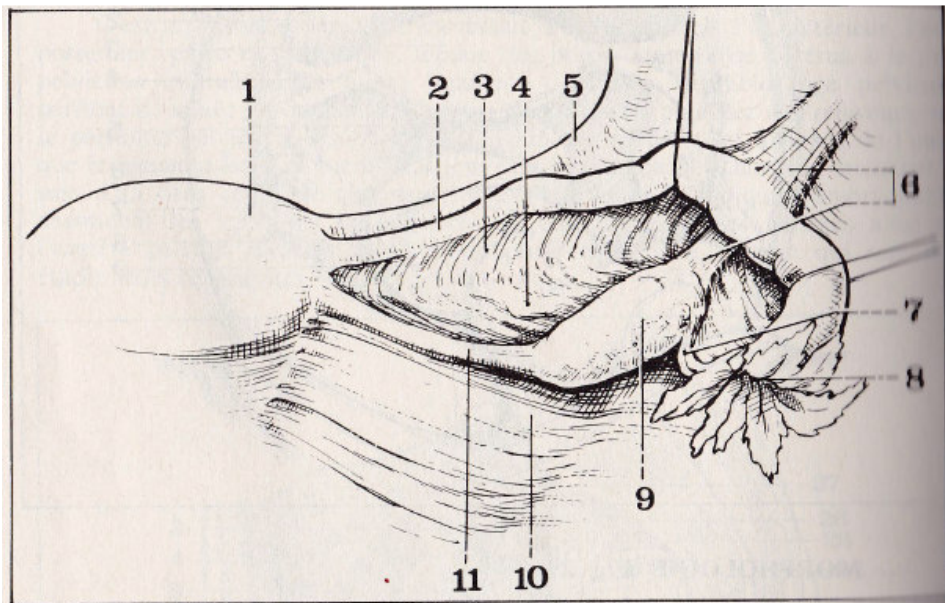


Fig. 5: parte superiore del legamento largo<sup>10</sup>

1-fondo uterino; 2- tuba uterina; 3- mesosalpinge; 4- mesovario; 5- legamento rotondo; 6- legamento sospensore dell'ovaio; 7- fimbria di Richard; 8- padiglione tubarico; 9- ovaio; 10- faccia posteriore del legamento largo; 11- legamento uteroovarico.

L'ovaio è dotato di molteplici mezzi di fissità (Fig.5) :

- 1) il legamento sospensore dell'ovaio,
- 2) il legamento uteroovarico,
- 3) il mesovario,
- 4) il legamento tubovarico.

Il *legamento sospensore dell'ovaio*, o lomboovarico, è un reale mezzo di fissità, in quanto è costituito da una lamina connettivale contenente miocellule che avvolge i vasi e i nervi ovarici destinati a formare il peduncolo principale dell'organo. Forma un ben evidente rilievo nel peritoneo delle fossa iliaca e, portandosi in

avanti e medialmente, incrocia lo stretto superiore del bacino e i vasi iliaci esterni, per raggiungere l'estremità superiore del margine anteriore dell'ovaio.

Il *legamento uteroovarico*, o legamento proprio dell'ovaio, è un cordoncino fibroso, lungo 3-4 cm con miocellule e fibre elastiche. E' diretto dal polo inferiore dell'ovaio all'angolo superiore dell'utero, dove si inserisce al di sotto e posteriormente allo sbocco della tuba. Nel suo decorso solleva la pagina posteriore del legamento largo, determinando, insieme al mesovario, una piega denominata ala posteriore.

Il *mesovario* deriva dal legamento largo: dalla pagina posteriore di questo si staccano due foglietti i quali, dopo un breve decorso, si separano dirigendosi verso le due facce dell'ovaio per arrestarsi dopo poco in corrispondenza della linea di Farre-Waldeyer, che segna il limite tra il rivestimento peritoneale e l'epitelio di rivestimento dell'ovaio. Tra i due foglietti decorrono vasi e nervi e il loro punto d'attacco sul margine anteriore dell'organo corrisponde all'ilo dell'ovaio.

Il *legamento tubovarico* interessa il polo superiore dell'ovaio e non rappresenta un reale mezzo di fissità, bensì assicura il contatto tra l'ovaio e il padiglione della tuba uterina, in corrispondenza della fimbria ovarica<sup>8</sup>.



▪ VASCOLARIZZAZIONE

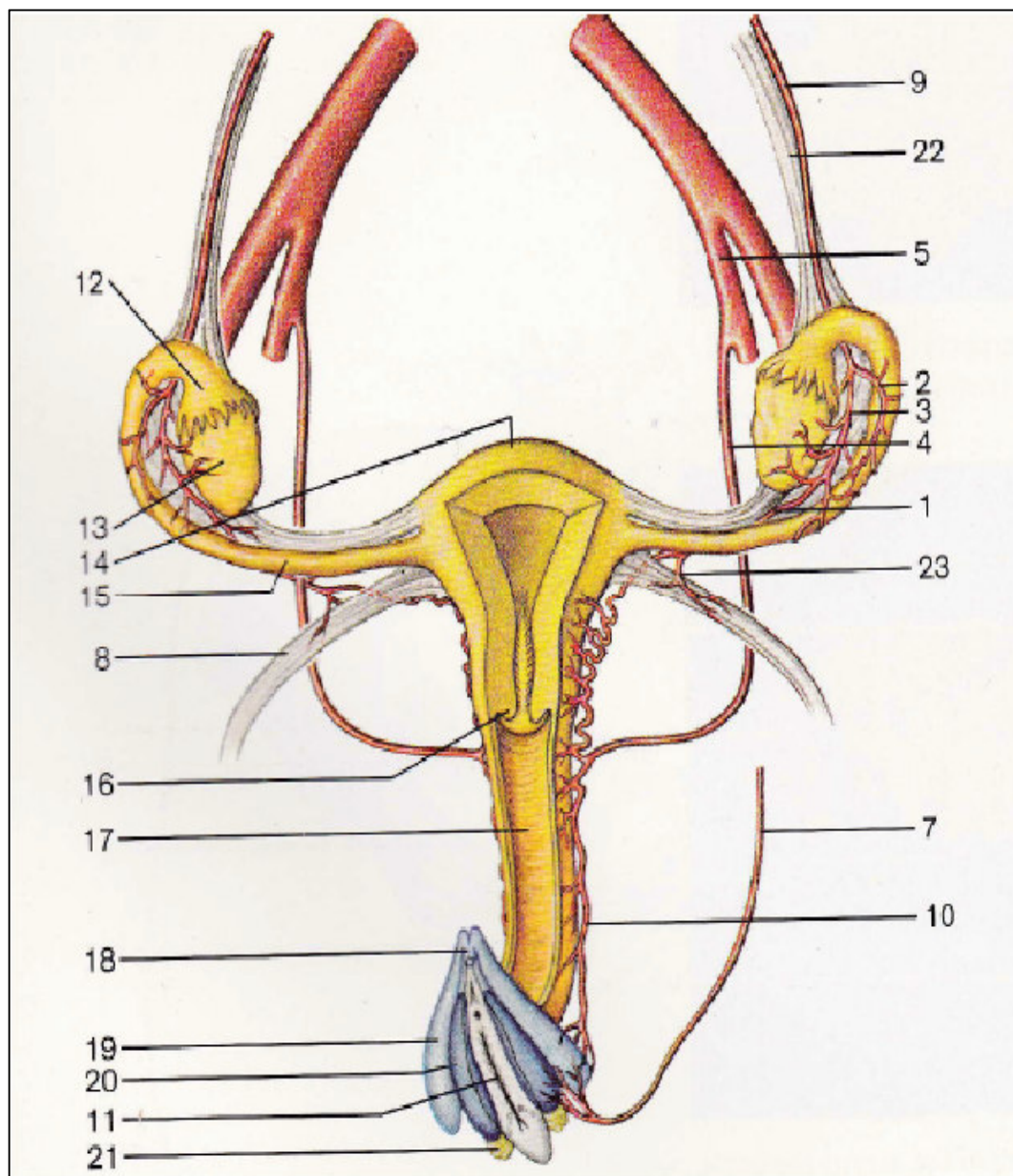
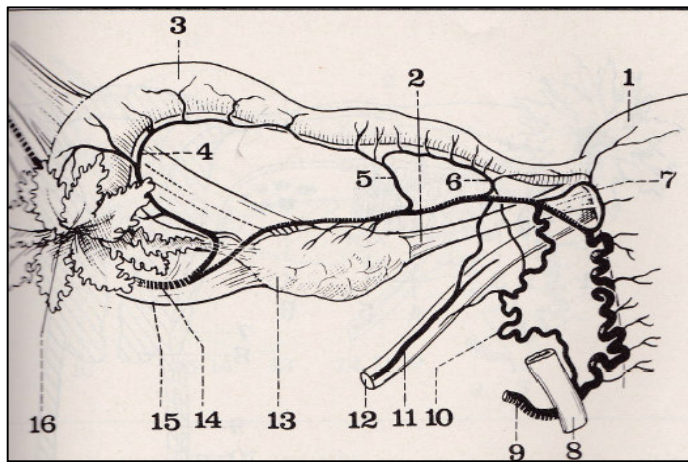


Fig.6: Sistema arterioso dell'apparato genitale femminile; disegno schematico<sup>11</sup>

1-branca ovarica dell'arteria uterina (anastomosi con arteria ovarica); 2- branca tubarica dell'arteria ovarica; 3- branca ovarica dell'arteria ovarica; 4- arteria uterina; 5- arteria iliaca interna; 6-arteria glutea inferiore; 7- arteria pudenda interna; 8- legamento rotondo dell'utero; 9-arteria ovarica; 10- arteria vaginale; 11-orificio vaginale; 12- infundibulo della tuba uterina; 13- ovaio; 14- fondo dell'utero; 15- tuba uterina; 16- portio vaginale della cervice uterina; 17- vagina; 18- clitoride; 19- corpo cavernoso del clitoride; 20- bulbo vestibolare; 21- ghiandole del Bartolino; 22- legamento sospensore dell'ovaio; 23- arteria del legamento rotondo.



1-fondo dell'utero; 2-  
legamento uteroovarico; 3-  
tuba uterina; 4- arcata sotto-  
tubarica; 5- arteria tubarica  
media; 6- arteria tubarica  
interna; 7- arteria retrograda  
del fondo uterino; 8- uretere; 9-  
arteria uterina; 10-arteria del  
legamento largo; 11- arteria del  
legamento rotondo; 12-  
legamento rotondo; 13- ovaio;  
14- arteria ovarica; 15-  
legamento sospensore  
dell'ovaio; 16- padiglione  
tubarico.

Fig. 7: dettaglio della vascolarizzazione tubo-ovarica<sup>10</sup>

L'ovaio ha una duplice irrorazione: dall'arteria ovarica (genitale) e dall'arteria uterina (Fig. 6, Fig. 7). L'arteria ovarica nasce dall'aorta addominale, a livello della seconda vertebra lombare; a destra, passa al davanti della vena cava inferiore, incrociando, sui due lati, l'uretere e il tratto iniziale dei vasi iliaci esterni, all'interno del legamento sospensore. Al polo superiore dell'ovaio entra nel mesovario, ove si anastomizza a pieno canale con il ramo ovarico dell'arteria uterina, formando un'arcata arteriosa i cui rami penetrano nell'ilo per distribuirsi al parenchima ovarico. Il ramo ovarico dell'arteria uterina nasce a livello dell'angolo superiore dell'utero e, seguendo il legamento uteroovarico, raggiunge il mesovario per anastomizzarsi con l'arteria ovarica. Le vene si riuniscono a livello della zona midollare contribuendo alla costituzione del cosiddetto bulbo dell'ovaio, e fanno capo medialmente alla vena uterina e lateralmente alle vene ovariche. Queste ultime sono dapprima riunite in un plesso ovarico o, per omologia con quello maschile, pampiniforme, che risale verso l'addome nel legamento sospensore, poi si riuniscono in un unico tronco che sbocca, a destra, nella vena cava inferiore e a sinistra nella vena renale. I linfatici dell'ovaio si ritrovano abbondantemente attorno sia ai follicoli sia ai corpi lutei, si dirigono poi

verso la midollare e, da qui, i tronchi efferenti decorrono all'interno del legamento sospensore insieme ai vasi ovarici per terminare nei linfonodi pre- e paraortici<sup>8</sup>.

La tuba uterina possiede un ricco corredo vascolare. Il sangue proviene dai rami tubarici delle arterie uterina e ovarica, che si anastomizzano tra loro dando origine a un'arcata arteriosa che decorre nel mesosalpinge, una piega del legamento largo. Da questa arcata nascono i rami arteriosi diretti verso la parete tubarica. Le vene della tuba, dopo aver costituito anch'esse un'arcata analoga a quella arteriosa, fanno capo medialmente alla vena uterina e lateralmente alla vena ovarica. Alcune piccole vene, seguendo il legamento rotondo dell'utero, raggiungono la vena epigastrica inferiore. I linfatici iniziano con ampi capillari di calibro irregolare situati nella mucosa, si raccolgono in reti ben sviluppate nello spessore della parete, da cui originano i tronchi che, assieme a quelli provenienti dall'ovaio e dal fondo dell'utero, fanno capo ai linfonodi pre- e paraortici<sup>8</sup>.

#### ▪ INNERVAZIONE

I nervi giungono all'ovaio tramite i vasi arteriosi attorno ai quali formano un ricco plesso. Il plesso uteroovarico, emanazione del plesso celiaco, accompagna l'arteria genitale; fibre nervose, provenienti dal plesso pelvico, seguono il ramo ovarico dell'arteria uterina. Dalle ricche reti nervose della midollare emanano fibre che, o seguendo i vasi o isolate, si portano alla corticale: trattasi di fibre amieliniche adrenergiche e colinergiche, destinate per lo più all'innervazione vasomotoria. Si ritiene, tuttavia, che le fibre nervose che decorrono indipendenti dai vasi possano avere un significato sensitivo e forse anche effettore. Fibre

nervose sono reperibili attorno ai follicoli cavitari, ma non nel contesto della granulosa e nei setti tra le cellule luteiniche.

I nervi pervengono alla tuba dai plessi uterovaginale e uteroovarico, tramite i corrispondenti vasi. Sono destinati soprattutto alla muscolatura liscia della parete, ma sottili rami penetrano anche nello spessore della lamina propria delle pieghe<sup>8</sup>.

## CAPITOLO II

### TORSIONE DEGLI ANNESSI UTERINI

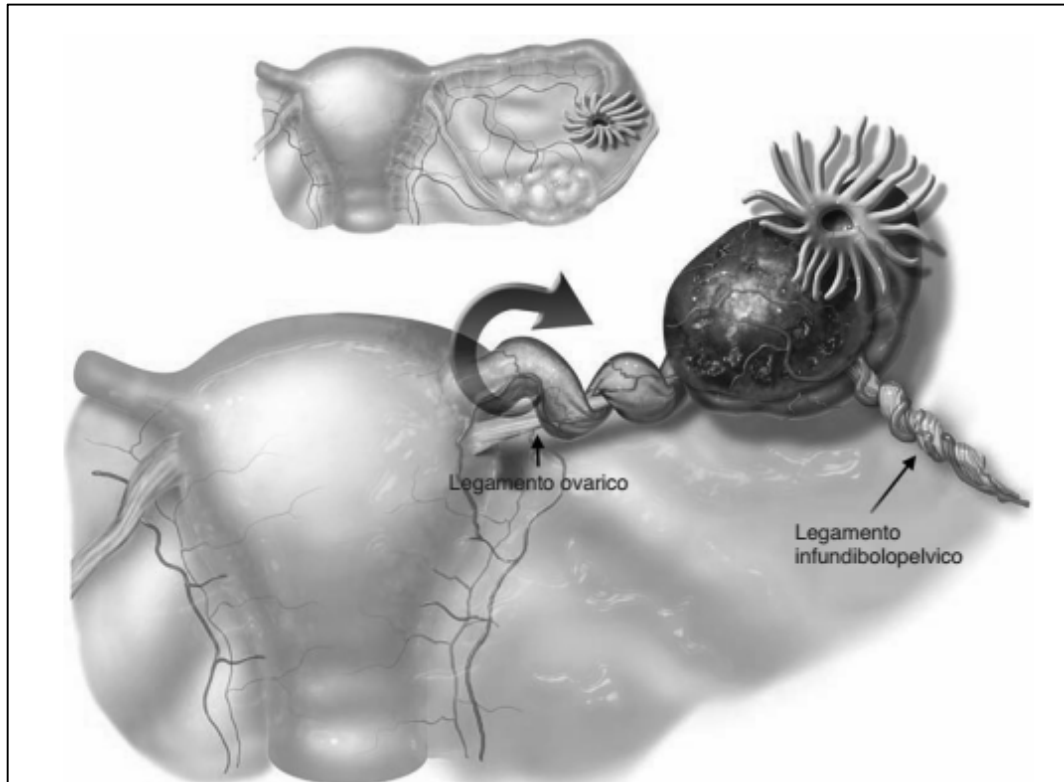


Fig. 8: disegno schematico della torsione annessiale<sup>12</sup>

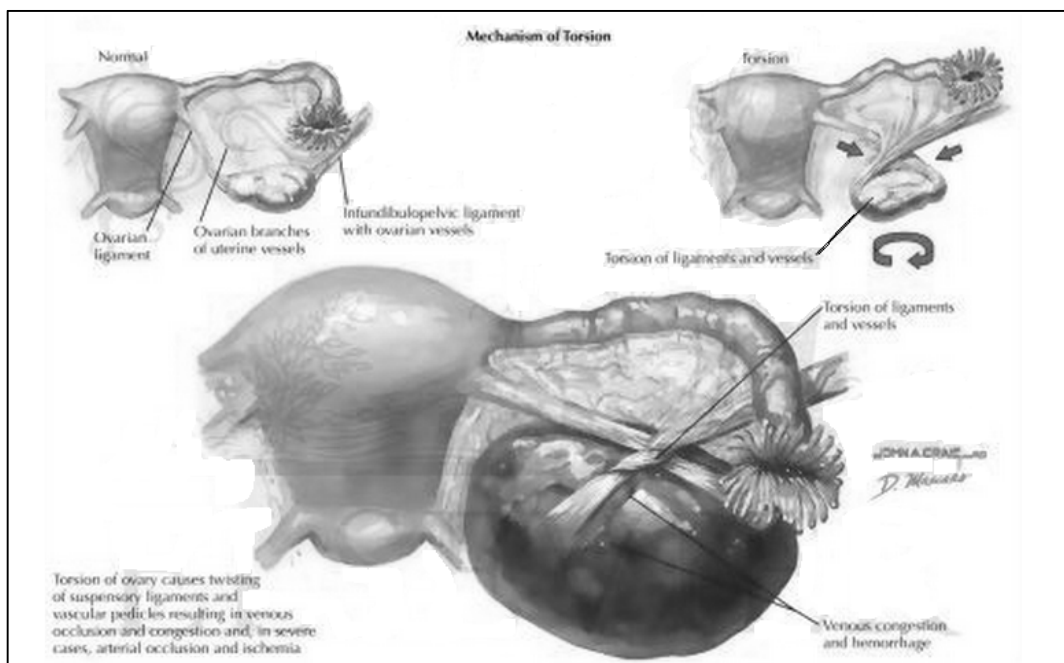


Fig. 9: disegno schematico della torsione ovarica<sup>12</sup>

## 2.1 FISIOPATOLOGIA

Sebbene la torsione dell'ovaio e della tuba uterina possano realizzarsi in forma isolata, nella maggior parte dei casi vengono interessate entrambe le strutture (Fig. 8, Fig. 9). L'ovaio è supportato dal legamento uteroovarico, dal mesovario e dal legamento sospensore che contiene vasi e nervi: nonostante la presenza dei suddetti, l'ovaio non è fissato nella cavità pelvica. Le tube uterine sono ancorate al mesosalpinge<sup>13</sup>. Gli annessi uterini possono ruotare intorno al legamento sospensore e al legamento uteroovarico determinando la compressione dei vasi ovarici che decorrono nel loro contesto. Le prime componenti vascolari ad essere interessate da questo evento sono quella venosa e linfatica, poiché le cellule muscolari della parete arteriosa sono dotate di maggior resistenza. La compressione determina lo sviluppo di edema a carico dell'ovaio, conferendogli un aspetto eterogeneo caratteristico. Il flusso arterioso è compromesso successivamente, e l'analisi eco-color-Doppler può documentare il danno. L'ostruzione vascolare può non essere completa grazie alla presenza di vasi collaterali. Se la torsione non viene trattata, l'ovaio diviene ischemico e successivamente necrotico con l'insorgenza di complicanze quali tromboflebiti (conseguente al rilascio locale di un importante quantitativo di citochine), emorragie ed infezioni, che possono evolvere a peritonite<sup>13-16</sup>. Altre complicanze comprendono lo sviluppo di calcificazioni e di auto-amputazione dell'ovaio. Hasdemir et al<sup>17</sup> descrivono un caso di torsione annessiale associata alla presenza di formazioni calcifiche: gli autori ipotizzano che queste si siano realizzate sulla base di uno stato di ipossia cronica indotta da rotazioni parziali ed intermittenti delle strutture interessate. L'auto-amputazione è una rara complicanza (incidenza

1: 11421) che si verifica attraverso un meccanismo di torsione cronica cui segue la devascularizzazione, la necrosi e il distacco stesso dell' ovaio<sup>13, 18</sup>. L'ovaio "fluttuante" nella cavità addominale può essere riassorbito, può calcificarsi o aderire ad un'altra superficie contestualmente alla cavità addominale stessa<sup>19</sup>.

## 2.2 EPIDEMIOLOGIA

La torsione degli annessi uterini è una condizione relativamente frequente nelle donne in età riproduttiva, sebbene possa essere osservata a qualunque età, dall'infanzia fino al periodo post-menopausale<sup>20</sup>. La sua incidenza stimata nei soggetti con età inferiore ai 20 anni è di 4.9/100 000, con un'età media di presentazione di circa 12 anni<sup>19, 21</sup>. E' riportata essere la quinta causa di emergenza ginecologica, con una prevalenza del 2.7%<sup>1, 17, 22-28</sup>. In confronto, la torsione isolata della tuba uterina è una condizione rara, con un'incidenza di 1/ 1.5 milioni<sup>14, 29-33</sup>. La torsione si realizza più frequentemente a destra a causa della maggior mobilità del cieco e dell'ileo rispetto al segmento colon-sigma controlaterale<sup>14, 18, 19, 29-31, 34</sup>. Anche una maggior lunghezza costituzionale del mesosalpinge e del legamento uteroovarico a destra, può contribuire ad un aumentato sviluppo di torsione in tale sede<sup>31</sup>.

## 2.3 EZIOPATOGENESI

La torsione di ovaie normali è un'evenienza che si osserva maggiormente nelle bambine e nelle adolescenti, dal momento che l'utero è relativamente piccolo e i legamenti uteroovarici sono sproporzionatamente lunghi<sup>19, 35</sup> (durante lo sviluppo

puberale i legamenti uteroovarici si accorciano<sup>13</sup>). Rispetto alle pazienti adulte, le pazienti pediatriche che hanno sviluppato torsione presentano ovaie normali fino al 25% dei casi<sup>24, 35</sup>. Si descrive una fisiologica lassità legamentosa nel corso dell'infanzia, che può contribuire allo sviluppo della torsione ovarica<sup>13</sup>. Possibili meccanismi che sono stati ipotizzati nel tentativo di spiegare lo sviluppo di torsione in assenza di patologie organiche sono: l'eccessiva mobilità degli annessi uterini (conseguente ad un'abnorme lunghezza della tuba uterina), la congestione venosa degli annessi nel corso dell'attività pre-menarcale, movimenti inconsueti del corpo durante esercizi fisici vigorosi o improvvisi cambi di posizione, un aumento della pressione intra-addominale e traumi<sup>30, 35</sup>. Quando non sono presenti patologie a carico della tuba, la torsione di questa è generalmente attribuita alla sua anomala mobilità che si realizza durante l'inizio della pubertà causata da un'elevazione dei livelli di FSH<sup>14</sup>.

La torsione degli annessi uterini nelle bambine e nelle adolescenti spesso può realizzarsi in presenza di patologie, quali cisti e tumori. Le più frequenti anomalie sono: teratomi, cisti follicolari o emorragiche, cisti paraovariche, cistadenomi, o idrosalpinge<sup>23, 24</sup>. Il rischio di torsione aumenta quando la massa è benigna (dal momento che le lesioni maligne sono spesso aderenti ai tessuti adiacenti) e quando le dimensioni di essa sono uguali o superiori ai 5 cm<sup>13</sup>. Anche l'ovulazione, l'iperstimolazione ovarica, la sindrome dell'ovaio policistico, l'endometriosi e le infezioni possono aumentare il rischio di torsione<sup>2, 13, 36, 37</sup>, così come l'agenesia, l'ipoplasia o i difetti di sviluppo delle strutture mulleriane<sup>30</sup>. La prevalenza di anomalie a carico dei dotti mulleriani nella popolazione generale è stimata essere approssimativamente del 3-7%<sup>30</sup>. Donne con agenesia mulleriana



non hanno un completo sviluppo dei dotti paramesonefrici e conseguentemente non hanno gli organi che da essi derivano: la cervice, l'utero, le tube uterine e i due terzi superiori della vagina. Quando le ovaie si sviluppano in assenza delle strutture sopracitate, perdono la loro relativa stabilità, dal momento che sono adese solo lateralmente alla parete pelvica dal legamento sospensore<sup>38</sup>. L'ovaio diviene perciò più mobile rispetto al normale e può ruotare intorno a questo legamento, determinando la compressione del drenaggio venoso e linfatico e risultando nel quadro clinico della torsione ovarica<sup>30,38</sup>.

## 2.4 ITER DIAGNOSTICO

La torsione degli annessi uterini è una patologia di difficile diagnosi, basata su sintomi e segni clinici integrati a tecniche di imaging, sebbene una diagnosi definitiva possa essere formulata solo mediante intervento chirurgico<sup>16,39</sup>. In molti casi la diagnosi è ritardata a causa dell'aspecificità dei dati clinici e strumentali<sup>13,19</sup>. Una diagnosi precoce e un intervento immediato sono fondamentali, specialmente nelle bambine e nelle adolescenti, per preservare la funzione ovarica<sup>26,40</sup>.

### **Presentazione clinica**

Il sintomo più comune nelle pazienti con torsione degli annessi uterini è il dolore addominale o pelvico acuto, solitamente riferito ad un solo emilato<sup>2</sup>. Questo dolore può essere descritto come non irradiato, costante o intermittente (sulla base della parzialità o totalità della torsione), di intensità variabile (da lieve a grave),

che può insorgere con un improvviso cambio di posizione del corpo o attività (strenuo esercizio fisico, sforzo o rapporto sessuale)<sup>2, 19, 20</sup>. La sua durata può essere variabile (da giorni a mesi) e può essere presente una storia anamnestica di dolore intermittente, indicante una pregressa torsione parziale: una durata superiore alle 10 ore prima dell'intervento chirurgico è associata ad aumentato riscontro di tessuto necrotico<sup>14</sup>. Il dolore è dovuto all'occlusione del peduncolo vascolare, con conseguente ipossia<sup>2</sup>. Può essere associato a nausea (70%), vomito (45%) che insorge come riflesso peritoneale, dolore al fianco, anoressia, sanguinamento vaginale, turbe funzionali a carico di intestino e vescica<sup>16, 19, 31</sup> (Tabella 1).

La torsione degli annessi uterini deve essere differenziata da altre cause di dolore addominale quali appendicite, calcolosi renale, linfadenite mesenterica, gastroenterite, rottura o emorragia del corpo luteo, malattia infiammatoria pelvica, leiomioma necrotizzante, gravidanza ectopica<sup>2, 13, 24, 41</sup>.

<b>SINTOMI</b>	
- dolore addominale o pelvico	- anoressia
- nausea	- sanguinamento vaginale
- vomito	- turbe funzionali a carico di intestino e vescica

Tabella 1: sintomi più comuni della torsione annessiale.

## **Esame obiettivo e dati di laboratorio**

I segni clinici sono spesso aspecifici: la temperatura corporea è normale o lievemente aumentata, così come la frequenza cardiaca e la pressione arteriosa se il dolore è intenso; tuttavia tali reperti si correlano maggiormente ad una tarda presentazione con evoluzione dell'ovaio in senso necrotico<sup>19, 22, 23</sup>. Ad oggi non esistono esami di laboratorio dirimenti per stabilire una diagnosi pre-operatoria di torsione, sebbene molti studi siano stati condotti. Un test di gravidanza dovrebbe essere sempre effettuato nei soggetti sessualmente maturi per escludere la presenza di gravidanza ectopica, così come un emocromo completo e un dosaggio degli elettroliti. Nella maggior parte dei casi, i valori di laboratorio sono normali, sebbene una modesta leucocitosi possa essere osservata in una percentuale di pazienti che va dal 27% al 50%<sup>2, 19</sup>. Occasionalmente può essere descritta una piuria sterile<sup>23</sup>. Elevati livelli di marcatori tumorali come CA125 e AFP possono essere correlati con la torsione degli annessi, dal momento che gli stessi tornano a livelli normali dopo rimozione della patologia ovarica sottostante<sup>25, 42</sup>. Innumerevoli marcatori sierici sono stati studiati per determinare se questi possano avere un qualche ruolo nel formulare una diagnosi preoperatoria di torsione:

- Daponte et al<sup>43</sup> hanno valutato il ruolo dell'interleuchina-6 in pazienti con dolore addominale dimostrando che i suoi livelli sono significativamente aumentati nelle pazienti con torsione ovarica;

- Incebyc et al<sup>44</sup> hanno valutato il ruolo dei livelli di D-Dimero plasmatico in donne con torsione degli annessi, concludendo che elevati livelli sono suggestivi per la diagnosi;
- Bakacak et al<sup>45</sup> hanno dimostrato attraverso uno studio sperimentale che elevati livelli di proteina C reattiva potrebbero essere considerati come un marker plasmatico per la diagnosi precoce di torsione;
- Suh et al<sup>46</sup> e Yildiz et al<sup>25</sup> ipotizzano che elevati livelli di CA-125 potrebbero aumentare la probabilità di riconoscimento di torsione ovarica ed essere utilizzati come predittori di fenomeni necrotici in presenza di lesione neoplastica.
- Guven et al<sup>47</sup> hanno analizzato i livelli di IMA (ischemia-modified albumin) risultando significativi per la diagnosi di torsione.

Il ruolo di questi marcatori nella popolazione pediatrica è a tutt'oggi ignoto poiché la maggior parte degli studi sono stati condotti su popolazione adulta, tuttavia la loro valutazione potrebbe essere interessante per speculazioni future.

## **Imaging**

La diagnosi pre-operatoria non è resa difficoltosa solo dalla presentazione clinica aspecifica, ma anche dal fatto che alle metodiche di imaging non possano essere descritti reperti distintivi specifici per identificare la torsione annessiale<sup>29, 32</sup>. Poiché le caratteristiche cliniche della torsione annessiale possono simulare altre cause di addome acuto, la diagnosi strumentale dovrebbe essere fatta sulla base dell'ultrasonografia (US), tomografia computerizzata (TC), risonanza magnetica

(RM) tenendo conto di fattori quali la presentazione clinica della paziente, l'esperienza dell'operatore e opportuni schemi di riferimento<sup>48</sup>.

- US



Immagine 1: Ecografia addomino-pelvica in bambina di 9 anni che documenta tumefazione annessiale retro-uterina; parete irregolare; porzione liquida centrale con significato emorragico, versamento del Douglas e in fossa iliaca destra; utero dislocato anteriormente.

L'ecografia pelvica (Immagine 1) è la metodica di imaging più comunemente utilizzata per la diagnosi di torsione annessiale<sup>2, 13, 40</sup>. I benefici dell'ultrasonografia sono: il basso costo, l'assenza di radiazioni ionizzanti e la facile accessibilità. L'ecografia transvaginale sarebbe la tecnica più sensibile e specifica per la torsione, ma è inappropriata nella maggior parte delle pazienti nella popolazione pediatrica. Di fatto, lo studio di imaging maggiormente accurato e indicato per le bambine che riferiscono dolore addominale è l'ecografia addominale integrata alla tecnica color-Doppler<sup>49</sup>. Il reperto più frequentemente documentato in corso di torsione annessiale è l'ingrandimento asimmetrico dell'ovaio interessato<sup>2, 13, 16, 24</sup>. Questo può localizzarsi superiormente e medialmente rispetto alla sua consueta posizione<sup>2, 39</sup>. Altri reperti comuni sono la

presenza di liquido libero in cavità pelvica, l'aspetto edematoso ed eterogeneo dell'ovaio, la deviazione dell'utero verso il lato in cui è avvenuta la torsione e la presenza di follicoli periferici uniformi, dal momento che essi vengono spinti alla periferia dall'edema dello stroma ovarico<sup>22</sup>. Infatti la torsione degli annessi uterini comporta l'ostruzione dell'outflow venoso con rigonfiamento, edema e conseguente anomalia o assenza del flusso arterioso. Dal momento che il flusso arterioso viene interrotto, si realizzano l'emorragia e l'infarcimento dell'ovaio; difatti questo può apparire circondato da un alone anecogeno<sup>2, 13</sup>.

La tuba andata incontro a torsione può apparire dilatata, edematosa, e ricolma di liquido in presenza di idrosalpinge o di cisti paratubale. Può essere anche descritto il cosiddetto beak sign (segno "a becco di uccello"), riferito all'assottigliamento delle terminazioni della tuba ovarica<sup>29</sup>. La torsione del peduncolo vascolare può produrre uno specifico reperto, non sempre individuabile, definito come "whirlpool sign" ("segno a mulinello")<sup>15, 16, 39</sup>. Oltre che come segno di whirlpool, questo reperto è anche conosciuto come segno "ad occhio di bue" o "a guscio di chiocciola": con tale terminologia si identifica una struttura circolare iperecogena contenente all'interno molteplici anelli di larga misura con aspetto ipoecogeno. Gli anelli ipoecogeni corrispondono alle componenti del peduncolo ovarico, ovverosia il legamento largo, la tuba uterina e i vasi sanguigni<sup>39</sup>.

Questo segno può essere prodotto muovendo la sonda ecografica avanti e indietro lungo l'asse principale del peduncolo ovarico. Il segno di whirlpool può essere osservato in diverse posizioni: tra l'ovaio e la parete laterale della cavità pelvica o compreso tra l'ovaio e l'utero. Navve et al<sup>39</sup> descrivono l'importanza di identificare la sede laterale o mediale del segno di whirlpool nella valutazione

clinica in quanto la localizzazione laterale è associata alla presenza di masse ovariche di dimensioni maggiori rispetto a quelle localizzate in sede mediale. In caso di torsione isolata della tuba uterina, l'ovaio può presentarsi di dimensioni normali e la tuba dilatata associata al segno di whirlpool in caso di idrosalpinge, possono essere gli unici reperti descritti<sup>3, 50</sup>.

L'aggiunta dell'analisi color-Doppler è utile per migliorare la descrizione del quadro anatomico. L'assenza di flusso vascolare è altamente sospetta per la diagnosi di torsione tuttavia non sempre si realizza: ci sono casi di torsione che non determinano una completa ostruzione del flusso, e ciò significa che ci può essere una conservazione della circolazione venosa ed arteriosa<sup>2, 13</sup>. All'osservazione color-Doppler, il mantenimento di un flusso normale in casi di torsione conclamata, può essere dovuto ad una duplice irrorazione arteriosa dell'ovaio (quindi alla presenza di circoli collaterali che suppliscono alla carenza di sangue) o ad un meccanismo di torsione parziale o intermittente. Per tali motivi, la presenza di flusso sanguigno non è dirimente per escludere la diagnosi di torsione, specie se altamente sospetta<sup>2</sup>. La metodica color-Doppler mostra maggiori anomalie di flusso in soggetti di età premenarcale e postmenopausale: ciò può essere dovuto all'incremento delle necessità metaboliche degli annessi uterini nel corso della maturazione sessuale ed, in particolare modo, in corso di ovulazione. Sebbene le anomalie all'analisi color-Doppler possano non sempre essere osservate, quando presenti, riducono notevolmente il tempo di diagnosi<sup>2, 13</sup>. Naiditch et al<sup>49</sup> ipotizzano pertanto che questa metodica abbia un elevato valore predittivo negativo e questo può essere molto utile per escludere o meno la diagnosi di torsione degli annessi nelle pazienti in età pediatrica che si presentano con dolore addominale acuto. Comunque, un' ultrasonografia associata a color-

Doppler interpretata come positiva per la torsione o che non può escludere tale patologia, deve essere considerata contestualmente al quadro clinico di ogni paziente, non escludendo l'esecuzione di una esplorazione laparoscopica quando la situazione non è del tutto chiara. L'analisi eco-color-Doppler non dovrebbe essere considerata come unica metodica per l'indicazione chirurgica, dal momento che non fornisce risultati certi. King et al<sup>51</sup> hanno proposto uno score per valutare la probabilità che un certo quadro clinico-diagnostico corrisponda alla condizione di torsione ovarica nella popolazione pediatrica. Il sistema di score comprende:

- il calcolo del rapporto ecografico tra l'ovaio patologico e l'ovaio sano;
- il calcolo del volume assoluto dell'ovaio affetto;
- la valutazione di sintomi quali presenza di nausea e durata del dolore.

Gli autori hanno calcolato la sensibilità e la specificità teorica di questo score nella popolazione pediatrica e hanno determinato un punteggio soglia per stabilire la necessità di effettuare l'esplorazione chirurgica. L'utilità pratica di questo modello deve ancora trovare riscontro nella realtà clinica<sup>27, 52</sup>. Una meta-analisi condotta da Bronstein et al<sup>27</sup> dimostra come l'ultrasonografia bimodale integrata a criteri morfologici sia specifica e sensibile per la diagnosi di torsione annessiale in pazienti con età inferiore ai 18 anni, e questi dati sono confermati da Rostamzadeh et al<sup>53</sup>, che considerano la valutazione ecografica dotata di una sensibilità del 72.1%, una specificità del 99.6% e un'accuratezza del 96%. L'analisi eco-color-Doppler è piuttosto specifica ma poco sensibile per la diagnosi di torsione<sup>27</sup>.



- **TC**

L'ingrandimento asimmetrico dell'ovaio conseguente alla presenza di una massa ovarica è il reperto più frequente che si riscontra alla tomografia computerizzata, ma non è specifico dal momento che può essere descritto in altre condizioni patologiche quali cisti emorragiche, endometriosi, cisti ovariche, ascessi tubo-ovarici e neoplasie<sup>13</sup>. Altri reperti che possono essere descritti sono: multipli follicoli periferici contestuali all'ovaio ingrandito, una riduzione della captazione di mezzo di contrasto da parte delle strutture interessate dalla torsione, torsione del peduncolo vascolare, presenza di liquido libero in cavità pelvica, flogosi dell'adipe adiacente l'ovaio interessato, deviazione dell'utero verso il lato della torsione<sup>15, 48</sup>. La tuba uterina andata incontro a torsione appare dilatata. Swenson et al<sup>54</sup> hanno dimostrato che la sensibilità e la specificità della tomografia computerizzata non si sono dimostrate essere significativamente diverse da quelle riscontrate per l'ultrasonografia nella diagnosi di torsione<sup>27</sup>.

- **RM**

La risonanza magnetica non è comunemente impiegata come primo studio di imaging in caso di sospetta torsione annessiale, ma può essere di estremo aiuto in condizioni quali la gravidanza (in presenza di reperto ecografico dubbio) o come metodica di risoluzione in casi misconosciuti. La risonanza magnetica offre un miglior contrasto tra i tessuti molli<sup>2, 16</sup>. I reperti che possono essere descritti sono simili a quelli ottenuti mediante metodica ultrasonografica e tomografica: ingrandimento asimmetrico dell'ovaio con stroma stromale (specialmente nelle

sequenze T2), torsione del peduncolo vascolare, emorragia, e liquido libero in cavità pelvica<sup>13, 15</sup>. Differenze notevoli possono essere evidenziate a seconda che la risonanza magnetica sia effettuata con immagini pesate in T1 o T2. Kato et al<sup>55</sup> hanno valutato il ruolo della risonanza magnetica per il riconoscimento dell'infarcimento emorragico che può realizzarsi a carico dell'ovaio dopo torsione: nonostante non esista una reale differenza di intensità di segnale tra le immagini pesate in T1 e in T2 nelle pazienti con o senza segni di infarcimento, il coefficiente di diffusione apparente (ADCs) è risultato essere significativamente più basso nelle pazienti con emorragia rispetto quelle senza. Il calcolo di questo parametro può quindi essere molto utile per stabilire la presenza o meno di questa complicanza.

I principali reperti evidenziati alla US, TC e RM vengono elencati in Tabella 2.

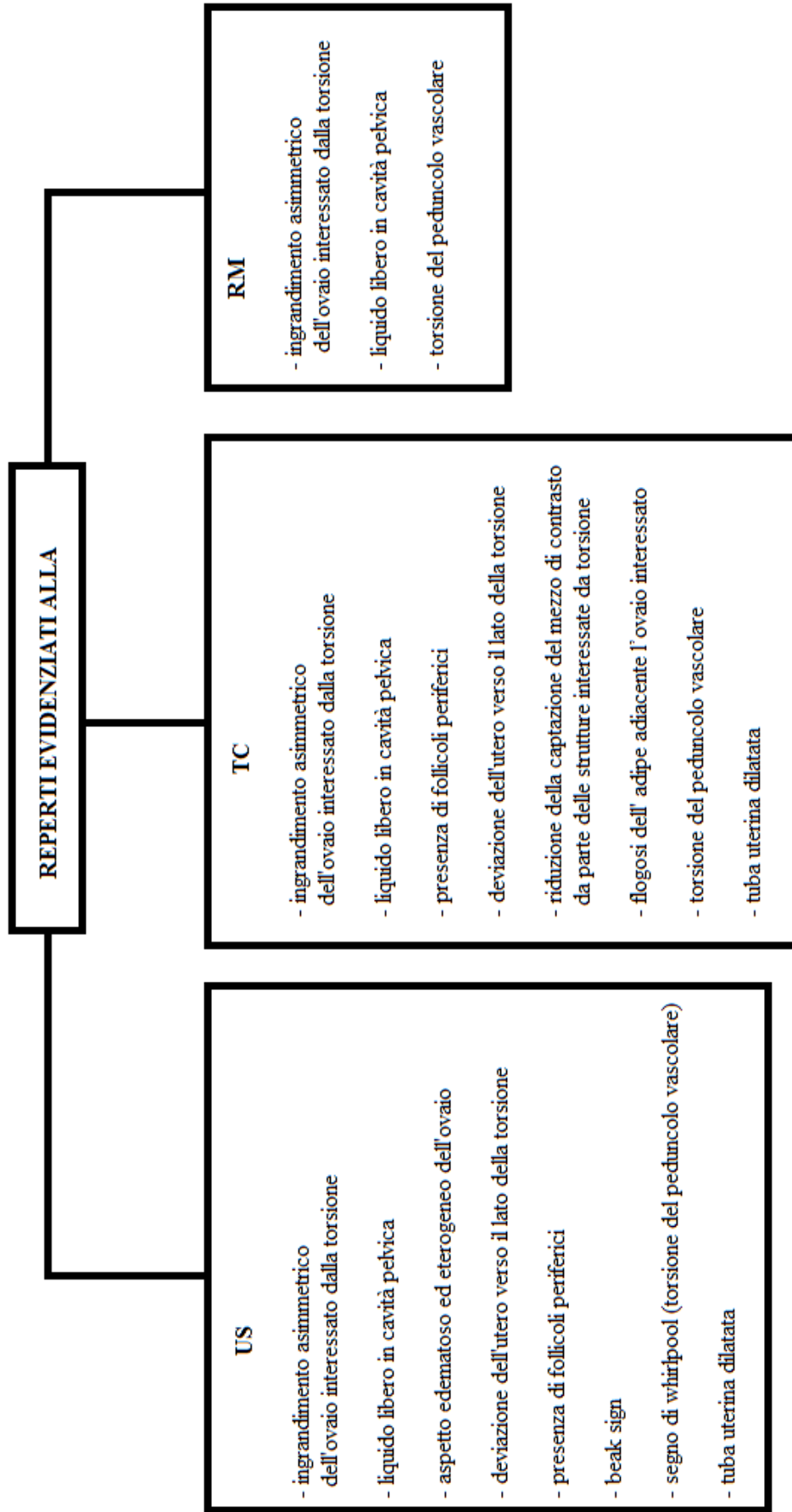


Tabella 2: reperti più comunemente evidenziati in corso di torsione annessiale attraverso le metodiche US, TC e RM.

## CAPITOLO III

### TRATTAMENTO CHIRURGICO

Il miglior modo di gestire la torsione annessiale è il suo riconoscimento precoce ed il trattamento tempestivo<sup>24, 25, 40</sup>. Sebbene i reperti clinici e strumentali possano suggerire la diagnosi di torsione degli annessi uterini, questa viene definitivamente formulata attraverso l'esplorazione chirurgica<sup>32</sup>. La via laparoscopica è considerata il migliore approccio diagnostico-terapeutico, dal momento che consente di intervenire sulla condizione in atto senza necessità di cambiare l'accesso in caso di bisogno<sup>26, 34, 56-58</sup>. La laparoscopia è superiore alla laparotomia per le incisioni di minori dimensioni che richiede, il ridotto dolore post-operatorio, i minori tempi di ospedalizzazione, i minori rischi di complicanza (formazioni di aderenze) e i migliori risultati estetici<sup>26, 59</sup>. E' importante stabilire un corretto posizionamento degli accessi laparoscopici. Takeda et al<sup>56</sup> hanno valutato il ruolo della laparoscopia con tecnica LESS (Laparo-endoscopic single site surgery) nella popolazione pediatrica. Questa tecnica prevede che venga effettuata una sola incisione ombelicale di circa 1,5 cm attraverso la quale è possibile l'introduzione di una porta (trocar) con l'inserimento di ottica, pinza bipolare e forbice. Tale approccio è stato dimostrato essere una valida alternativa all'accesso multiport, come confermato dallo studio condotto da Linz et al<sup>57</sup>.

### 3.1 Trattamento conservativo e radicale

Il trattamento della torsione ovarica può essere di natura conservativa o radicale: l'approccio conservativo prevede la semplice detorsione dell'ovaio eventualmente associata a cistectomia o tumorectomia; il trattamento radicale coincide con l'ooforectomia, ovverosia la completa asportazione dell'ovaio.

La selezione dei pazienti che dovrebbero essere trattate con detorsione o ooforectomia non è sempre immediata<sup>60</sup>. L'età, la capacità riproduttiva futura, lo stato ormonale, e l'evidenza di patologie ovariche sono tutti fattori che dovrebbero essere considerati nella gestione della scelta terapeutica<sup>2</sup>.

Ad oggi il trattamento conservativo è considerato la migliore procedura chirurgica da attuare in caso di torsione per il mantenimento della funzione ovarica<sup>19, 24, 25, 28, 35, 40, 58, 61-65</sup>.

In passato, gli argomenti a favore della ooforectomia erano:

- 1) il rischio di non identificare una eventuale lesione maligna sottostante;
- 2) il rischio di fenomeni tromboembolici dopo la semplice detorsione;
- 3) la convinzione che l'aspetto altamente alterato del tessuto interessato da torsione corrispondesse necessariamente ad un danno funzionale irreversibile dello stesso<sup>23, 28, 61, 62</sup>.

Evidenze scientifiche dimostrano come ad oggi le lesioni maligne a carico dell'età pediatrica in ambito ginecologico siano estremamente rare; per questo, la probabilità di lasciare in sede cellule cancerogene è minima. In più, nel caso si verificasse tale evenienza, la precoce invasione dei tessuti adiacenti

comporterebbe la formazione di aderenze pelviche, con conseguente riduzione della probabilità di sviluppo della torsione stessa<sup>24, 25</sup>. In passato, il rischio di liberazione di emboli vascolari originati dalla manovra di detorsione costituiva un deterrente tale da favorire su tutti i trattamenti la rimozione completa degli annessi interessati. Tale strategia si è dimostrata inadeguata, dal momento che l'incidenza di embolia polmonare in casi di torsione è dello 0.2%<sup>24, 28</sup>. La presenza di edema, flogosi, congestione ed ischemia determina un ingrandimento delle dimensioni dell'ovaio e l'assunzione di un aspetto definito "black-bluish" (Immagine 2). Questo aspetto, spesso fuorviante, può rendere difficoltosa la scelta terapeutica, comportando un maggior inopportuno utilizzo dell'ooforectomia<sup>66</sup>.



Immagine 2: aspetto black-bluish di ovaio destro "normale" dopo detorsione del peduncolo in bambina di 9 anni<sup>9</sup>

Generalmente l'approccio chirurgico viene stabilito sulla base dell'insorgenza del dolore, dall'aspetto macroscopico dell'ovaio al momento dell'esplorazione, dalla sua consistenza, e dai cambiamenti visivi del tessuto interessato a seguito della detorsione; questi accorgimenti tuttavia non sono dirimenti<sup>35, 60, 66</sup>. E' stato dimostrato che un ovaio con aspetto black-bluish, che non cambia il suo colore

durante la manovra di detorsione, non sia necessariamente necrotico e che un suo recupero funzionale possa sempre verificarsi<sup>2, 28, 66</sup>. La maggior parte delle ovaie dimostra infatti l'osservazione eco-color-Doppler un normale sviluppo follicolare dopo sole sei settimane dall'intervento<sup>23</sup>.

In considerazione di ciò, sarebbe utile effettuare una biopsia intraoperatoria in casi selezionati, per accertarsi che la circolazione sanguigna del tessuto ovarico sia preservata e per escludere la presenza di necrosi, che rappresenta il principale carattere istologico evidenziato<sup>61, 66, 67</sup>. Questa osservazione consentirebbe di stabilire in modo ottimale l'approccio definitivo da assumere in corso di trattamento chirurgico: se l'ovaio è ischemico ma non necrotico, un approccio conservativo, consistente nella detorsione manuale diviene più adeguato; se l'ovaio è necrotico, la sua rimozione diviene appropriata attraverso un approccio radicale. In caso di lesioni benigne o cistiche, può essere effettuata la detorsione manuale associata ad una sincrona tumorectomia o cistectomia; se ciò non risulta essere attuabile a causa dell'edema stromale e delle anomali strutturali dell'ovaio, è auspicabile un atteggiamento di sorveglianza al fine di osservare l'evoluzione della lesione ed eventualmente praticare un secondo intervento a distanza, evitando comunque l'ooforectomia<sup>2, 23, 24, 56, 62, 66</sup>. Quando una sospetta lesione maligna è confermata essere tale alla biopsia, è richiesta l'ooforectomia<sup>24, 25</sup>. Al trattamento conservativo segue sempre un periodo di follow-up a 6 mesi (mediante controllo clinico ed ecografico) che può evidenziare due possibili quadri evolutivi: il tessuto ovarico può riprendere la propria attività funzionale, confermando quanto il trattamento conservativo sia stato risolutivo; o lo stesso può andare incontro ad atrofia, rendendo perciò necessario un trattamento di tipo radicale<sup>61, 66</sup>.

La possibilità di recupero dell'ovaio, anche a distanza di tempo, rende ragione di come l'approccio conservativo sia comunque auspicabile -eccetto per i casi mandatori di ooforectomia- in quanto lascia margine di manovra e non costituisce un "punto di non ritorno" per la capacità riproduttiva ed ormonale della donna come quello radicale. La Tabella 3 mostra i diversi approcci chirurgici che possono essere intrapresi in presenza di torsione ovarica.

Analogamente all'ovaio, anche il salvataggio della tuba uterina andata incontro a torsione è raccomandato. Sebbene la torsione isolata della tuba uterina rappresenti una rara entità patologica, quando si verifica, un parziale salvataggio della tuba e una neosalpingostomia attraverso una procedura a due step può essere raccomandata. Ad oggi, le conseguenze di questo intervento non sono conosciute<sup>68</sup>.



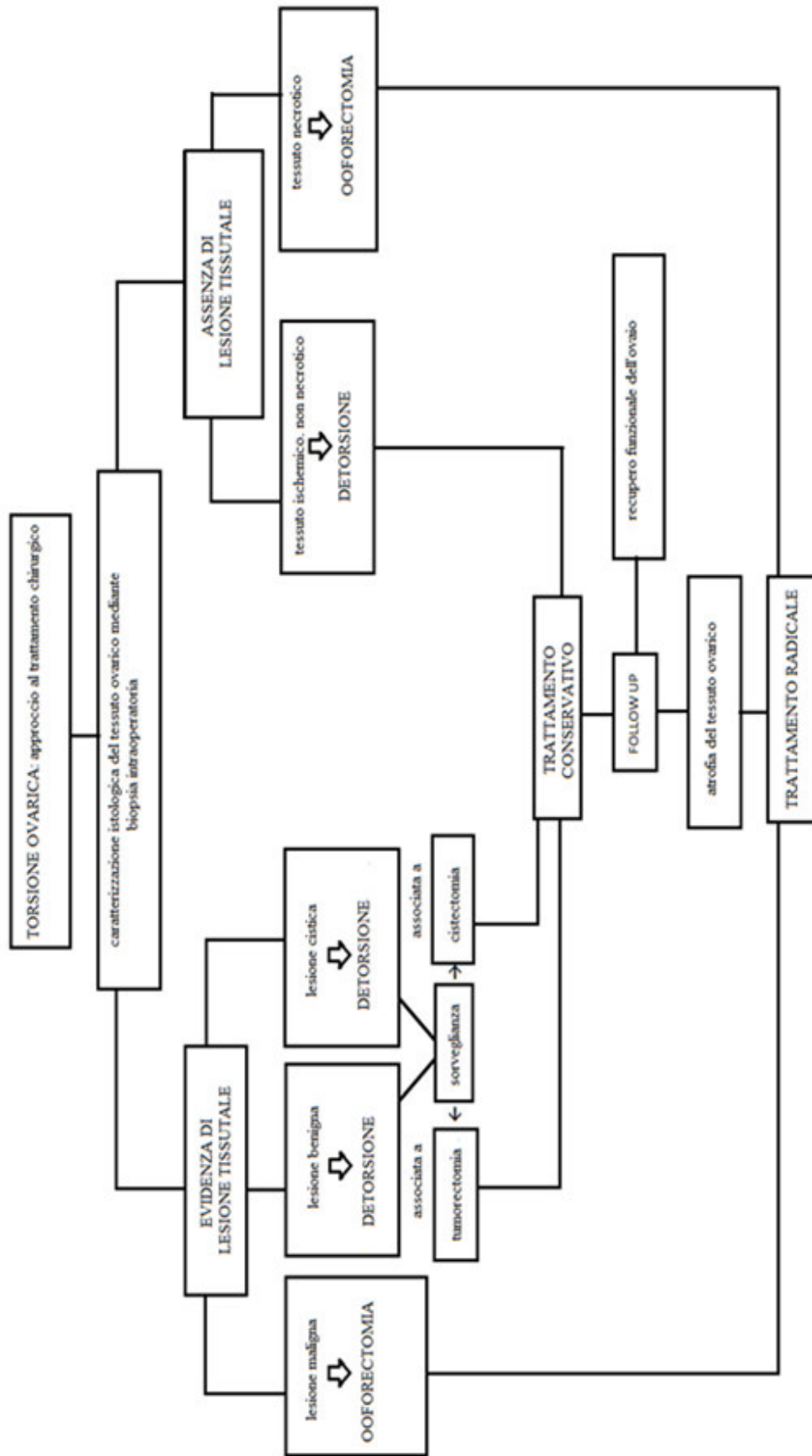


Tabella 3: opzioni chirurgiche per il trattamento della torsione ovarica.

## 3.2 Ooforopessi

Contestualmente al trattamento della torsione ovarica, può essere effettuato l'intervento di ooforopessi. Questa tecnica chirurgica è finalizzata a limitare la mobilità dell'ovaio<sup>19, 26, 35</sup>. Tale intervento può essere utile in casi di torsione di ovaie normali, torsioni ricorrenti, quando un'ooforectomia controlaterale è stata precedentemente praticata, quando è presente un ovaio anatomicamente vulnerabile, ma ancora per prevenire il rischio di torsione sincrona/asincrona dell'ovaio non primitivamente interessato da torsione<sup>1, 26, 35, 63, 69</sup>. Né la tecnica, né il tempo, né la sede di fissazione dell'ovaio sono uniformi nella letteratura. Non esiste un'opinione condivisa sulla tempistica entro cui il fissaggio dovrebbe essere effettuato per evitare la ri-torsione; se nella situazione in acuto o in un secondo tempo come procedura in elezione. Evidenze scientifiche suggeriscono che probabilmente sarebbe più semplice effettuare l'ooforopessi in elezione, quando il tessuto è meno edematoso<sup>63</sup>. La tecnica chirurgica dovrebbe essere individualizzata<sup>1</sup>.

Il ruolo dell'ooforopessi è perciò controverso: Kurtoglu et al<sup>35</sup> affermano che questa dovrebbe essere considerata al tempo della prima torsione, per prevenire la torsione dell'ovaio rimanente (in caso di tumorectomia o cistectomia) e dell'ovaio controlaterale -e quindi prevenire il sopraggiungere di una torsione bilaterale- .

La torsione ovarica bilaterale asincrona è un'entità molto rara nell'età pediatrica, ma, dal momento in cui una bambina perde un ovaio deve essere considerato attentamente il rischio di torsione asincrona dell'ovaio controlaterale, in quanto ciò potrebbe avere sequele catastrofiche, quali la castrazione chirurgica. Gli autori raccomandano pertanto di praticare un'ooforopessi sia dell'ovaio primitivamente

interessato, sia di quello controlaterale per prevenire il ricorrere della patologia. Sheizaf et al<sup>26</sup> suggeriscono che anche in presenza di rischio elevato, la prima gestione della torsione ovarica non dovrebbe includere l'ooforopessi, una tecnica non del tutto scevra da complicanze che non necessariamente previene il rischio di recidiva.

Innumerevoli tecniche chirurgiche sono state descritte per la fissazione dell'ovaio: questo può essere suturato alla parete posteriore dell'utero, al legamento rotondo, alla fossetta ovarica, a lato o dietro la parete pelvica, ma più comunemente tra l'uretere e i vasi iliaci<sup>63</sup>. Le conseguenze dell'ooforopessi non sono ancora state valutate, ma alcuni autori ipotizzano che si possa verificare una riduzione della fertilità a causa di un difetto di continuità strutturale e funzionale che si viene ad instaurare tra l'ovaio e la tuba uterina<sup>1, 63</sup>. Per questi motivi, alcuni chirurghi hanno sviluppato tecniche di fissaggio alternative. In alcuni casi, può essere auspicato l'accorciamento del legamento uteroovarico mediante applicazione di un laccio (endloop); questa metodica si è dimostrata essere particolarmente utile in quelle situazioni anatomiche caratterizzate da un'eccessiva lunghezza dei legamenti, lunghezza che potrebbe predisporre a rischio di torsione. In questa tecnica, deve essere posta particolare attenzione al decorso dell'arteria uterina, dal momento che i suoi vasi collaterali possono decorrere all'interno del legamento ed essere quindi lesionati nel corso della procedura. Solitamente sono utilizzati fili di sutura riassorbibili, ma per prevenire a lungo termine il rischio di recidiva, alcuni autori raccomandano l'uso di fili permanenti<sup>63</sup>. Blitz et al<sup>31</sup>, Sheizaf et al<sup>26</sup>, Simsek et al<sup>1</sup> descrivono casi in cui l'ooforopessi è stata inefficace nel prevenire la recidiva di torsione.

### 3.3 Esame istologico

I caratteri istologici della torsione annessiale nella popolazione pediatrica sono scarsamente definiti in letteratura. Mneimneh et al<sup>67</sup> hanno descritto lo spettro di caratteristiche istopatologiche della torsione ovarica attraverso lo studio di campioni ottenuti durante gli interventi chirurgici di neonate, bambine ed adolescenti, evidenziando le differenze tra questi gruppi. La torsione ovarica nelle neonate e nelle bambine produce reperti specifici come la presenza di granulomi necrotizzanti disposti a palizzata, calcificazioni distrofiche, esiti fibrotici e depositi di emosiderina; reperti assenti nelle pazienti di età superiore. Le calcificazioni sono probabilmente legate ad una torsione di lunga durata, evenienza di più facile riscontro nella popolazione neonatale rispetto a quella adolescenziale. In quest'ultima popolazione l'aspetto istopatologico più comune è il quadro di necrosi emorragica acuta, simile a quello osservabile nella popolazione adulta.

### 3.4 Effetti della riperfusione dopo detorsione chirurgica: studi sperimentali

La torsione degli annessi uterini produce danno ischemico<sup>70</sup>. Il trattamento per eccellenza mira al ripristino del flusso sanguigno e della perfusione tissutale attraverso la detorsione. Durante la riperfusione, il danno tissutale che può insorgere può essere anche più grave di quello verificatosi in corso di ischemia a causa dei radicali liberi dell'ossigeno (ROS) tra cui perossido di idrogeno, (H<sub>2</sub>O<sub>2</sub>),

idrossile (-OH) e ossido nitrico (NO) che si accumulano dopo la detorsione<sup>71</sup>. Questo processo è conosciuto come “danno da ischemia/ riperfusione” (I/R injury) e può determinare un’importante compromissione tissutale sia a livello locale che sistemico<sup>72</sup>. Innumerevoli studi sono stati condotti al fine di dimostrare se l’impiego di determinate sostanze possa prevenire l’insorgenza di questo tipo di danno<sup>70</sup>. Premesso che la detorsione può provocare questo tipo di insulto e che da sola può non essere sufficiente a preservare la riserva ovarica, dal momento che il numero di follicoli si riduce (Ozler et al<sup>73</sup>), innumerevoli sostanze, tra cui farmaci anti-infiammatori e antiossidanti, sono state valutate allo scopo di determinare se esse possano svolgere una qualche attività di protezione nei confronti del tessuto ovarico. Questi studi, ad oggi totalmente sperimentali, sono stati condotti su ovaie di topo mediante somministrazione di diversi farmaci tra cui: erdoestina, acido lipoico<sup>72</sup>, sildenafil<sup>74</sup>, colchicina<sup>75</sup>, etil-piruvato<sup>70</sup>, omegaven<sup>76</sup>, hesperetina<sup>77</sup>, quercetina<sup>78</sup>, 2-aminoetossidifenilborato<sup>79</sup>, ossitocina<sup>80</sup>, infliximab<sup>52</sup>, curcumina<sup>81</sup>, vitamina E<sup>82</sup>, zofenopril<sup>83</sup>, eterocoxib<sup>84</sup>, atorvastatina<sup>85</sup>, enoxaparina<sup>21</sup>. Tutte queste sostanze hanno determinato effetti benefici sul tessuto ovarico, riducendo o prevenendo il danno ossidativo originato dalla riperfusione. E’ stato dimostrato che anche la semplice detorsione effettuata in maniera graduale possa ridurre il rischio di danno da ischemia/ riperfusione<sup>71</sup>. In contrasto a tali valutazioni, Yucel et al<sup>86</sup>, Calis et al<sup>87</sup>, Bozdag et al<sup>60</sup> affermano che la riserva follicolare non è ridotta a seguito della detorsione e che essa non sia influenzata dalla durata e dall’intensità del danno a carico dell’ovaio.

## CAPITOLO IV

### OUTCOME

Gli effetti a lungo termine dell'approccio radicale e conservativo sulla fertilità futura rimangono ad oggi misconosciuti<sup>88</sup>. Studi condotti su soggetti adulti suggeriscono un'associazione esistente tra il tipo di chirurgia applicata all'ovaio e la conseguente capacità riproduttiva: tale relazione è stata analizzata e valutata sulla base del raggiungimento dello stato di gravidanza. Poiché il riscontro di tale evenienza trova difficile applicazione nella popolazione pediatrica, Zhai et al<sup>88</sup> hanno proposto uno studio in cui viene indagata la regolarità dei cicli mestruali in soggetti che sono stati sottoposti a terapia chirurgica a carico dell'ovaio (assunto che tale tipo di asserzione possa essere considerata un appropriato surrogato per la valutazione dello stato funzione dell'ovaio). Le bambine che sono state sottoposte ad un trattamento di tipo conservativo, confrontate con quelle che sono state sottoposte ad ooforectomia unilaterale, hanno dimostrato un notevole incremento di irregolarità a carico del ciclo mestruale associato alla comparsa di dismenorrea. Cicli mestruali irregolari e dismenorrea secondaria sono verosimilmente associati ad una fertilità ridotta e ad una funzionalità ovarica compromessa. Nessuna differenza è stata documentata tra i due gruppi a confronto per quanto riguarda il tempo di comparsa del menarca e lo stato ormonale. La conclusione di questo studio è che la perdita di un singolo ovaio non sembra influire significativamente sulla funzione gonadica, come si evince dagli effetti sul ciclo mestruale e conseguentemente sulla fertilità. Nonostante i risultati e le considerazioni emerse da questo studio gettino nuova luce sull'outcome delle pazienti sottoposte a

intervento chirurgico per torsione annessiale, gli autori raccomandano comunque un approccio conservativo laddove possibile.

Questa interpretazione è parzialmente condivisa da Bellati et al<sup>89</sup> i quali ipotizzano che l'asportazione di un singolo ovaio non peggiori significativamente la capacità riproduttiva futura delle pazienti rispetto ad quelle che hanno subito procedure chirurgiche a livello addominale o pelvico. D'altra parte, persiste l'idea che la resezione unilaterale dell'ovaio interessato da torsione, cioè il trattamento radicale, possa comportare una riduzione del potenziale riproduttivo futuro<sup>28</sup>. Molti studi affermano che la chirurgia laparoscopica conservativa rappresenti il miglior approccio terapeutico volto a preservare la funzione ovarica, ad assicurare il raggiungimento di un normale stato puberale e a massimizzare il potenziale riproduttivo futuro delle bambine che hanno presentato torsione degli annessi uterini<sup>23-25, 28, 35, 62-65</sup>.

# CAPITOLO V

## STUDIO

### 5.1 Scopo dello studio

Scopo dello studio qui proposto è documentare - sia attraverso la revisione della letteratura, sia attraverso la valutazione di una casistica chirurgica- come nel corso degli ultimi anni la gestione terapeutica della torsione annessiale si stia sempre maggiormente identificando in un tipo di trattamento il più conservativo possibile, a scapito di un approccio radicale, riservato solo a condizioni specifiche e non altrimenti trattabili, al fine di preservare la funzione ovarica e la capacità riproduttiva futura delle bambine affette da queste patologia.

### 5.2 Materiali e metodi

Vengono considerati in questa sede, i casi pediatrici di torsione ovarica trattati tra il 2001 e il 2015 al Dipartimento di Chirurgia Pediatrica dell'Università di Pisa e dell'Ospedale Meyer, Università di Firenze. Ogni paziente è stata valutata in modo completo da un punto di vista anamnestico, clinico e diagnostico. Le procedure chirurgiche sono state condotte seguendo un approccio di tipo radicale o di tipo conservativo, a seconda della patologia riscontrata. Tutte le bambine sottoposte a chirurgia conservativa sono rientrate nel programma di follow-up.



Lo studio si basa poi su un'accurata revisione della recente letteratura (2013-2015) ottenuta attraverso i motori di ricerca Pub-Med e Ovid all'inserimento di key-words quali adnexal torsion, ovarian torsion, tubal torsion, children, adolescent, per un totale di 80 articoli individuati -vedi appendice- di cui 13 selezionati in questo contesto per le loro asserzioni in ambito del trattamento.

### 5.3 Risultati

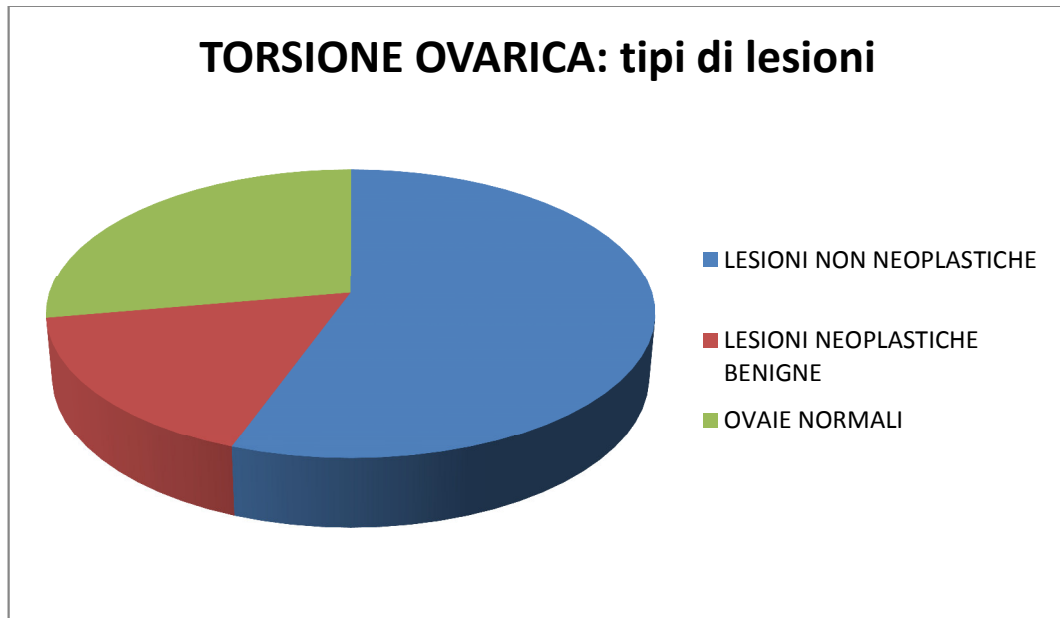
Nell'arco di 15 anni sono stati eseguiti 36 interventi chirurgici per torsione ovarica, su un totale di 156 bambine trattate per patologia ovarica (Tabella 4). Ciò significa che la torsione si è verificata nel 23.1% dei casi totali di patologia ovarica. L'età delle pazienti alla presentazione era compresa tra i 2 mesi e i 18 anni. L'età media è stata di 12.2 anni e il picco di frequenza è stato nell'intervallo tra i 9 e i 13 anni. Il sintomo maggiormente descritto alla presentazione clinica è stato il dolore addominale. Il trattamento chirurgico è stato effettuato mediamente dopo 12 ore dall'inizio della presentazione clinica.

ISTOLOGIA	TOT MASSE	NO TORSIONE	TORSIONE
<b>Lesioni non neoplastiche</b>	78 (50%)	58 (48.3%)	20 (55.5%)
<i>Cisti follicolari</i>	43	35	8
<i>Cisti emorragiche</i>	35	22	12
<b>Lesioni benigne</b>	63 (40.4%)	57 (47.5%)	6 (16.7%)
<i>Teratoma maturo cistico</i>	37	32	5
<i>Cistoadenoma sieroso</i>	10	9	1
<i>Cistoadenoma mucinoso</i>	8	8	
<i>Fibroma</i>	5	5	
<i>Cistoadenofibroma mucoso</i>	2	2	
<b>Lesioni maligne</b>	5 (3.2%)	5 (4.2%)	0
<i>Tumore sacco vitellino</i>	2	2	
<i>Fibrosarcoma</i>	2	2	
<i>Poliembrioma</i>	1	1	
<b>Ovaie normali</b>	10 (6.4%)		10 (27.8%)
<b>TOT</b>	<b>156</b>	<b>120</b>	<b>36</b>

-Tabella 4: descrizione del tipo di lesione responsabile di patologia ovarica: valutazione dello sviluppo di torsione-

Si sono osservati 36 casi di torsione ovarica di cui 20 (55.5%) da attribuire a lesioni non neoplastiche, 6 a lesioni neoplastiche benigne (16.7%), 0 a lesioni neoplastiche maligne (0%) e 10 a ovaie normali (27.8%) (Tabella 4 e Grafico 1). A rigor di termini, si specifica che nell'ambito delle lesioni non neoplastiche sono comprese le cisti follicolari e le cisti emorragiche; nell'ambito delle lesioni neoplastiche benigne teratomi maturi, cistadenomi, fibromi e cistoadenofibromi;

nell'ambito delle lesioni neoplastiche maligne tumore del sacco vitellino, fibrosarcoma e poliembrioma.



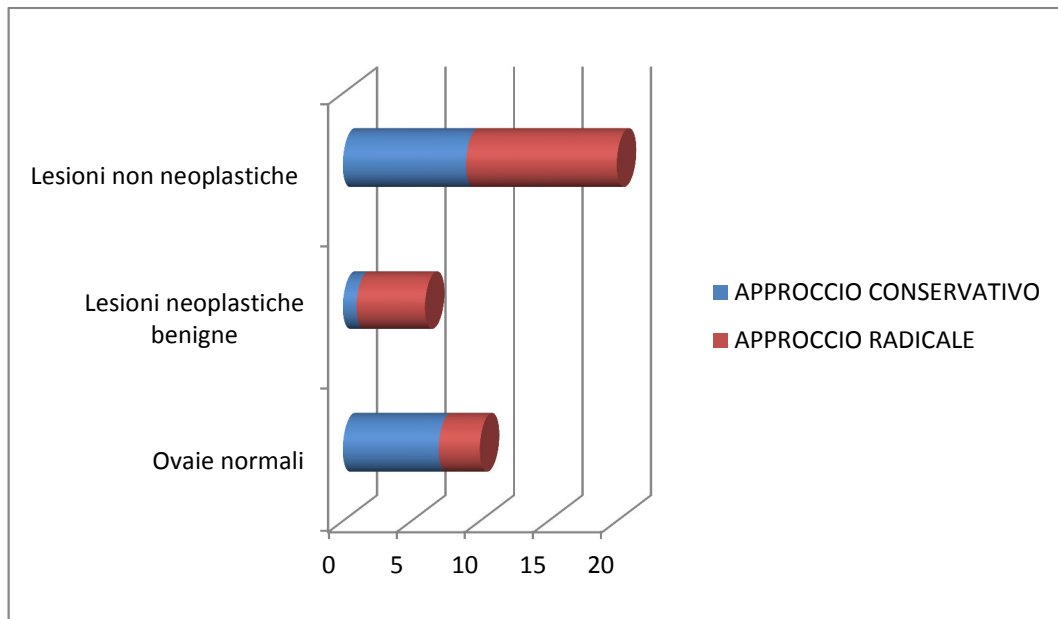
-Grafico 1: tipi di lesione sottostanti alla torsione ovarica-

In 18 bambine su 36 (50%) è stata applicata una chirurgia di tipo laparotomico; nelle altrettante 18 (50%) di tipo laparoscopico: è importante sottolineare come dal 2011 quest'ultima pratica abbia preso il sopravvento, essendo stata attuata nella totalità delle bambine con torsione.

Un'analisi sistematica (Grafico 2) che correla il tipo di patologia sottostante la torsione al tipo di intervento chirurgico eseguito rivela che:

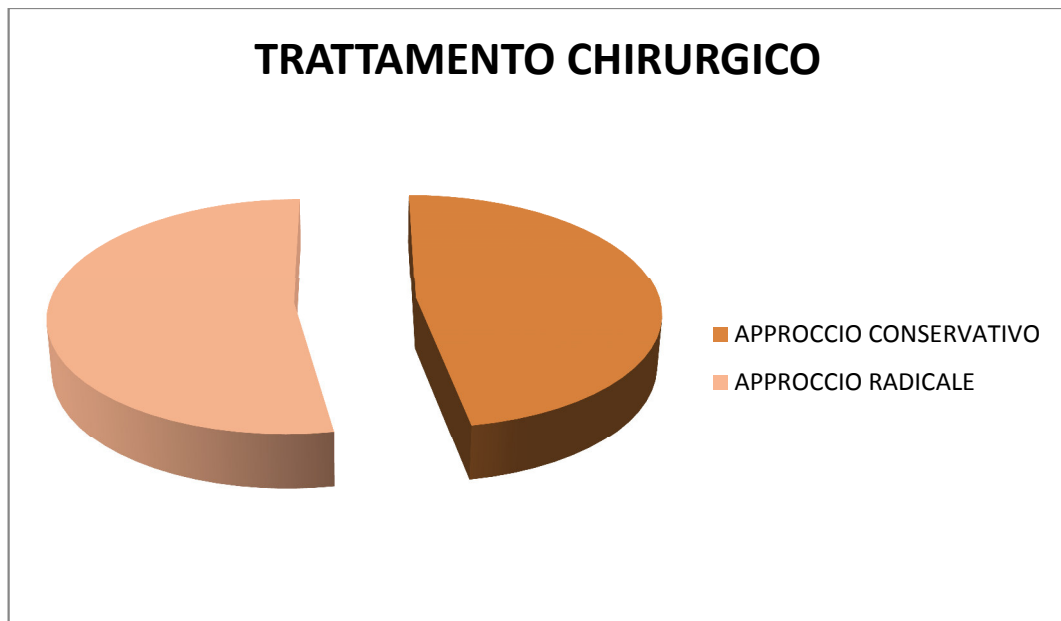
- Lesioni non neoplastiche (TOT 20): 9 (45%) trattate con approccio conservativo, 11 (55%) trattate con approccio radicale;
- Lesioni neoplastiche benigne (TOT 6): 1 (16.7% ) trattata con approccio conservativo, 5 (83.3%) trattate con approccio radicale;

- Lesioni neoplastiche maligne: 0
- Ovaie normali (TOT 10): 7 (70%) trattate con approccio conservativo, 3 (30%) trattate con approccio radicale.



-Grafico 2: relazione tra tipo di lesione sottostante alla torsione ovarica e trattamento chirurgico-

Nel totale della casistica, si osserva pertanto che il 47.2% delle pazienti ( pari a 17 casi su 36) sono state trattate con approccio conservativo ( detorsione isolata o associata a tumorectomia o cistectomia), mentre il 52.8% ( 19 casi su 34) ha subito un trattamento di tipo radicale (Grafico 3). In tutte le pazienti trattate con atteggiamento di natura conservativa è stata documentata una ripresa dell'attività funzionale ovarica.



-Grafico 3: tipo di trattamento chirurgico-

Una valutazione qualitativa del tipo di trattamento chirurgico intrapreso nel corso degli anni, documenta e conferma un trend in aumento per l'approccio conservativo - dal 28% al 45%, come già rilevato<sup>66</sup>- : questo è sicuramente da imputare ad un miglioramento delle tecniche diagnostiche, che consente un più precoce riconoscimento dell'emergenza in atto, ma anche alla maggiore attenzione del medico a quelle che sono le conseguenze dell'approccio radicale.

La revisione della letteratura documenta come ad oggi sia stato definitivamente appurato che l'approccio chirurgico più adatto per la gestione della torsione annessiale sia rappresentato dal trattamento conservativo: le riserve descritte in passato, sui rischi di mantenere in sede un ovaio o una tuba andata incontro a torsione, sono state superate sulla base di evidenze scientifiche comprovate<sup>19, 24, 25, 28, 35, 40, 58, 61-66</sup>.

**TRATTAMENTO CHIRURGICO:**  
**REVISIONE DELLA LETTERATURA**<sup>19, 24, 25, 28, 35, 40, 58, 61-66</sup>  
**(Anni 2013-2015)**

<b>TITOLO</b> <b>Auto-amputation of the ovary and fallopian tube in a child<sup>19</sup></b>	<b>AUTORI E RIVISTA DI PUBBLICAZIONE</b> Mellor A., Grover S. Australian and New Zealand Journal of Obstetrics and Gynaecology 2014; 54: 189–190	<b>SCOPO</b> to illustrate a case of chronic intermittent torsion, resulting in auto-amputation and resorption of the right adnexa.	<b>TIPO DI STUDIO</b> a case report of a 9-years-old child
<b>RISULTATI</b> A 6-ye ar-old girl presented to the emergency department with acute right iliac fossa pain on a background of intermittent pain over the preceding months, with occasional associated vomiting. US: right ovary larger than the left, with some small peripheral follicles. Normal Doppler colour flow was seen. Diagnostic laparoscopy for presumed ovarian torsion: right ovary appeared enlarged but normal. No suggestion of a cyst or evidence of torsion. Exclusion of intermittent torsion At the age of 15, the patient presented again: She referred a history of chronic, intermittent right iliac fossa pain since age 6. Imaging over this period showed the presence then possible absence of the right ovary. diagnostic laparoscopy :absence of the right ovary and tube, except for a short proximal stump.		<b>ARGOMENTI TRATTATI</b> -ovarian torsion: incidence, localization, clinical features, examination findings, US, relationship detorsion-riperfusion. -Management of torsion ( detorsion, cystectomy, oophorectomy) importance of ovarian conservation Auto-amputation is a rare complication of adnexal torsion. One report suggests an incidence of 1 in 11 421. The accepted mechanism is that of chronic adnexal torsion with subsequent devascularisation, necrosis and detachment*. The identification of a tubal stump at the time of laparoscopy is consistent with auto-amputation and has been reported. The free-floating structure may then resorb, calcify or adhere to another surface within the abdomen. Auto-amputation most commonly presents as long-standing intermittent or chronic pain, though may occur in the fetus, the neonate and in asymptomatic girls and women	<b>CONCLUSIONI</b> <b>CONCLUSIONS: it is important to consider the possibility of adnexal torsion in females presenting with chronic, intermittent pelvic pain, especially if vomiting is a feature.</b> <b>It is difficult to predict the likelihood of torsion of a normal ovary at laparoscopy and the rare occurrence of adnexal auto-amputation. Ovarian conservation should be performed , even with a prolonged duration of symptoms or an ovary which appears discoloured, ischemic or necrotic. In the vast majority of cases, the ovary will remain viable; in those that do not, there is no associated morbidity with attempting ovarian conservation.</b>

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO
<b>Ovarian torsion in children: Management and outcomes<sup>24</sup></b>	Geimaniate L., Trainavicius K. J Pediatr Surg. 2013 Sep;48(9):1946-53. doi: 10.1016/j.jpedsurg.2013.04.026.	The purpose of this study is to evaluate the clinical symptoms, diagnosis, management, and outcomes in children with ovarian torsion.	<p>Methods: The charts of 50 patients with 53 cases of ovarian torsion treated between January 1989 and March 2012 were reviewed retrospectively. Long term follow up was available for 20 girls who had their ovaries left in the abdominal cavity after detorsion.</p> <p>Results: In 22 cases ovaries were removed, and in 31 cases the torsion was relieved and the ovaries left in the abdominal cavity. Twenty-five of the salvaged ovaries were black-bluish and 10 bluish in color. Since 2005, after a change in preferred treatment, all ovaries treated by detorsion were left in the abdominal cavity. The long term results were observed clinically and by ultrasound in 20 girls. Multifollicular ovaries were found in 17 girls. One girl had a normal size paucifollicular ovary, a one-year-old girl had a normal size ovary with microfollicles, and one girl had no ovarian material detectable by ultrasound.</p>
<b>CLINICA</b>	<b>DIAGNOSI</b> (laboratorio e strumentali)	<b>TRATTAMENTO</b>	<b>CONCLUSIONI</b>
abdominal pain Nausea or vomiting was present in 45 girls, 29 girls had fever (12 of them over 38 °C) and 37 girls had leukocytosis (over 10 × 10 <sup>9</sup> /l)	increase in the size of the ovaries "whirlpool" sign Multiple peripheral cysts No blood flow Fluid in cul-de-sac	From 1989 to 2004, the number of girls treated was 27, with 30 ovarian torsions. Ovaries were removed in 21 (70%) cases and were preserved in 9 (30%) cases, since after detorsion they became lighter in color. The average age of the girls was 10.35 ± 4.65 years (from 6 months to 17.5 years.); From 2005 to March 2012 the number of girls treated was 23, with 23 cases of ovarian torsion. In 22 girls (95.7%) the ovaries were preserved (20 of them were black-bluish) and one ovary was removed because of mature teratoma. The average age was 10.54 ± 5.8 years (from 2 months to 17.9 years).	<p><b>CONCLUSIONS: Long term analysis of the treatment of ovarian torsion revealed that ovaries treated by detorsion and left in the abdominal cavity preserved their normal anatomy and function. Conservative surgical treatment proved to be safe. None of the girls had thromboembolism or peritonitis, and no malignant tumors were found in the operated ovaries.</b></p> <p>Until the end of 2004, the preferred treatment was to preserve only those ovaries that regained their normal color or those with only a slight color change. Since 2005, the policy has been to keep all ovaries having normal relation with the uterus and suspensory ligament in the abdomen, even though they were severely ischemic-hemorrhagic (black-bluish) at surgery.</p>



TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO & RISULTATI	ARGOMENTI CONCLUSIONI	TRATTATI &
<b>A</b> <b>retrospective</b> <b>review of the</b> <b>adnexal</b> <b>outcome after</b> <b>detorsion in</b> <b>premenarchal</b> <b>girls</b> <sup>25</sup>	Yildiz A, Erginel BI, Akin M, Karadağ CA, Sever N, Tamik C, Canmemiş A, Dokucu AI. Afr J Paediatr Surg. 2014 Oct; Dec:11(4):304-7. doi: 10.4103/0189- 6725.143134.	The aim of this study was to report our results on premenarchal girls with adnexal torsion who were treated with different approaches.	26 adnexal torsions in children <18 years were analysed retrospectively (1997-2010). The mean age of the patients was 11.42 (range 2-16). The two groups were similar in age (P = 0.29). No difference of sides of the torsion was found between two groups (P = 0.23). Group 1: cases of oophorectomy for the twisted adnexa. Group 2: patients with adnexal torsion who untwisted either with a laparoscopic or open approach. Postoperative restoration of ovarian function was evaluated by Doppler ultrasound at the 6th month. All oophorectomy and biopsy specimens were also evaluated Group 1 consisted of 11 cases with the mean age of 10.7 (range: 6-13 years), that underwent oophorectomy due to gangrenous change and haemorrhagic infarction. 7 left-side and 4 right-side adnexal torsions. Histology was of a mature teratoma in 2 cases and haemorrhagic necrosis due to torsion in 7. Group 2 consisted of 15 patients. 10 of the cases were operated upon laparoscopically, 5 with an open approach. 12 left adnexal torsions, and 3 had right. In 10 out of 15 patients, preoperative biopsy is performed in which their histology revealed haemorrhagic necrosis in 8 cases, and simple cyst with a benign nature in 2 cases. In all of the 10 untwisted adnexas, postoperative radiological imaging showed complete recovery with normal follicular development. No malignancy or increased tumour markers were noted in both groups.	-adnexal torsion: definition, epidemiology, MANAGEMENT OF ADNEXAL TORSION:  -RADICAL vs CONSERVATIVE APPROACH  -malignancy rate in adnexal torsion → "it is unnecessary to hesitate to untwist the adnexa because of fear of malignancy. Although malignancy in adnexal torsions is sometimes found in the paediatric age group, a biopsy can prevent any misdiagnosis in these rare cases."  <b>CONCLUSIONS: Adnexas can be left in place regardless of the preoperative degree of necrosis. Biopsy can be added to the procedure to rule out malignancy.</b>	

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO	ARGOMENTI & CONCLUSIONI
<p><b>Should the ovary always be conserved in torsion? A tertiary care institute experience<sup>28</sup></b></p>	<p>Parelkar SV1, Mundada D2, Sanghvi BV2, Joshi PB2, Oak SN2, Kapadnis SP2, Shetty S2, Athawale H2, Multani P2.            J Pediatr Surg. 2014 Mar;49(3):465-8. doi: 10.1016/j.jpedsurg.2013.11.055. Epub 2013 Nov 19.</p>	<p>The aim of this study was to analyze our experience in conserving ovarian tissue in cases of ovarian torsion, irrespective of grade of necrosis at exploration.</p>	<p><b>MATERIALS AND METHODS:</b>            All children with a diagnosis of ovarian torsion admitted to our hospital from January 2009 to January 2013 were included. Patients with underlying ovarian pathology were excluded.</p> <p><b>RESULTS:</b>            There were 13 torsions in 12 children (one bilateral). In addition, torsion of ovary was graded as follows:            Grade 1: Slightly discolored, normal size ovary, which promptly reverted to normal color after detorsion.            Grade 2: Dark red to brown, mildly enlarged ovary, which became hyperemic with multiple pin-point petechiae after detorsion.            Grade 3: Brown to black, grossly enlarged ovary with hematoma with slight improvement in color, small pin-point oozing after detorsion and hematoma evacuation.            Grade 4: Completely black, grossly enlarged ovary with hematoma and no improvement in color after detorsion and hematoma evacuation.</p> <p>All underwent detorsion with or without evacuation of hematoma. Follow-up ultrasonography (USG) with color Doppler was done for all 13 ovaries, which showed an ovary with good vascularity and follicular development in 12 ovaries (92%). In 76% (10 of 13) of cases, intraoperatively, the ovary was judged to be moderately to severely ischemic/necrotic. Yet, follow-up sonograms showed the ovary with follicular development in all cases except one (7%). There were no major complications in our series.</p>	<p>-The earlier recommended treatment of ovarian torsion was oophorectomy. Recent reports, describe ovarian conservation with untwisting of the ischemic adnexa as a safe and successful procedure            The arguments in favor of oophorectomy are: risk of missing an underlying malignancy, thromboembolism after detorsion and a belief that a grossly black hemorrhagic adnexa is irreversibly damaged</p> <p>-DESCRIPTION OF SEVERAL REVIEW</p> <p><b>CONCLUSIONS:</b>  <b>Simple detorsion, instead of traditionally advocated oophorectomy, was not accompanied by an increase in morbidity. On follow-up, almost all patients studied had functioning ovarian tissue despite the grave ischemia observed intraoperatively. Detorsion should be the procedure of choice for all cases of simple ovarian torsion in children.</b></p>

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO & RISULTATI	ARGOMENTI TRATTATI & CONCLUSIONI
<b>Asynchronous Bilateral Ovarian Torsion. A Case Report and Mini Review</b> <sup>35</sup>	Kurtoglu E, Kokeu A, Danaci M  J Pediatr Adolesc Gynecol. 2014 Jun;27(3):122-4. doi: 10.1016/j.jpag.2013.06.016. Epub 2013 Sep 26.	To report the case of asynchronous bilateral ovarian torsion in a 9-year-old girl, resulting in right and subsequently left salpingoophorectomy	<p>a case of a 12-year-old who presented to gynecology clinic due to absence of secondary sex characteristics.</p> <p>At the age of 9, she was admitted to the hospital emergency service with abdominal pain, nausea, and vomiting, existing for 3 days. She had a history of right salpingoophorectomy and appendectomy due to torsion of a "normal ovary" a month before at another hospital.</p> <p>EO rebound and tenderness in all quadrants of the abdomen. Laboratory tests elevated white blood cell count and anemia. US: Left ovary measuring 58 *46 *48 mm with anechoic cysts, the largest of which was 16* 12 mm in diameter, located in the periphery of the ovary. Color Doppler ultrasonography showed absence of circulation in the left ovary, supporting the diagnosis of ovarian torsion.</p> <p><u>exploratory laparotomy:</u> left ovary torsed twice, cyanotic, and necrotic. Detorsion and "hot application" was performed but no sign of circulation was observed, so the patient underwent left salpingoophorectomy.</p> <p>At the age of 12 years, she presented to our gynecology clinic due to absence of secondary sex characteristics. On physical examination, she did not have signs of development of secondary sex characteristics, including telarche, pubarche, and menarche. The absence of ovaries was imaged by magnetic resonance imaging.</p>	<p>-adnexal torsion: definition, etiology, DD, diagnosis, treatment, techniques of oophorectomy, complications</p> <p>-torsion of the normal adnexa</p> <p>-review bilateral ovarian torsion:</p> <p><b>CONCLUSIONS: The diagnosis of ovarian torsion often is delayed. When ovarian torsion is suspected, laparoscopy should be performed without delay, and conservative management should be strongly considered to prevent surgical castration. Detorsion and oophorectomy in unilateral torsion in children even in delayed diagnosis are recommended.</b></p> <p><b>Oophorectomy of the ipsilateral and contralateral ovary should be considered to prevent a recurrent torsion.</b></p>

<b>TITOLO</b>	<b>AUTORI E RIVISTA DI PUBBLICAZIONE</b>	<b>SCOPO</b>	<b>TIPO DI STUDIO</b>
<b>A Clinicopathological Study of Women with Adnexal Masses Presenting with Acute Symptoms<sup>40</sup></b>	Al-Shukri MI, Mathew MI, Al-Ghafri WI, Al-Kalbani MI, Al-Kharusi LI, Gowri VI.  Ann Med Health Sci Res. 2014 Mar;4(2):286-8. doi: 10.4103/2141-9248.129067.	The purpose of the following study is to assess the clinicopathologic outcome of women with adnexal masses presenting with acute pain.	A retrospective study of women with adnexal masses who had surgical intervention for acute symptoms from June 2007 to May 2012 was undertaken. During the study period, a total of 57 women were operated for adnexal masses as emergency. The mean age of the patients was 29.1 ± 9.5 and the median age was 28 years  Results: Of the 57 women operated for adnexal masses as emergency, the most common pathology was teratoma 26% (15/57) followed by corpus luteal hemorrhage (16%) and endometriosis (14%). Laparoscopy was the initial surgical approach in just over 50% of patients, but surgery was completed laparoscopically only in about one-third of patients. Conservative surgery in the form of ovarian cystectomy was possible in 70% of patients.
<b>CLINICA</b>	<b>DIAGNOSI (laboratorio e strumentali)</b>	<b>TRATTAMENTO</b>	<b>CONCLUSIONI</b>
Abdominal pain 98% Nausea 30% Vomiting 16% Vaginal spotting 5% Menstrual irregularities 8% Von Willebrand's disease 4% Sickle cell disease 4%	US and CT	Conservative surgery in the form of ovarian cystectomy was possible in 70% of patients. Salpingo oophorectomy was necessary in 24% patients due to necrosis of the tumor or large size of the tumor with the tube stretched over it. Three patients had hysterectomy with salpingo oophorectomy for suspected malignancy of which two were 50 years old and one was 60 year old.	<b>CONCLUSIONS: Complications of adnexal masses such as torsion and hemorrhage are common causes of acute abdominal pain. Timely diagnosis of the adnexal pathology and surgical intervention will help to preserve the reproductive outcome. Conservative surgery was possible in 70% of our study group.</b> <b>The commonest pathology in acute abdominal presentations secondary to adnexal masses not related to pregnancy was mature cystic teratoma of the ovary in the current study</b>

TITOLO	AUTORE E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO	ARGOMENTI & CONCLUSIONI	TRATTATI &
Laparoscopic detorsion of isolated idiopathic Fallopian tube torsion: conservative treatment in a 13-year-old girl <sup>58</sup>	Ardıçlı Bİ, Ekinçi S, Oğuz B, Haliloğlu M, Tanyel FC, Karnak İ. Turk J Pediatr. 2013 Jul-Aug;55(4):451-4	Herein, the authors present an adolescent premenarcheal girl with idiopathic IFTT, which was treated by laparoscopic detorsion, to emphasize that tubal torsion should be included in the list of differential diagnoses of abdominal pain in adolescent girls.	A 13-year-old girl presented with left-sided abdominal pain for three days. She reported having regular menstrual cycles, and was on the first day of her cycle at the time of her admission. Her urinary and bowel habits were normal. She received no benefit from antibiotic treatment commenced in another hospital with the presumptive diagnosis of urinary tract infection. EO: no tenderness, defense or mass. Laboratory examinations: ndr Blood biochemistry and urinalysis were also normal. Plain erect and supine abdominal X-rays were normal. US revealed an edematous, enlarged, tortuous, and cystic left fallopian tube (hydrosalpinx) free pelvic fluid, and minimally enlarged left ovary (5x3x2 cm). The uterus, right tube and right ovary were normal. The differential diagnosis between pelvic inflammatory disease and torsion could not be made. Magnetic resonance imaging revealed a tubular, tortuous, cystic left adnexal. Laparoscopy demonstrated a 720° torsion of the left fallopian tube. The left ovary was mildly edematous. Detorsion was performed by using two additional port entries. The circulation and color of the tube were quite normal after reduction. No additional pathology was encountered	-IFTT: etiology <b>CONCLUSIONS: Isolated tubal torsion should be included in the list of differential diagnoses of abdominal pain in adolescent girls. Minimally invasive, organ-saving surgery should be done, and the child should be followed up for recurrent torsion.</b>	

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO	ARGOMENTI TRATTATI & CONCLUSIONI
<b>Treatment of Ovarian Lesions in Children and Adolescents: A Retrospective Study of 130 Cases<sup>61</sup></b>	Claudio Spinelli,1 Valentina Pucci,1 Silvia Strambi,1 Roberto Lo Piccolo,2 Alessandra Martin,2 and Antonio Messineo2 Pediatric Hematology and Oncology, Early Online: 1-8, 2013	To analyze the management of ovarian masses in a total of 130 children surgically treated for 137 ovarian lesions (7 bilateral).	130 children surgically treated for 137 ovarian lesions (7 bilateral). Ovarian torsion occurred in 36 cases (26,27 o/s). A conservative treatment was performed in 81 (59,170) girls: 61 (75,3o/o) treated in non-emergency and 20 (24,7o/o) in emergency/surgery; laparoscopic approach in 35 cases (43,2o/o); and open surgery in 46 (56,80/o). The remaining 56 (40,9o/o) ovarian masses underwent nonconservative surgery: 40 cases (71,4o/o) non-emergency and 16 (28,60/o) emergency; laparoscopy in 20 patients (35,7o/o); and open surgery in 36 (64,30/o).	<b>CONCLUSIONS:</b> Fertility preservation should be a goal in the surgical treatment. The management of ovarian torsion should include adnexal detorsion and recovery of the ovarian tissue. In case of benign neoplasms, laparoscopic tumorectomy should be the gold standard; in early stage malignant tumors, fertility-sparing surgery with accurate staging is preferred.

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO	ARGOMENTI & CONCLUSIONI
<p><b>Ovarian preservation in children for adnexal pathology, current trends in laparoscopic management and our experience</b><sup>62</sup></p>	<p>Preet Agarwal, Prakash Agarwal,1 Rajkishore Bagdi,2 Subramaniam Balagopal,1 Madhu Ramasundaram, and Balamourougane Paramaswamy  J Indian Assoc Pediatr Surg. 2014 Apr-Jun; 19(2): 65-69. doi: 10.4103/0971-9261.129594</p>	<p>to report our experience of both modalities of management where we initially removed adnexal torsion by either laparoscopic salpingo oophorectomy or oophorectomy, but later followed a more conservative approach of adnexal lesion removal with ovarian preservation.</p>	<p><b>Materials and Methods:</b> Retrospective review of clinical records of patients with ovarian pathology who were managed laparoscopically.  <b>Results:</b> 46 cases of pediatric ovarian pathology were managed between March 2006 and March 2013 in two centers by a team of surgeons. The age ranged from 1 days to 18 years (average 14.3 years) and the pathology varied from 30 cases of a simple ovarian cyst with torsion, 3 cases of ovarian torsion without any cyst, 7 cases of a dermoid cyst with torsion in all, 1 case of secreting ovarian tumor and 5 cases of a paraovarian cyst with torsion. All patients had a normal tumor marker except 1 girl with a functional ovarian tumor who had elevated LDH and estrogen levels along with suppressed LH and FSH. In the initial period of our study we did 1 salpingo-oophorectomy for a suspected complex lesion and two oophorectomies for torsion with a simple cyst.  In the later part of our study we performed laparoscopic cystectomy and ovarian preservation in 40 cases, including 7 cases of dermoid, where we performed laparoscopic detorsion with dermoid cystectomy and ovarian preservation in the same sitting. In three cases of chronic torsion who presented to us late, we could not preserve the ovary and had to resort to salpingo-oophorectomy. Histology showed a simple corpus luteal and follicular ovarian cyst in 31 cases, a paraovarian cyst in 5 cases with mature teratoma in 7 cases. Twenty-five patients with ovarian preservation following detorsion were subjected to follow-up ultrasound, who were found to have normal shape, size and blood flow compared to the contra lateral side.</p>	<p>-The treatment of ovarian torsion is controversial. Although several studies suggest that untwisting the ischemic adnexal is safe and successful most of the time, many surgeons believe that by the time the patient comes to medical attention, it is too late to salvage the twisted ovary and advocate resection, risking their long-term fertility.  <b>CONCLUSIONS:</b> We outline our experience from the management of 46 cases of various ovarian pathologies with and without ischemia and found that ovarian torsion with a benign pathology and ischemia is not a contraindication for ovarian preservation, as pointed out in the current literature.</p>

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO & RISULTATI	ARGOMENTI & TRATTATI & CONCLUSIONI
<p><b>Re-torsion of the ovaries</b><sup>63</sup></p>	<p>Hyttel TE, Bak GS, Larsen SB, Løkkegaard EC. Acta Obstet Gynecol Scand. 2015 Mar;94(3):236-44. doi: 10.1111/aogs.12542. Epub 2014 Dec 11.</p>	<p>This review addresses risk of re-torsion and describes preventive strategies to avoid re-torsion in pre-menarcheal girls, and fertile and pregnant women.</p>	<p>A total of 38 publications including 71 girls, 363 fertile women, and 69 pregnant women were found to be relevant. All studies were case reports or case series, sometimes with non-randomized controls. The studies show considerable heterogeneity in design, population, management and outcome. Only four studies included more than 50 cases. In pregnancy the risk of re-torsion was as high as 19.5-37.5%; among fertile women it was 28.6%. Most articles concluded that fixation of the ovaries to the pelvic sidewall or plication of the ovarian ligament after torsion may prevent re-torsion. In one case a girl experienced re-torsion after ovariopexy.</p>	<p>-adnexal torsion: incidence, treatment -review -ovariopexy techniques De-torsion and fixation of the ovaries, most often to the pelvic side-wall, is a safe procedure which can maintain ovarian function and reduce the risk of recurrence of torsion. <b>CONCLUSIONS: Based on observational studies it seems that detorsion and fixation of the ovary is a safe procedure that usually ensure maintenance of ovarian function and reduces the risk of recurrence, especially when there are no ovarian cysts or adnexal masses.</b></p>



TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO & RISULTATI	ARGOMENTI CONCLUSIONI	TRATTATI &
<p><b>Outcome of conservative laparoscopic surgery for adnexal torsion through one-stage or two-stage operation<sup>64</sup></b></p>	<p>Akira Fujishita1, Hiroyuki Araki1, Shiko Yoshida1, Daisuke Hamaguchi1, Daisuke Nakayama1, Nobuo Tsuda2 and Khaleque Newaz Khan3  J. Obstet. Gynaecol. Res. Vol. 41, No. 3: 411-417,9 March 2015</p>	<p>We investigated the outcome on ovarian appearance and occurrence of adhesion after conservative laparoscopic surgery for adnexal torsion during reproductive age.</p>	<p><b>Material and Methods:</b> From April 2009 to September 2012, we treated patients with clinically suspected adnexal torsion who desired future pregnancy. We performed conservative surgery, such as cystectomy or detorsion at one-stage operation, but switched to salpingo-oophorectomy in complicated cases. We evaluated adnexal condition and pattern of adhesion by careful assessment with two-stage laparoscopy or second-look laparoscopy after first surgery. <b>Results:</b> Mean age of patients was 25 ± 8 years. Among 37 patients with suspected adnexal torsion, 18 (49%) had adnexal torsion at first surgery. Conservative treatment was carried out in 14 of 18 cases. We obtained informed consent for second-look laparoscopy or two-stage operation in six of these 14 cases. Among these six patients, two cases were treated with only detorsion by one-stage operation and cystectomy was performed in the other four cases at first operation. At subsequent surgery, the ovary appeared normal in six cases with occurrence of mild to moderate adhesion around the adnexal lesion. Of note, two cases with para-ovarian cyst had torsion that showed complete tubal occlusions and associated severe adhesions. No major complications (peritonitis, thrombotic emboli) were observed after conservative laparoscopic surgery.</p>	<p><b>CONCLUSIONS:</b> Laparoscopic surgery is a safe procedure to preserve ovarian function in women with adnexal torsion. Careful attention and measures should be considered during follow-up management with the fact in mind that adhesion is a common occurrence and even tubal occlusion may occur in some cases.</p>	

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO	ARGOMENTI TRATTATI & CONCLUSIONI
Five year retrospective case series of adnexal torsion <sup>65</sup>	Nair S1, Joy S1, Nayar J2. J Clin Diagn Res. Dec;8(12):OC09-13. doi: 10.7860/JCDR/2014/9464.5251. Epub 2014 Dec 5.	The study is about clinical presentation and management approach of adnexal torsion in a tertiary care centre.	Retrospective study.  <b>MATERIALS AND METHODS:</b> Review of case records during the five years of 2008 November - 2013 November in Amrita Institute of Medical Sciences, Kochi, India. <b>RESULTS:</b> Adnexal torsion was found mainly in the reproductive age. Ultrasound was the most commonly used imaging modality. Benign tumours predispose to torsion. Torsion occurred during postovulatory period in many cases. Polycystic ovaries were a risk factor for unexplained torsion in younger age groups. Diagnosis of adnexal torsion was mostly intra operative by direct visualisation of the rotated adnexa. Laparoscopy was the preferred method of surgical intervention. Ovarian conservation was tried in majority of the child bearing age groups.	<b>CONCLUSIONS:</b> Adnexal torsion is a rare emergency which requires a high index of clinical suspicion for diagnosis as the symptoms are non specific. Imaging helps in diagnosis but most of them are diagnosed intra operatively. Laparoscopic conservative surgery is the preferred surgical approach especially in younger age groups. An early surgical intervention helps in salvaging the adnexa and prevents further complications.

TITOLO	AUTORI RIVISTA PUBBLICAZIONE	SCOPO	TIPO DI STUDIO	ARGOMENTI CONCLUSIONI	TRATTATI & CONCLUSIONI
<p>Adnexal torsion in children and adolescents: new trends to conservative surgical approach -- our experience and review of literature<sup>66</sup></p>	<p>Spinelli CI, Buti I, Pucci V, Lisserre J, Alberti E, Nencini L, Alessandra M, Lo Piccolo R, Messineo A.</p>	<p>The purpose of this study is to discuss the surgical treatment for ovarian torsion in children and adolescents with a focus on the procedures of adnexal conservation surgery and its frequency in the literature of the last 10 years.</p>	<p>127 operative ovarian lesions including 30 ovarian torsions (23.6%) treated in two pediatric centers over a 10-year period were reviewed. Age at presentation, presenting symptoms, diagnostic studies, surgical procedure and pathological findings were analyzed. Mean age was 13.7 years. Conservative surgery has been performed in 46.7% of the cases and laparoscopic approach in 40%. Ovarian torsion occurred in 56.7% on ovaries with functional lesion, in 23.3% on normal adnexa and in 20% on ovaries with benign neoplasm. The article includes a literature review (2000-2010) and a statistical analysis which shows a slow increase in conservative surgery from 28 to 45%. Laparoscopic surgery accounts for 23.5%. Literature review shows 40.5% normal adnexa, 33.2% non-neoplastic lesions, 25.3% benign neoplasms and 1% malignant neoplasms.</p>	<p><b>CONCLUSIONS:</b> The surgical treatment of children and adolescents presenting adnexal torsion should be practiced as an emergency and it should be more conservative as possible in order to maximize the future reproductive potential.</p>	

## 5.4 Discussione e conclusioni

La torsione degli annessi uterini è una condizione che dovrebbe essere considerata nei soggetti in età pediatrica con dolore addominale acuto, dal momento che si presenta come un'emergenza chirurgica. La diagnosi non è semplice, poiché i segni clinici e i reperti di imaging non sono specifici e una diagnosi definitiva può essere effettuata solo mediante esplorazione chirurgica. L'approccio chirurgico dovrebbe essere conservativo, laddove possibile, al fine di preservare la futura capacità riproduttiva di queste pazienti. Tale atteggiamento, auspicato dalla letteratura scientifica, si sta progressivamente affermando nella realtà chirurgica. Nonostante i progressi finora ottenuti, ad oggi in letteratura non è riportato uno schema di gestione terapeutica ben definito, che tenga effettivamente conto delle patologie a carico degli annessi e del trattamento chirurgico ad esse corrispondenti più adeguato. Sarebbe utile a tal proposito effettuare una biopsia intraoperatoria in casi selezionati per verificare la viabilità del tessuto ovarico ed evitare un approccio maggiormente aggressivo (vedi Tabella 3). Il ruolo dell'ooforopessi è controverso, tuttavia potrebbe essere utile per evitare la ricorrenza di torsione. Ad oggi, studi sperimentali stanno valutando il ruolo di diverse sostanze che potrebbero prevenire l'insorgenza del danno da ischemia/riperfusion che si realizza in corso di torsione, migliorando così la prognosi di questi soggetti.

## APPENDICE

### **ANALISI SINTETICA DI 80\* ARTICOLI tratti dalla letteratura scientifica:**

Si riportano di seguito estratti schematici degli articoli considerati e analizzati in questo lavoro di tesi, per una consultazione agevole e immediata.

I lavori trattano degli ultimi aggiornamenti in ambito epidemiologico, fisiopatologico, clinico, diagnostico e sperimentale.

TIPOLOGIA ARGOMENTO	ARGOMENTI
Case series & review	2, 14, 20, 23, 24*, 31, 32, 33, 34, 36, 37, 40*, 41, 56, 57, 58*, 59, 61*, 62*, 65*, 66*, 68, 89*.
Eziopatogenesi	30, 38.
Complicanze	1, 17, 18, 19*, 26, 35*, 63*, 69.
Diagnostica	3, 13, 15, 16, 22, 27, 29, 39, 48, 49, 50, 51, 53, 54, 55.
Marker sierici	42, 43, 44, 45, 46, 47.
Esame istologico	67.
Outcome	25*, 28*, 60, 64*, 88.
Studi sperimentali	21, 52, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87.

\*inclusi nella sezione "STUDIO".

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO & RISULTATI	ARGOMENTI CONCLUSIONI	TRATTATI &
Repeated ovariopexy failure in recurrent adnexal torsion: combined approach and review of the literature <sup>1</sup>	Simsek E1, Kilicdag E, Kalayci H, Yukse1 Simsek S, Parla1gumus A. Eur J Obstet Gynecol Reprod Biol. 2013 Oct;170(2):305-8. doi: 10.1016/j.ejogrb.2013.06.044. Epub 2013 Aug 3.	To present a case report trying to define alternative techniques of ovarian fixation in the light of the current literature.	case of 20-year-old woman experiencing six separate recurrent adnexal torsion events in spite of two distinct ovarian fixations during her laparoscopies.	-adnexal torsion: definition, etiology -role of oophoropexy (when, how); techniques <b>CONCLUSIONS: Choice of ovariopexy technique should be individualized</b>	
Adnexal torsion: review of the literature <sup>2</sup>	Sasaki KJ, Miller CE. J Minim Invasive Gynecol. 2014 Mar-Apr;21(2):196-202. doi: 10.1016/j.jmig.2013.09.010. Epub 2013 Oct 12.	Review of the literature	A pub med search was performed between 1985 and 2012 for reviews, comparative studies, and case reports, to provide a review of the epidemiology, risk factors, clinical presentation, common laboratory and imaging findings and treatments of adnexal torsion.  *****  definition, incidence, etiology, risk factors		
CLINICA		DIAGNOSI (laboratorio e strumentali)	TRATTAMENTO	CONCLUSIONI	
abdominal pain nausea, vomit, flank pain, fever slight tachycardia, elevated blood pressure		Laboratory: elevate interleukin-6 levels US: ovarian mass, unilateral ovarian enlargement, free fluid, uniform peripheral cystic structures. swelling and edema abnormal or absent arterial flow. Doppler: whirlpool sign persistence or absence of arterial flow!!!!	conservative treatment VS salpingectomy and/ or oophorectomy  role of oophorectomy	<b>CONCLUSIONS: an accurate analysis of clinical features, imaging ecc can be useful to an early diagnosis of adnexal torsion.</b>	

TITOLO		AUTORE RIVISTA DI PUBBLICAZIONE		SCOPO DELLO STUDIO E SUE MODALITA'
<b>Isolated Torsion of the Fallopian Tube with Hydrosalpinx Mimicking a Multiloculated Ovarian Cyst: Whirlpool Sign on Preoperative Sonography and MRI<sup>1</sup></b>		Aydın R1, Bildircin D, Polat AV. <i>J Clin Ultrasound.</i> 2014 Jan;42(1):45-8. doi: 10.1002/jcu.22030. Epub 2013 Mar 16.		To report a case of isolated tubal torsion with specific imaging findings on preoperative ultrasonography, color Doppler ultrasonography, and magnetic resonance imaging that was misdiagnosed as a multiloculated ovarian cyst at a local hospital. case report: 33-year-old woman presented with acute abdominal pain in the right infraumbilical region.
US	First abdominopelvic US examination, shows a right multiloculated ovarian cystic mass. Second abdominopelvic US examination shows uterus and both of the ovaries normal. There was a tubular and folded cystic mass on the right side (dilatation of the tube), which measured 63.3 x 42.3 x 21 mm. There were incomplete folds in the narrow portion, suggestive of a hydrosalpinx. sonographic whirlpool sign	DOPPLER	no flow seen in the walls of the hydrosalpinx or in the twisted pedicle	<b>ARGOMENTI/AFFRONTATI &amp; CONCLUSIONI</b>  TT: definition, causes, clinical features, DD <b>CONCLUSIONS: isolated fallopian tube torsion, although extremely rare, should be included in the differential diagnosis of acute lower abdominal pain in women. Normal ovaries and a dilated fallopian tube with a whirlpool sign at the endpoint of the hydrosalpinx are specific features of IFTT on US and MRI.</b>
		CT	RM cystic lesion (dilatation of fallopian tube) with fluid, which had hypointense signal intensity on T1-weighted images and hyperintense signal intensity on T2-weighted images. On T2-weighted imaging, the whirlpool sign was seen at the endpoint of the hydrosalpinx. The uterus and both ovaries were normal.	

TITOLO		AUTORI E RIVISTA DI PUBBLICAZIONE		SCOPO DELLO STUDIO E SUE MODALITA'	
<p><b>Ovarian and tubal torsion: imaging findings on US, CT, and MRI</b><sup>13</sup></p>		<p>Ana P. Lourenco &amp; David Swenson &amp; Robert J. Tubbs &amp; Elizabeth Lazarus Emerg Radiol (2014) 21:179–187 DOI 10.1007/s10140-013-1163-3</p>		<p>To illustrate the findings of surgically confirmed ovarian and fallopian tube torsion on US, CT, and MRI, including those in the pregnant patient</p>	
US	DOPPLER	CT	RM	ARGOMENTI AFFRONTATI & CONCLUSIONI	
<p>Asymmetric ovarian enlargement to greater than 5 cm</p> <p>Ovarian mass</p> <p>Edematous ovary with peripheral follicles</p> <p>Twisted vascular pedicle</p> <p>free pelvic fluid</p>	<p>endangerment of arterial flow</p> <p>absence of vascular flow</p> <p>However, there are cases of torsion that do not completely obstruct vascular flow, and thus there may be preserved arterial and venous flow to the ovary. A common pitfall is to rely too heavily on the spectral Doppler tracings when flow is preserved and thereby conclude that there is no adnexal torsion. Studies have found normal Doppler findings in 45–61% of torsion cases</p>	<p>Asymmetric ovarian enlargement</p> <p>Ovarian mass</p> <p>Decreased contrast enhancement</p> <p>Edematous ovary with peripheral follicles</p> <p>twisted vascular pedicle</p> <p>free pelvic fluid</p> <p>Adnexal fat stranding</p> <p>uterine deviation towards torsion</p>	<p>Asymmetric ovarian enlargement</p> <p>Ovarian mass</p> <p>Decreased contrast enhancement</p> <p>Edematous ovary with peripheral follicles</p> <p>Twisted vascular pedicle</p> <p>free pelvic fluid</p> <p>Adnexal fat stranding</p> <p>Uterine deviation toward torsion</p>	<p>adnexal torsion: clinical presentation, embryologic development, pathophysiology of torsion, risk factors</p> <p>Ultrasound (US) imaging is most frequently used to assess torsion. However tomography (CT) and MRI utilization have increased</p> <p><b>CONCLUSIONI : Ultrasound (US) imaging is most frequently used to assess torsion. However tomography (CT) and MRI utilization have increased. It is imperative to know the findings of adnexal torsion on CT as well as US for the early diagnosis</b></p>	



TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO & RISULTATI
Isolated salpingeal torsion in children: a case series and review of the literature <sup>4</sup>	Erikci VSI, Hoggör M2, Ulus Travma Acti Cerrahi Derg. 2014 Jan;20(1):75-8. doi: 10.5505/tje.s.2014.26918	to evaluate and determine the history, clinical presentation, and physical examination and laboratory findings in a pediatric (n=1) and adolescent (n=2) population with isolated tubal torsion (ITT) and to examine its surgical management	A retrospective review of all the cases of ITT treated in our hospital between January 2000 and December 2012 was performed. The diagnosis of ITT was performed by physical examination and radiological studies including ultrasonography (US), color Doppler US, and computed tomography (CT) and confirmed by surgical intervention. There were 3 children with ITT in the study period. Two of the patients were adolescents and one was diagnosed in the neonatal period. Two patients had left-sided ITT. The neonatal patient was diagnosed with abdominopelvic mass antenatally. ITT in the other two children occurred three days after the onset of symptoms. All the patients in this study were treated with salpingectomy. ITT is rarely diagnosed preoperatively, and is treated mostly by salpingectomy.
CASE REPORT			<p><b>ARGOMENTI TRATTATI</b> E</p> <p><b>CONCLUSIONI</b></p> <p>-ITT: definition, pathophysiology</p> <p><b>CONCLUSIONS:</b> A better recognition of this entity may help to improve the treatment of this rare condition. As advocated for ovarian salvage in adnexal torsions, earlier diagnosis and preservation of the tube, if possible, with prompt surgical intervention may increase the future reproductive potential of these patients.</p>
<p><b>Case 1-</b> A 14-year-old girl was admitted to the emergency room with pain in her lower right quadrant of three-days' duration and bilious vomiting for one day. She had her first menstrual period with the onset of the pain. EO: tenderness in the right lower quadrant with mild guarding; laboratory tests: unremarkable. US and a color Doppler: bilateral normal perfused ovaries with a cystic mass of 6 cm CT confirmed that the mass was cystic, with a dimension of 5x6 cm. As ITT with hydrosalpinx was diagnosed, the patient underwent an emergent exploration: left ovary and fallopian tube were normal. The right ovary appeared increased in size, to double that of the left ovary, with multiple follicular cysts inside. The right fallopian tube with hydrosalpinx and a closed tip of the ampulla was found to be torse 360° clockwise, and it was untwisted to its neutral position. As no change in color was observed in time, salpingectomy was performed. Histopathological evaluation of the specimen revealed hematosalpinx with hemorrhagic necrosis in all sections. She was discharged three days after the surgical intervention. Serial US assessments showed no signs of tubal or ovarian pathologies with both ovaries of equal dimensions during the follow-up of five years.</p> <p><b>Case 2-</b> A five-day-old female baby with an antenatal diagnosis of abdominal mass was admitted to our clinic. EO: unremarkable except for a mobile mass in the lower abdominal region. Laboratory tests: increase in the ferritin levels, lactate dehydrogenase and alpha-fetoprotein.</p> <p>US: 4x5 cm mobile cystic mass with air-fluid level. CT confirmed the septated mass to be located under the liver with the majority of the mass being cystic in nature. At laparotomy, the left fallopian tube and ovary were normal. There was no right ovary, and the right tube was 0.5 cm in length with obliterated tip. A mass of 6x5 cm in diameter connected to the tip of the appendix was found in the pelvis and resected with the appendix. It was Histopathological examination revealed a cystic mass with hemorrhagic infarction and dystrophic calcification in its wall and an inflamed appendix. It was considered as an in-utero ITT with autoamputation. The postoperative course was uneventful, and she was discharged from the hospital on the 4<sup>th</sup> postoperative day. One month after the surgical intervention, she was internalized with the diagnosis of brid ileus and treated conservatively. There has been no recurrence to date after a 12-year follow-up.</p> <p><b>Case 3-</b> A 13-year-old girl was admitted to our clinic with pain in her lower left quadrant of three-days' duration. Her menstruation had begun one year before, with regular cycles of 28-32 days. Laboratory tests were unremarkable. EO: moderate tenderness on deep palpation of her left lower quadrant. A vaginal examination was not performed, and a digital rectal examination revealed a mass in the anterior region of the rectum. US confirmed the presence of a mass containing no vascular flow on color Doppler. CT revealed a 9 cm septated mass separate from the uterus. Diagnostic laparoscopy revealed a 10 cm necrotic blue mass in the left pelvis. For a better exposure and easier removal of necrotic tissue, a laparotomy was performed, and a totally necrotic torse-d left fallopian tube was resected with incidental appendectomy. The pathology report revealed extensive hemorrhagic infarction in the left fallopian tube. She was discharged from the hospital on the 3<sup>rd</sup> postoperative day with no recurrence to date after a 12-year follow-up.</p>			

TITOLO		AUTORE/RIVISTA DI PUBBLICAZIONE		SCOPO DELLO STUDIO E SUE MODALITA'	
Multimodality imaging in adnexal torsion <sup>15</sup>		Patil AR, Nandikoor S, Rao A, M Janardan G, Kheda A, Hari M, Basappa S. <i>J Med Imaging Radiat Oncol.</i> 2015 Feb;59(1):7-19. doi: 10.1111/1754-9485.12266. Epub 2014 Dec 22.		To discuss the multimodality imaging approach for the diagnosis of adnexal torsion, its limitations and mimics	
US		CT		ARGOMENTI AFFRONTATI & CONCLUSIONI	
Ovarian enlargement	DOPPLER	Ovarian enlargement with or without haemorrhage	RM	adnexal torsion: definition, etiology, anatomy	<b>CONCLUSIONS:</b> <b>Adnexal torsion is an important cause of acute pelvic pain in females. It includes torsion of normal ovary, ovarian, paraovarian masses and Fallopian tube torsions.</b> <b>Torsion of subserosal fibroid is rare. USG is the initial modality of choice. CT and MRI features solve any sonographically inconclusive findings</b>
Peripherally placed follicles	Doppler demonstration of absent ovarian venous and/or arterial vascularity aids in the diagnosis, but normal vascularity does not necessarily exclude torsion	Peripherally placed follicles	The features are similar to that seen on CT such as deviated uterus, enlarged ovary with peripheral follicles and ascites.		
Oedematous ovarian stroma		Presence of adnexal mass			
Absent arterial/venous flow		Thickened fallopian tube/twisted pedicle			
Presence of adnexal mass		Beak sign			
Extra ovarian whirlpool sign representing twisted pedicle		Deviation of uterus			
Ascites		Anteriorly placed ovary			
Probe tenderness (on transvaginal scan)		Ascites			

TITOLO		AUTORI E RIVISTA DI PUBBLICAZIONE		SCOPO DELLO STUDIO E SUE MODALITA'	
<p><b>Sonographic appearance of adnexal torsion, correlation with other imaging modalities, and clinical History<sup>16</sup></b></p>		<p>Gerscovich EO, Corwin MT, Sekhon S, Runner GJ, Gandour-Edwards RE. <i>Ultrasound Q.</i> 2014 Mar;30(1):49-55. doi: 10.1097/RUQ.0000000000000049. Review</p>		<p>This pictorial essay illustrates the varied imaging appearances of adnexal torsion and its diagnostic pitfalls. This is a difficult diagnosis with many false positives and false negatives. Diagnosis is mostly based on clinical history and ultrasound examination, with computed tomography and/or magnetic resonance used to support the diagnosis and to exclude other pathologies.</p>	
US	<p>Isolated ovarian enlargement with or without parenchyma heterogeneity</p> <p>Ovarian cyst</p> <p>Peripheral follicles</p> <p>Dermoid cyst</p> <p>Free fluid</p>	DOPPLER	<p>BLOOD FLOW: ABSENT OR PRESENT? Even if present, it does not mean that there is not a torsion</p> <p>whirlpool sign</p>	CT	<p>adnexal enlargement</p> <p>partially cyst mass</p> <p>ipsilateral deviation of uterus</p> <p>misplacement of torsed adnexa</p> <p>ascites</p>
			RM	<p><b>ARGOMENTI AFFRONTATI &amp; CONCLUSIONI</b></p> <p>-adnexal torsion: definition, etiology, clinical features</p> <p>-review of studies</p> <p>-HUCHON'S SCORE</p> <p><b>CONCLUSIONS</b></p> <p>Several final comments can be made on adnexal torsion: (1) Most cases of adnexal torsion involve both ovary and tube. Less frequently, isolated ovarian or tubal torsion may be seen. (2) Most torsed ovaries are enlarged, but rarely the ovary may be normal in size. (3) Avascularity or hypovascularity support the diagnosis of torsion, but hypovascular masses such as ovarian fibroma, thecafibroma, and dermoid cyst are hypovascular per se, without being torsed. (4) The presence of arterial and/or venous flow does not exclude the diagnosis of torsion. (5) Morphology of a torsed ovary is variable, including an appearance simulating epithelial tumors. (6) The "classic" appearance of ovarian torsion with enlargement and a row of prominent peripheral follicles is infrequent. (7) A significant number of cystic structures found in the context of adnexal torsion represent hydatidocystes rather than ovarian cysts. (8) Because of the described variable morphology and Doppler appearance, correlation with clinical history is of the utmost importance when considering the possibility of adnexal torsion.</p>	

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO & RISULTATI	ARGOMENTI & TRATTATI & CONCLUSIONI
<p><b>Adnexal with Torsion Dystrophic Calcifications in an Adolescent: A Chronic Entity?</b><sup>17</sup></p>	<p>Hasdemir PS1, Eskicioglu F1, Pekindil G2, Kandiloglu AR3, Guvenal T1. Case Rep Obstet Gynecol. 2013;2013:235459. doi: 10.1155/2013/235459. Epub 2013 Dec 19.</p>	<p>To speculate that the pattern of the intermittent pain in the story of the patient and the dystrophic calcifications might have been potentially developed as a result of chronic hypoxia due to intermittent partial torsions over a period of two years.</p>	<p>Case report An 18-year-old girl presented to the outpatient clinic with an intermittent pelvic pain for the last two years with a worsening pattern over the last 6-weeks. <u>Past medical history:</u> unremarkable. <u>Physical examination:</u> 10cm soft mass in front of the uterus. <u>Laboratory findings:</u> white blood cell count of <math>7.6 \times 10^3</math>, serum hematocrit level of 26%, and serum Ca-125 level of 52.2U/mL. Serum LDH, Alpha fetoprotein, CA 19-9, and beta-HCG levels were within normal limits. <u>Pelvic MRI</u> diffuse hypointensity of necrotic left ovary with small hyperintense peripheral area corresponding to hemorrhage and calcification at the periphery of left ovary as a hypointense focus. <u>Pelvic ultrasonography with colour Doppler</u> showed a <math>63 \times 56 \times 66</math>mm solid-cystic mass with no arterial perfusion. <u>Laparoscopy:</u> the right ovary was seen in front of the uterus as a biloculated cystic mass (<math>8 \times 9</math> cm in diameter). Torsioned left adnexa (<math>9.5 \times 7</math> cm in diameter) was obliterated to Douglas pouch completely with adhesions. Cystectomy was made in the right ovary. The left adnexa were mobilized with blunt dissection. Both left tuba and ovary were seen three times torsioned in the presence of a cystic mass. Total salpingo-oophorectomy was performed because of the diffuse tissue necrosis.</p>	<p>-adnexal torsion: definition -role of calcifications <b>CONCLUSIONS:</b> <b>calcification might have been potentially developed as result of chronic hypoxia due to intermittent partial torsions in a long time.</b></p>

<b>TITOLO</b> <b>The Auto-Amputated Adnexa: A Review of Findings in a Pediatric Population</b> <sup>18</sup>	<b>AUTORI E RIVISTA DI PUBBLICAZIONE</b> Focșeneanu MAI, Omurtag K, Ratts VS, Merritt DE. <i>J Pediatr Adolesc Gynecol.</i> 2013 Dec;26(6):305-13. doi: 10.1016/j.jpags.2012.08.012. Epub 2012 Dec 31.	<b>SCOPO</b> To quantify our experience and that of the literature with diagnosis and management of the auto-amputated adnexa in a pediatric population.	<b>TIPO DI STUDIO</b> Case series of pediatric patients (<18 years of age) with surgically documented adnexal auto-amputation collected from our medical center and the literature 3 case reports + 91 cases of auto-amputated adnexa from literature since 1943 TOT: 94 CASES.
<b>RISULTATI</b> Case 1: Autoamputation of Left Adnexa with Free-floating Mass in Cul-de-sac Case 2: Autoamputation of Left Adnexa with Adherence and Implantation at Transverse Colon Case 3: Autoamputation of the Right Adnexa with Preservation of the Structures and Blood Supply at the Pelvic Side Wall  46/94 patients (49%) <18 years of age. Of these, the majority (n = 26) were identified in a subgroup of girls who were diagnosed with an adnexal cyst by antenatal ultrasound. 6 of these neonates were asymptomatic at birth or had a palpable abdominal mass and at the time of surgical exploration were found to have an auto-amputated adnexa.  34/46 cases were analyzed in detail. The right adnexa were involved in 56% of the cases. The most common presenting complaint verbalized by the older girls was pain; however, 8 cases were identified in asymptomatic girls undergoing unrelated diagnostic testing	<b>ARGOMENTI TRATTATI</b> -autoamputation: definition, incidence (1 in 11,421), etiology*, autoamputation in utero and neonates!!-> etiology -references to old studies -consequences of auto-amputation: tubo-ovarian remnant is found free-floating in the pelvis management:		<b>CONCLUSIONI</b> <b>CONCLUSIONS:</b> The auto-amputated adnexa is a rare finding in the pediatric population, but it must be considered as a possible explanation for the incidental finding of absence of the fallopian tube or ovary in the subgroup of patients who undergo surgery for any reason. Patients with an antecedent history of pelvic pain either chronic or intermittent in nature may be diagnosed with torsion or less frequently autoamputation of the adnexa. A fetal “pelvic mass” or “ovarian cyst” may predispose the adnexa to torsion and subsequent auto-amputation either in-utero or post-delivery. Many of these antenatally diagnosed cysts and even subsequent auto-amputations are completely asymptomatic, however, and do not compromise fertility assuming the contralateral adnexa are normal. Thus expectant management is appropriate for small (less than 4 cm), asymptomatic simple cysts and even suspected auto-amputated adnexa in an asymptomatic patient. If the simple cysts increase in size, become complex, or cause symptoms, they are often treated by ultrasound-guided drainage or surgical excision

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDI
<b>Clinico-pathological profile of adnexal torsion cases: a retrospective analysis from a tertiary care teaching hospital<sup>29</sup></b>	Vijayalakshmi K1, Reddy GM2, Subbiah VN3, Sathya S4, Arjun B5.  J Clin Diagn Res. 2014 Jun;8(6):OC04-7. doi: 10.7860/JCDR/2014/8167.4456. Epub 2014 Jun 20.	To analyze the clinical and pathological profile of adnexal torsion cases in a tertiary care teaching hospital.	The study was a retrospective analysis of hospital records. It included all cases of adnexal torsion that underwent laparotomy between January 2007 to December 2012 in a tertiary care teaching hospital. The study was approved by the Institute's human Ethics Committee.  Results: A total of 18 patients were included in the study. Majority (66.7%) of participants were in the reproductive age group. Abdominal pain was the most common symptom seen in 77.8% of patients. The other symptoms were abdominal distension, back ache and dysuria. Majority of the women belonged to Para 2 (44.4%) and Para 3 (27.8%). The proportion of women with one and two LSCS was 11.1% and 16.7% respectively. Tenderness (38.9%), mass (22.2%) were the common per abdomen findings. Pespesculum findings were normal in majority (88.9%) of the participants. About 39.2% of the patients presented with a mass in either fornices or pouch of Douglas on per vaginal examination. The side of lesion was only on right in 9 (50%), only left in 7(38.9%) and both sides in 2 (11.1%) of cases. On histopathological examination, of the lesions there were mucinous cystadenoma (33.3%) serous cystadenoma (16.7%) and benign cystic teratoma (16.7%) as most common lesions.
<b>CLINICA</b> Abdominal pain 44.4% Abdominal pain with vomiting 27.8% Abdominal pain,vomiting & fever 5.6% Abdominal distension 5.6% Back ache 5.6% Dysuria 5.6% Pain & distension 5.6%	<b>DIAGNOSI</b> (laboratorio e strumentali) The sonographic findings which may predict adnexal torsion are visualisation of a cystic, solid or complex mass at the location of the adnexal, cranial to the uterine fundus, thickening of the adnexal wall, unilateral ovarian enlargement, peripherally enlarged follicles, cystic hemorrhage and free pelvic fluid	<b>TRATTAMENTO</b>	<b>CONCLUSIONI</b> <b>CONCLUSIONS: Adnexal torsion, though a rare clinical condition can present as an emergency most of the times. High index of suspicion is required for diagnosis, as the clinical presentation can be varied. But the diagnosis can be made certain only on the operating table, either by laparoscopy. Avoiding a delay in operating upon the patient will help prevent complications, and aid in conserving the ovary.</b>

TITOLO	AUTORI E DI RIVISTA PUBBLICAZIONE	SCOPO	TIPO DI STUDIO & RISULTATI	ARGOMENTI TRATTATI & CONCLUSIONI
<p><b>Effect of detorsion alone and in combination with enoxaparin therapy on ovarian reserve and serum antimüllerian hormone levels in a rat ovarian torsion model<sup>1</sup>.</b></p>	<p>Kaya C1, Turgut H2, Cengiz H3, Turan A4, Ekin M3, Yaşar L3  Fertil Steril. 2014 Sep;102(3):878-884.e1. doi: 10.1016/j.fertnstert.2014.06.007. Epub 2014 Jul 1.</p>	<p>To investigate the effect of enoxaparin on ovarian reserve and antimüllerian hormone (AMH) levels in a rat ovarian torsion model.</p>	<p><b>DESIGN:</b> Experimental study.  <b>SETTING:</b> Experimental surgery laboratory in a training and research hospital.  <b>ANIMAL(S):</b> 14 female Wistar Hannover rats.  <b>INTERVENTION(S):</b> 1) Control group received no special treatment other than abdominal exposure; 2) detorsion-only group received bilateral adnexal torsion (3-hour ischemia), and then after 3-hour torsion period, detorsion (reperfusion) was performed; and 3) detorsion-enoxaparin group received 0.5 mg/kg enoxaparin subcutaneously 2 hours before the same surgery as the detorsion-only group and a second 0.5 mg/kg dose of enoxaparin 24 hours after the first surgeries. Apart from the surgeries, preoperative and postoperative 1-mL blood samples were drawn from the right jugular vein of each rat.  <b>MAIN OUTCOME MEASURE(S):</b> Preoperative and postoperative serum AMH levels, histopathologic damage scores, and follicle counts in the ovarian tissue of the rats.  <b>RESULT(S):</b> Vascular congestion and hemorrhage scores were higher in the detorsion-enoxaparin group than in the detorsion-only and control groups. The number of small antral follicles was smaller in the detorsion-only group than in the control group. The difference in the pre- and postoperative AMH levels was higher in the detorsion-only group than in the control and detorsion-enoxaparin groups.</p>	<p><b>CONCLUSIONS:</b> The combination of enoxaparin therapy with conventional ovarian detorsion is more effective in protecting the ovarian reserve than detorsion alone.</p>

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO
<b>Key Clinical Predictors in the Early Diagnosis of Adnexal Torsion in Children</b> <sup>22</sup>	Appelbaum HI, Abraham C, Choi-Rosen J, Ackerman M. J Pediatr Adolesc Gynecol. 2013 Jun;26(3):167-70. doi: 10.1016/j.jpag.2012.12.005. Epub 2013 Apr 6.	The purpose of this study was to identify predictors that differentiate adnexal torsion from other sources of acute abdominal pain.	This study was retrospective chart review of girls age 4-18 y/o with acute abdominal pain who then underwent surgical evaluation. Data collected included age, menarchal status, symptoms, physical exam findings, laboratory tests, imaging studies, operative procedures and postoperative diagnosis. Factors associated with adnexal torsion were included in a logistic regression model. A receiver operator characteristic (ROC) curve based on this model was then constructed in order to determine its ability to predict adnexal torsion.  <b>Results: 94 patients presented with acute abdominal pain; 45 were diagnosed with AT and 49 with other causes of abdominal pain. Presence of intermittent pain (P&lt;.0217), non-radiating pain (P&lt;.0229) and increased adnexal size (P &lt; .0032) were significantly associated with adnexal torsion in the final model. The area under the ROC curve was equal to 0.8601, suggesting excellent discrimination between adnexal torsion and other causes of acute abdominal pain by using these 3 parameters.</b>
<b>CLINICA</b> nausea, vomiting, fever, abdominal pain, leukocytosis		<b>DIAGNOSI</b> (laboratorio e strumentali) US: whirlpool sign free fluid, abnormal position of the adnexa in relation to the uterus, and tenderness of the adnexa during imaging. Color Doppler can be confusing because there are many series where Color Doppler flow was present in surgically proven cases of adnexal torsion	<b>TRATTAMENTO</b> Standard management of AT for many years involved oophorectomy (and possible laparotomy) secondary to delays in diagnosis that limited preservation of ovarian viability. Now, laparoscopic untwisting has become a fundamental tenet of AT management and has been found to be efficacious in children with AT. In 2010, however, Guthrie et al noted that the incidence of oophorectomy had not changed between 2000 and 2006. These findings further emphasize the need for a tool that can assist in making an earlier diagnosis of AT in order to improve ovarian viability and ovarian salvage rates.
			<b>CONCLUSIONI</b> adnexal torsion: introduction, incidence, etiology.  <b>CONCLUSIONS : Key clinical and imaging findings can aid in the early diagnosis of AT in children. Future prospective studies will focus on development of a clinical predictive model for the diagnosis of AT in the pediatric population.</b>



TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO
<b>Pediatric ovarian torsion: case series and review of the literature</b> <sup>23</sup>	Poonai N, Poonai C, Lim R, Lynch T. Can J Surg. 2013 Apr;56(2):103-8. doi: 10.1503/cjs.013311.	The objective of the present 15-year review of ovarian torsion in a large Canadian children's hospital was to more completely describe the nature of the pain in pediatric patients with ovarian torsion and detail findings on ancillary tests, such as urinalysis.	Methods: We performed a retrospective review of hospital charts of all patients aged 0–18 years (mean age: 12) with a diagnosis of ovarian torsion at the Children's Hospital at London Health Sciences Centre, in London, Ont., from 1993 to 2008. Results: We analyzed 13 charts of patients aged 7 months to 18 years. Most patients presented with peripheral leukocytosis, vomiting and right lower quadrant pain that did not radiate or migrate. On urinalysis, about half the patients demonstrated pyuria without bacteruria. Pelvic ultrasound revealed an ovarian cyst on the same side of the pain in 11 of 13 patients. Most were found to have a hemorrhagic cyst or ovary and underwent salpingo-oophorectomy or cystectomy within 48 hours of presentation.
<b>CLINICA</b>	acute onset lower abdominal pain and vomiting	<b>DIAGNOSI</b> (laboratorio e strumentali) Ultrasound is the diagnostic modality of choice; however, the presence of vascular flow on Doppler imaging does not reliably exclude torsion	<b>CONCLUSIONI</b> <b>CONCLUSIONS: Ovarian torsion should be considered in any female child with acute onset lower abdominal pain accompanied by vomiting. Pain can be characterized as constant or colicky, but unlike with appendicitis, does not typically migrate. Sterile pyuria is found in a substantial proportion of cases. Ultrasound is the most useful initial diagnostic modality, but the absence of flow on Doppler imaging is not always present. Conservative management with detorsion and oophorectomy is recommended.</b>
		<b>TRATTAMENTO</b> With regards to surgical management, most patients (11 of 12) underwent surgery within 48 hours of presentation. In 1 patient, the pathologist reported a right-sided enlarged ovary, which presumably had torsioned and then spontaneously detorsioned. Six of the 11 patients underwent ipsilateral salpingo-oophorectomy. Three patients underwent cystectomy. Only 2 patients underwent detorsion and oophorectomy. Three patients underwent detorsion only.	To our knowledge, our study is the first to document sterile pyuria in a substantial proportion of patients with ovarian torsion, suggesting that urinary tract infection as an alternate diagnosis may delay timely intervention.

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO & RISULTATI	ARGOMENTI & CONCLUSIONI	TRATTATI &
"Habitual adnexal torsions" -- recurrence after two oophoropexies in a prepubertal girl: a case report and review of the literature <sup>26</sup>	Shezaf B1, Ohana E, Weintraub AY.  J Pediatr Adolesc Gynecol. 2013 Jun;26(3):e81-4. doi: 10.1016/j.jpag.2013.01.060. Epub 2013 Mar 19.	To describe a case of recurrent asynchronous bilateral torsions in a prepubertal patient	<p>a case of a 8-year-old girl who suffered 5 events of recurrent asynchronous bilateral ovarian torsion after utero-ovarian ligament fixation.</p> <p>An 8-year-old girl presented to the pediatric emergency room with cramping right abdominal pain and vomiting which started a day earlier.</p> <p>She had no fever, dysuria, or diarrhea.</p> <p>medical history: unremarkable.</p> <p><u>E/O:</u> Her abdomen was soft, with significant right lower quadrant tenderness.</p> <p><u>US:</u> abundant free fluid and a cystic mass in the pelvis.</p> <p><u>CT</u> scan was suggestive of a right ovarian torsion.</p> <p><u>Laparoscopy</u> revealed a right 720° adnexal torsion. The right ovary and tube looked ischemic but regained their normal color after untwisting. Both ovaries had a polycystic appearance. The uterus was infantile and both ovarian ligaments were described as extremely long.</p> <p>She returned afterwards 4 times.**The etiology for the sequential oophoropexy failure in the patient can only be speculated.</p>	<p>-adnexal torsion: definition, incidence, clinical features, diagnosis, etiology, treatment.</p> <p>-Laparoscopy vs laparotomy</p> <p>-Role of Oophoropexy.</p> <p>-explanations about oophoropexy (when, how)</p> <p><b>CONCLUSIONS:</b> recurrent adnexal torsion before puberty is rare but might jeopardize ovarian function. In the absence of clear evidence, treatment should be flexible and dependent on the individual case. Thorough patient education is imperative in order to prevent a delay in diagnosis and treatment of recurrent adnexal torsion.</p>	

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO DELLO STUDIO MODALITA'	E SUE	RISULTATI
<p><b>A Meta-Analysis of B-Mode Ultrasound, Doppler Ultrasound, and Computed Tomography to Diagnose Pediatric Ovarian Torsion<sup>37</sup></b></p>	<p>Bronstein ME1, Pandya S1, Snyder CW2, Shi Q3, Muensterer OJ1.  Ear J Pediatr Surg. 2015 Feb;25(1):82-6. doi: 10.1055/s-0034-1387946. Epub 2014 Aug 30.</p>	<p>we performed a meta-analysis of all the published studies on B-mode ultrasound (US, morphological criteria), Doppler US (DUS, flow criteria), and computed tomography (CT) for the diagnosis of OT.</p> <p>The medical literature from 1987 to 2013 was searched for studies that evaluated US, DUS, CT, or combination of these techniques to diagnose OT in children using PubMed/MEDLINE database. The studies were screened and included if the quality criteria were met. Data were extracted using a standardized form. Reported sensitivities and specificities were pooled with 95% confidence intervals using a RevMan version 5.1 software (The Cochrane Collaboration, Oxford, United Kingdom).</p>	<p>The search strategy yielded a total of 347 studies from PubMed/MEDLINE electronic database. After applying an inclusion and exclusion criteria a total of 21 studies were identified with a total of 1,843 patients</p> <p>Results: A total of 18 US studies with 716 combined patients were included, along with 15 DUS studies comprising of 1,021 patients, and 5 CT studies with a total of 107 patients. All studies reported sensitivities, while only few selected studies also reported specificities. Using morphological criteria on B-mode US (including absolute or relative ovarian size, echotexture, location, and configuration) yielded high sensitivity and specificity (average 92 and 96%, respectively); DUS was highly specific, but lacked sensitivity, while CT was the least sensitive test. CT specificities could not be calculated from the available data.</p>	
<p><b>US</b></p> <ul style="list-style-type: none"> <li>-Enlarged heterogeneous ovary</li> <li>-Adnexal mass with ipsilateral nonidentification of the ovary</li> <li>-Cystic mass, particularly &gt; 5 cm in diameter</li> <li>-Multiple peripheral cortical follicles dilated with transudative fluid</li> <li>-Whirlpool-sign</li> </ul>	<p><b>DOPPLER</b></p>	<p><b>CT</b></p>	<p><b>RM</b></p>	<p><b>ARGOMENTI/FRONTATI &amp; CONCLUSIONI</b></p> <p><b>CONCLUSIONS:</b> this study found considerable variability of the reported sensitivities and specificities for the diagnosis of OT across all evaluated imaging modalities. Interestingly, B-mode US was the most sensitive and specific examination to detect OT. Some authors reported high diagnostic accuracy of DUS as well, but these findings have not been universally reproduced. CT had low overall sensitivity and is not recommended for the workup of suspected OT.</p>

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO DELLO STUDIO E SUE MODALITA'	RISULTATI
Fallopian tube torsion in the pediatric age group: radiologic evaluation <sup>25</sup>	Narayanan S, Bandarkar A, Bulas DI. <i>J Ultrasound Med.</i> 2014 Sep;33(9):1697-704. doi: 10.7863/ultra.33.9.1697	Our objective was to review whether imaging findings can be specific enough to suggest the diagnosis of tubal torsion prospectively in the appropriate clinical setting	An Institutional Review Board-approved retrospective review of our imaging database from 2005 to 2012 revealed 10 surgically proven cases of fallopian tube torsion.  All cases had sonography performed; 5 cases had additional multidetector computed tomography. All 10 patients (9-17 years) presented with acute pelvic pain. Sonographic findings included dilated tubular structures in 6 of 10 cases; adjacent to a normal ipsilateral ovary in 5 of 6 and adjacent to a benign ovarian teratoma in 1. In 4 cases, no dilated tube was identified; 3 of 4 had a cystic mass separate from the ovaries, and 1 had the imaging appearance of a multicystic ovary. Computed tomographic findings in the 5 cases that underwent multidetector computed tomography included a dilated tubular structure in 3 of 5; 2 of 5 had a cystic adnexal mass identified.
US dilated tubular structures dimension whirlpool sign	DOPPLER	CT cystic mass	ARGOMENTIAFFRONTATI & CONCLUSIONI  CONCLUSIONS: Although rare, tubal torsion should be considered in female adolescents with acute pelvic pain. Sonography should be the first imaging choice. When a tubular structure or a midline cystic mass associated with a normal ipsilateral ovary is noted, tubal torsion should be considered in the differential diagnosis.

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO & RISULTATI	ARGOMENTI TRATTATI & CONCLUSIONI
<p><b>Torsion of Fallopian Tube Remnant Associated with Noncommunicating Rudimentary Horn in Adolescent Girl with Unicornuate Uterus<sup>36</sup></b></p>	<p>Blitz MJ, Appelbaum H. J Pediatr Adolesc Gynecol. 2014 Oct;27(5):e97-9. doi: 10.1016/j.jpag.2013.07.012. Epub 2013 Dec 9.</p>	<p>to describe a case report</p>	<p>A 14-year-old female presented with intermittent right lower quadrant pain which varied from sharp to dull, radiated to the periumbilical region, and was associated with nausea and vomiting. <u>medical history</u>: unremarkable. <u>EO</u>: On examination, she was afebrile and her vital signs were stable. Her abdomen was soft with normal active bowel sounds. There was significant right lower quadrant tenderness with rebound. No palpable masses were identified. The external genitalia were grossly normal. The hymen was intact and concentric. On bimanual exam, a single vagina with a single cervix at the apex was identified. Significant right adnexal tenderness was noted, which compromised the ability to adequately assess the pelvic structures. <u>laboratory exams</u>: Urine HCG was negative, white blood cell count was 8,800/mL, and hemoglobin was 11.3 g/dL. <u>US</u>: normal ovaries bilaterally, a 2-cm simple adnexal cyst adjacent to the right ovary, and a normal uterus. <u>CT scan of the abdomen and pelvis</u>: normal appendix, normal bladder, normal kidneys bilaterally, and showed no evidence of ureteral stones. <u>Diagnostic laparoscopy</u>: unicornuate uterus with a normal-appearing left uterine horn and fallopian tube but atretic and cordlike müllerian structures on the right side. Ovaries were normal bilaterally. Torsion of the right tubal remnant and two paratubal cysts were noted. Although the structures were viable, they were excised to avoid recurrence and prevent future ectopic pregnancy.</p>	<p>-adnexal torsion: definition, diagnosis, clinical features  -müllerian anomalies: embryology, causes, incidence, classification, associated anomalies, consequences, diagnosis, treatment.  -Müllerian anomalies may increase the risk of adnexal torsion secondary to looser ligamentous attachments and consequent lack of fixation to the pelvic sidewall  -association between müllerian anomalies and adnexal torsion  <b>CONCLUSIONS: Agenesis, hypoplasia, or maldevelopment of müllerian structures may predispose patients to an increased risk of adnexal torsion secondary to looser ligamentous attachments and consequent lack of fixation to the pelvic sidewall.</b></p>

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO & RISULTATI
<p><b>Management of Isolated Tubal Torsion in a Premenarchal Adolescent Female with Prior Oophorectomy: A Case Report and Review of the Literature</b><sup>31</sup></p> <p><b>CASE REPORT</b></p> <p>A 14-year-old premenarchal girl presented to the emergency room with intermittent sharp lower abdominal pain of sudden onset accompanied by nausea and vomiting for several hours. Two years prior to this episode, she presented with similar severe abdominal pain and was found on emergent laparoscopy to have synchronous bilateral ovarian torsion, which was treated by untwisting and bilateral oophorectomy. She had no other significant medical history. Pain was not relieved by ibuprofen at home. On initial evaluation, the patient was alert and oriented, afebrile and normotensive. <u>EO</u>: mild tenderness in the left lower quadrant without rebound or guarding. Her physical exam was otherwise unremarkable.</p> <p>Digital vaginal examination and transvaginal ultrasound were not performed. The white blood cell count was elevated at 13,900. All other labs were within normal limits.</p> <p><u>US</u>: enlarged, heterogeneous left adnexa measuring 6.4 * 3.9 * 3.6 cm and a normal right ovary. The uterus was unremarkable. There was no free fluid. Furthermore, ultrasonographic evaluation of both ovaries suggested that they were properly positioned near the posterior aspect of the uterus consistent with previous oophorectomy.</p> <p>Emergent diagnostic laparoscopy revealed a dilated, dark red, edematous and twisted left fallopian tube with no evidence of necrosis. Ovaries appeared normal bilaterally. No pelvic adhesions were noted. Surgical evidence of previous bilateral plication of the utero-ovarian ligaments was confirmed.</p> <p>Laparoscopic untwisting of the left tubal structure allowed for immediate restoration of the appropriate vascular supply to the left fallopian tube. The postoperative course was uneventful and the patient was discharged home the next day with complete resolution of her symptoms.</p>	<p>Bliz MJ1, Appelbaum H.</p> <p>J Pediatr Adolesc Gynecol. 2013 Aug;26(4):e95-7. doi: 10.1016/j.jpags.2013.02.002. Epub 2013 Apr 17.</p>	<p>This case demonstrates that isolated tubal torsion should be considered in the differential diagnosis of acute abdominal pain in premenarchal girls and that a history of oophorectomy should not exclude the diagnosis of torsion of the adnexal structures</p>	<p>3 case reports</p> <p><b>ARGOMENTI TRATTATE/LE CONCLUSIONI</b></p> <p>adnexal torsion: causes</p> <p><b>CONCLUSIONS: Clinicians should consider torsion of the fallopian tube in the differential diagnosis of lower abdominal pain in all female patients. Prompt laparoscopic intervention is essential. Oophorectomy, while usually efficacious, may not prevent recurrence.</b></p>

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO
<b>Isolated Fallopian Tube Torsion in Pediatric and Adolescent Females: A Retrospective Review of 15 cases at a Single Institution</b>	Casey RK1, Damle LF, Gomez-Lobo V. J Pediatr Adolesc Gynecol. 2013 Jun;26(3):189-92. doi: 10.1016/j.jpag.2013.02.010.	To identify and review cases of isolated fallopian tube torsion (FTT) at our institution to further characterize diagnosis and management.	A retrospective review was conducted using the electronic medical record system to identify all charts with the ICD-9 diagnosis code 620.5 (ovarian, ovarian pedicle, or fallopian tube torsion) from September 1, 2001 through September 1, 2011. Case series of pediatric and adolescent females, 21 years old, with operatively diagnosed isolated fallopian tube torsion from our institution. Eighty-two patients were identified with the ICD-9 code 620.5 during the study period. Sixteen patients were identified as having fallopian tube torsion, 13 of which were isolated fallopian tube torsion without ovarian torsion diagnosed intraoperatively.
<b>CLINICA</b>	abdominal pain (93%). 53% : lower abdominal pain localized to the associated side of tubal torsion. 20%: generalized lower abdominal pain. One patient presented with suprapubic pain, 1 with back pain, 1 with abdominal and flank pain, and 1 with inguinal pain. Duration of pain ranged from 1 day to 6 months. Ten patients had acute onset of pain ranging from 1-3 days. The remaining 5 patients reported pain for a longer period of time. One patient had constant pain for 2 weeks, 1 for 3 weeks, 1 intermittently for 2 months, and 1 intermittently for 6 months. Fourteen patients presented with associated nausea and vomiting (93%).	DIAGNOSI (laboratorio e strumentali) elevated white blood cell count (40%); normal value was defined as 4.1-9.43 109/L. Three patients had tumor markers drawn (alpha-fetoprotein, human chorionic gonadotropin, lactate dehydrogenase, inhibin), due to concern for adnexal mass, all of which were negative. 9 had a CT scan of the abdomen and pelvis prior to US examination. All patients had US evaluation. On US, 11 patients had suspected adnexal cyst or mass, either ovarian or paraovarian. Ultrasonography reported only 3 findings of absent or decreased flow to the adnexa. Four patients had a mass described as tubular in structure, all of which included fallopian tube torsion on the preoperative diagnosis. Imaging that revealed a dilated tubular structure was described in 6 cases. Five cases showed evidence of a normal ipsilateral ovary, 3 of which included a cystic mass separate from the ovary. In the remaining 4 cases, no discrete dilated tube was identified.	Results: Fifteen cases of isolated fallopian tube torsion were identified based on intraoperative diagnosis. Patient ages ranged from 8-15 years old, mean age of 12. 14 patients (93%) presented with abdominal pain, 8 (53%) localized to the side of associated torsion. Ultrasonography reports described a tubular structure in 4 patients and an associated ovarian or paraovarian cyst in eleven patients. Suspicion of fallopian tube torsion was only described for those patients with a tubular structure described on ultrasonography report. Intraoperatively, 7 patients (47%) were found to have no associated pathology and 8 (53%) were found to have associated cyst or hydrosalpinx. Eight (53%) patients underwent salpingectomy and 7 (47%) underwent reversal of torsion with drainage of associated cyst or cystectomy.
			CONCLUSIONI
			CONCLUSIONS: Isolated fallopian tube torsion is a rare condition that seems to occur in younger adolescents. Vague clinical presentation contributes to low preoperative suspicion. Preoperative suspicion may be increased based on radiographic findings of an enlarged tubular structure or an adjacent normal ovary. Management may be considered non emergent and salpingectomy is controversial. Long-term fertility outcomes must be further assessed for more definitive decisions regarding surgical management.
			TRATTAMENTO
			Eight patients underwent salpingectomy (53%) and 7 patients underwent reversal of torsion with drainage of associated cyst or cystectomy (47%). Of the patients who had conservative surgery, 2 also had a salpingoepexy. Overall, 2 patients also underwent an appendectomy. Pathology revealed hemorrhagic and ischemic necrosis in all of the fallopian tube segments. All tubal cysts or cystic fluid sent for pathology were found to be benign.

TITOLO	AUTORE RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO & RISULTATI
<p><b>Isolated Fallopian Tube Torsion in Adolescents</b><sup>33</sup></p>	<p>Rajaram S, Bhaskaran S, Mehta S.  <b>Case Rep Obstet Gynaecol.</b> 2013;2013:341507. doi: 10.1155/2013/341507. Epub 2013 Oct 22.</p>	<p>describe 2 cases of ITT</p>	<p>2 case report</p>
<p><b>CASE REPORT</b></p>			<p><b>ARGOMENTI TRATTATE E CONCLUSIONI</b></p>
<p>Case 1: a 19-year-old girl presented with complaints of pain in the left lower abdomen since one day associated with episodes of vomiting. Her menstrual cycles were regular.  <u>EO</u>: tenderness in the left iliac region with no evidence of a mass.  Hematological investigations were normal and urine pregnancy test was negative.  <u>US</u>: 3.9 x 2.7 cm, heterogeneous mass in the left ovary with absent vascularity.  <b>diagnostic laparoscopy</b>: a twisted left fallopian tube at isthmic end (two twists) with ovary having a hemorrhagic cyst lying in POD Left tube was edematous, dilated, and congested with the fimbrial end appearing blue. Untwisting of the tube resulted in return of vascularity after 15 mins. Postoperative period was uneventful.</p> <p>Case 2: a 18-year-old patient presented with similar complaints since 1 week with aggravation of pain since two days. She had normal menstrual cycles with no past history of cyclical pain in abdomen, fever, or tuberculosis.  <u>EO</u>: mild tenderness in lower abdomen, and on per rectal examination a cystic tender mass of about 4 cm x 4 cm was felt in the midline.  <u>US</u>: revealed right adnexal cyst of 6.5 cm x 6.1 cm size with internal echoes.  Hematological investigations and tumor markers were normal.  <b>Diagnostic laparoscopy</b> showed a large terminally dilated twisted right fallopian tube (6 cm x 4 cm) which was dark blue and twisted two and a half times in a clockwise direction. Untwisting failed to improve color of tube and right salpingectomy was done. Histopathological examination revealed a paratubal cyst lined by mesothelium. The fallopian tube and wall of the cyst showed marked congestion and hemorrhage.</p>			<p><b>CONCLUSIONS</b>: Fallopian tube torsion, though rare, should be considered in women of reproductive age with unilateral pelvic pain. Early diagnostic laparoscopy is important for an accurate diagnosis and could salvage the tube.</p>



TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO	ARGOMENTI & CONCLUSIONI
Laparoscopy in elective and emergency management of ovarian pathology in children and adolescents*	Grabowski AI, Korlacki WI, Pasierbek MI Wideochir Inne Tech Malo Inwazyjne. 2014 Jun;9(2):164-9. doi: 10.5114/wiitm.2014.41626. Epub 2014 Apr 1.	To evaluate the usefulness of laparoscopy in surgery of lesions located in the ovaries in patients under 18 years of age and assess the risk of changes in the ovaries in girls with acute abdominal symptoms.	Material and methods: Retrospective evaluation of hospital records of the period 1996–2012 from a single hospital was performed. 105 laparoscopic procedures of ovarian pathology in patients aged 0–18 (mean: 13.5) years were reviewed. The overall sample was divided into groups depending on the indication and mode of surgery. Group I: elective or emergency surgery, imaging findings of ovarian cysts bigger than 5 cm or causing pain. Group II: elective surgery, the ovarian tumor visible in imaging (solid mass or mixed). Group III: treatment for acute abdomen, without visible ovarian pathology in the preoperative imaging studies. Group IV: elective treatment of other indications, incidental finding.  Results: There were no deaths or major complications. There were no conversions. Average length of hospital stay after surgery was 2.5 days. The risk of appendicitis in patients referred for surgery due to ovarian cysts visualized in ultrasound, in the factual absence of ovarian pathology (false positive ultrasound), in the presented material was 5.2%. The risk of lesions in the ovaries in patients operated on due to acute abdominal pain, with no findings in the pre-operative ultrasound (false negative ultrasound), in the presented material was 7.4%. The risk of coexistence of changes in the ovaries with appendicitis found during the procedure due to acute abdominal pain in the study group was 6%.	With increasing cyst diameter the risk of ovarian torsion increases – the size limit was established at 5 cm.  <b>CONCLUSIONS:</b> The laparoscopic treatment for ovarian masses is safe and efficient. The risk of wrong preoperative diagnosis (ovary mass vs. appendicitis) is in any direction between 5 and 8%, which is a number large enough to be taken into consideration when surgical training and legislation is concerned. It should be clearly stated also that the surgical treatment of lesions within the ovary in children should always be laparoscopic. The aim is to cut out the lesion, sparing ovarian parenchyma. One should always keep in mind some common symptoms of ovarian pathology and appendicitis and be prepared to change the procedure when forced by the intraoperative image.

TIPO DI STUDIO & RISULTATI	SCOPO			TIPO DI STUDIO & RISULTATI
<p>I case report</p> <p>The striking aspect of our case is that the fallopian tube itself was not twisted, but coiled around the utero-ovarian ligament. There is very little information in the literature on coiling, and imaging studies on coiling are limited.</p>	<p>report a rare case of with a brief literature review.</p> <p>Kim JI, Park D2, Han WB1, Jeong H3, Park YI. <i>Obstet Gynecol Sci.</i> 2014 Jul;57(4):338-41. doi: 10.5468/ogs.2014.57.4.338. Epub 2014 Jul 15.</p> <p><b>Acute abdomen due to ovarian congestion caused by coiling of the fallopian tube accompanied by paratubal cyst around the utero-ovarian ligament<sup>36</sup></b></p> <p><b>CASE REPORT</b></p> <p>A 22-year-old female was transferred to our hospital from a local clinic due to right lower abdominal pain since that morning. She was a virgin and her vital signs were stable without fever. EQ: tenderness and rebound tenderness were found in the right lower abdomen.</p> <p>Laboratory evaluations including hematologic, urinary, and routine chemistry tests were normal except for mild leukocytosis (white blood cell count 10,190/ml).</p> <p>US showed a right ovary measuring 80x32 mm with multiple small follicles located over the uterus and left ovary (74x42 mm) containing a 67x42 mm-sized anechoic cyst. Her pain became more aggravated as time went on without relief with parenteral analgesics. As the right ovary was suspected for torsion, we planned for an emergency laparoscopic operation.</p> <p>Laparoscopic findings revealed a dark blue-colored fallopian tube coiling around the utero-ovarian ligament two and half times in a counter-clockwise direction. The right ovary was enlarged, swollen, edematous, dark bluish discolored and seated over the uterus. A right paratubal cyst (&gt;6 cm in diameter) which had been sonographically misinterpreted as a cystic component of the left ovary was noted in the Douglas pouch, adjacent to the left ovary. The left ovary and tube were normal in appearance. The right ovary was uncoiled from the fallopian tube, and regained its color gradually. However, uncoiled tubal recovery was not as satisfactory as the right ovary. Furthermore, it was densely adherent to the cyst. We thought it would be nearly impossible to resect the cyst without damaging the tube. Due to the possibility of tubal damage which might increase the risk of a subsequent tubal pregnancy, we decided to perform a salpingectomy. The postoperative course was uneventful and the patient was discharged 4 days after the surgery.</p>			<p>ARGOMENTI TRATTATI E CONCLUSIONI</p> <p>-paratubal cysts: definition, embryology.</p> <p><b>CONCLUSIONS: Although coiling has a similar clinical presentation with torsion, surgical results can be significantly different. After uncoiling, a surgeon should decide whether to save the coiled tissue or not, and whether or not to perform salpingectomy, as the affected fallopian tube usually has a pathologic condition like a cyst and is stretched.</b></p>

TITOLO	AUTORIE RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO & RISULTATI
<p><b>An Uncommon Twist: Isolated Fallopian Tube Torsion in an Adolescent<sup>®</sup></b></p>	<p>Kisku S1, Thomas RJ. Case Rep Surg. 2013;2013:509424. doi: 10.1155/2013/509424. Epub 2013 Aug 19</p>	<p>report a case of IIT</p>	<p>We report a 13-year-old girl with bilateral paratubal cysts and left isolated fallopian tube torsion (IITT).</p>
<p><b>CASE REPORT</b></p>			<p><b>ARGOMENTI TRATTATE CONCLUSIONI</b></p>
<p>A 13-year-old postpubertal girl presented with vomiting, left flank, and lower abdominal pain for 5 days. She reported a similar, albeit milder episode 3 months ago. She was being treated by the emergency department for suspected urinary tract infection. EO: afebrile and hemodynamically stable. There was tenderness in the left iliac fossa and differential tenderness on rectal examination, in the Pouch of Douglas. Laboratory exams: Her hemoglobin was 11.0 gm% and total leukocyte count 10,600 cells/cc (66% polymorphs, 34% lymphocytes). Urine microscopy revealed RBC 15–20 cells/high power field (HPF) and WBC 6–8 cells/HPF. Abdominal sonography revealed a right ovarian cyst 6.4 × 3.8 × 5.4 cm. With a provisional diagnosis of torsion of the ovary, emergency laparoscopy was performed. The distal third of the left fallopian tube along with a 5 × 5 cm paratubal cyst had undergone gangrenous torsion (2.5 turns). Both ovaries were normal. The right fallopian tube had several paratubal cysts in its distal third. The torted left cyst contained 40mL of hemorrhagic fluid which was aspirated. The nonviable left fallopian tube and cyst were detorted and excised. The right paratubal cysts (three) were punctured, and clear fluid was drained. Histopathology revealed the left fallopian tube and cyst to be extensively congested, hemorrhagic, and infarcted. The postoperative period was uneventful, and she was discharged two days later. The parents were counseled of possible infertility in the future due to fallopian tubal stenosis secondary to the paratubal cysts.</p>			<p><b>CONCLUSIONS: Paratubal cyst causing isolated fallopian tube torsion is an uncommon cause of pain in an adolescent. Awareness and prompt treatment can potentially salvage the fallopian tube preserving fertility.</b></p>

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO & RISULTATI	ARGOMENTI TRATTATI & CONCLUSIONI
<p><b>Ovarian Torsion in a Patient with Mullerian Agnesis: Increased Risk?</b><sup>38</sup></p>	<p>Sullivan EM, Golden NH, Adams Hillard PJ. J Pediatr Adolesc Gynecol. 2012 Dec;25(6):e125-8. doi: 10.1016/j.jpag.2012.08.001. Epub 2012 Oct 23.</p>	<p>to describe a case report</p>	<p>.A 14-year-old female presented with severe lower abdominal/pelvic pain and emesis. Abdominal examination revealed a firm abdomen, tender to palpation with rebound tenderness, and normal bowel sounds. Pelvic examination revealed a blind ending vagina, 1 cm deep. At surgery, the patient was found to have 12* 11 cm ovarian mass with torsion of the right tube and ovary. Her ovary was rotated 1080° (3 full turns). The ovarian tissue was necrotic and hemorrhagic. The decision was made to perform an oophorectomy, as it appeared that the torsion was likely chronic rather than acute (as her symptoms of pain dated back 5 months, and imaging had revealed a mass 5 months earlier). Frozen section showed necrotic tissue with no evidence of malignancy. The patient's left ovary appeared normal, but was located in the lateral pelvis, unattached to what was felt to be a fibrous uterine remnant. A right uterine remnant was removed. The small fibrous left uterine remnant was left in situ. The final pathology report revealed no viable ovarian parenchyma. The patient was diagnosed with mullerian agnesis with right ovarian torsion.</p>	<p><u>-embryology and anatomy of gonades</u></p> <p>-ovarian torsion: definition</p> <p>-Kives et al reported a similar case of mullerian agnesis and ovarian torsion in 2005. They proposed that the association between mullerian agnesis and ovarian torsion was the improper position of the ovaries above the pelvis and the lack of supporting ligaments which normally originate in the uterus.<sup>2</sup> A review of ovarian and uterine embryology and anatomy supports this hypothesis.</p> <p>-oophoropexy: role and indications</p> <p><b>CONCLUSIONS: Agnesis, hypoplasia, or maldevelopment of mullerian structures may predispose patients to an increased risk of adnexal torsion secondary to looser ligamentous attachments and consequent lack of fixation to the pelvic sidewall.</b></p>

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO DELLO STUDIO MODALITA'	E. SUE	RISULTATI
<p><b>Medial or Lateral Location of the Whirlpool Sign in Adnexal Torsion<sup>39</sup></b></p>	<p>Navve D1, Hershkovitz R, Zetounie E, Klein Z, Tepper R. J Ultrasound Med. 2013 Sep;32(9):1631-4. doi: 10.7863/ultra.32.9.1631</p>	<p>To describe the location of the whirlpool sign (lateral or medial to the ovary) and to evaluate the clinical importance of the location.</p> <p>Thirty patients (14-66 years) with a confirmed surgical diagnosis of torsion and a positive whirlpool sign on sonography before surgery were included. We examined the sonographic clips of these patients.</p>		<p>Sixteen of 30 patients had right-sided torsion. Of these, 7 had a lateral whirlpool sign. All 7 of these patients had an ovarian or paraovarian mass. Nine of these 16 patients had a medial whirlpool sign. Of these, 7 had an ovarian or paraovarian mass, and 2 had no mass. Of the 14 patients with left-sided torsion, all had a medial whirlpool sign. Nine of 14 these patients had an ovarian or paraovarian mass, and 5 had no mass. The mean volume of the masses among cases with the lateral whirlpool sign was significantly greater compared to those with the medial whirlpool sign (304 versus 108 cm<sup>3</sup>); P = .035). In 25 of 30 cases, the torsed components included the ovary.</p>
<p>US -ovarian edema -ovarian mass -pelvic free fluid -whirlpool sign was detected on grayscale and color Doppler sonography by moving the transducer to and fro along the axis of suspected torsion.</p>	<p>DOPPLER ovarian ischemia whirlpool sign</p>	<p>CT</p>	<p>RM</p>	<p>ARGOMENTI AFFRONTATI &amp; CONCLUSIONI -whirlpool sign= a round hyperechoic structure with multiple inner concentric hypoechoic broad rings. This sign can be produced by moving the transducer back and forth along the main axis of the ovarian pedicle. The hypoechoic rings are composed of the components of the ovarian pedicle and include the broad ligament, the fallopian tube, and branches of the ovarian vein and artery. A previous study demonstrated an increase in true-positive cases from 55% to 90% by using the added value of the whirlpool sign. <b>CONCLUSIONS: The lateral whirlpool sign is associated with enlarged masses in comparison to the medial whirlpool sign. This finding indicates the need to search meticulously for the lateral whirlpool sign in cases with enlarged masses to decide whether to operate on these patients emergently</b></p>

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO
<b>Acute right lower abdominal pain in women of reproductive age: Clinical clues<sup>41</sup></b>	Hatipoglu SI, Hatipoglu FI, Abdullayev RI. World J Gastroenterol. 2014 Apr 14;20(14):4043-9. doi: 10.3748/wjg.v20.i14.4043.	To study possible gynecological pathologies in the differential diagnosis of acute right lower abdominal pain in patients of reproductive age.	<b>METHODS:</b> Following Clinical Trials Ethical Committee approval, the retrospective data consisting of physical examination and laboratory findings in 290 patients with sudden onset right lower abdominal pain who used the emergency surgery service between April 2009 and September 2013, and underwent surgery and general anesthesia with a diagnosis of acute appendicitis were collated. <b>RESULTS:</b> Total data on 290 patients were obtained. Two hundred and twenty-four (77.2%) patients had acute appendicitis, whereas 29 (10%) had perforated appendicitis and 37 (12.8%) had gynecological organ pathologies. Of the latter, 21 (7.2%) had ovarian cyst rupture, 12 (4.2%) had corpus hemorrhagicum cyst rupture and 4 (1.4%) had adnexal torsion. Defense, Rovsing's sign, increased body temperature and increased leukocyte count were found to be statistically significant in the differential diagnosis of acute appendicitis and gynecological organ pathologies.
<b>CLINICA</b>		<b>DIAGNOSI</b> (laboratorio e strumentali)	<b>CONCLUSIONI</b>
Clinical findings are similar to those of acute appendicitis (abdominal pain, nausea, vomit)			<b>CONCLUSIONI:</b> Gynecological pathologies in women of reproductive age are misleading in the diagnosis of acute appendicitis.
			<b>TRATTAMENTO</b> Cyst excision Detorsion + oophoropexy Oophorectomy + salpingectomy

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO & RISULTATI	ARGOMENTI & CONCLUSIONI
<p>The role of tumor markers in pediatric age: the surgical approach of ovarian masses in pediatric age: a 10-year study and a literature review<sup>42</sup>.</p>	<p>Spinelli C1, Pucci V, Buti I, Liserre J, Messineo A, Bianco F, Ugolini C. Ann Surg Oncol. 2012 Jun;19(6):1766-73. doi: 10.1245/s10434-012-2249-y. Epub 2012 Feb 10.</p>	<p>The purpose of this study was to detect the role of serum tumor markers in the differential diagnosis and in the choice of the surgical treatment of ovarian lesions in pediatric age.</p>	<p><b>METHODS:</b> We retrospectively reviewed medical charts of all pediatric girls operated in two pediatric centers during a 10-year period. The following features were analyzed: age at the moment of presentation, symptoms, diagnostic studies, surgical approach, pathological findings, and, in particular, serum tumor markers. Also, a literature review and statistical analysis (<math>\chi^2</math> test) concerning the increase of different tumor markers in benign and malignant ovarian lesions were related to the study.</p> <p><b>RESULTS:</b> A total of 120 children with 127 ovarian masses (7 with bilateral pathologies) were reviewed. Pathology showed 61 nonneoplastic lesions (48%), 54 benign tumors (42.5%), 5 malignant tumors (4%), and 7 torsed normal ovaries (5.5%). The evaluation of serum tumor markers was performed in 106 cases and was positive in 16 (15.1%); in all of the 5 cases (100%) of malignant neoplastic lesions and in 11 (20.4%) benign neoplastic ones. The literature review confirmed these data, and statistical analysis highlighted them as significant values.</p>	<p><b>CONCLUSIONS:</b> The role of tumor markers is still controversial. This is the reason why, before considering a radical treatment, we suggest caution to optimize future fertility.</p>

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO & RISULTATI	ARGOMENTI CONCLUSIONI	TRATTATI &
<p>Novel serum inflammatory markers in patients with adnexal masses who had surgery for ovarian torsion<sup>43</sup>.</p>	<p>Daponte A.I, Pourmaras S, Hadjichristodoulou C, Liakos G, Kallitsaris A, Maniatis AN, Messimis IE.</p> <p>Fertil Steril. 2006 May;85(5):1469-72. Epub 2006 Apr 17.</p>	<p>To determine the diagnostic value of pre-operative levels of interleukin-6 (IL-6), tumor necrosis factor-alpha (TNF-alpha), interleukin-8 (IL-8), and E-selectin in patients with an adnexal mass who had surgery for ovarian torsion.</p>	<p>Prospective study.</p> <p><b>RESULT:</b></p> <p>Thirteen patients had proven torsion of the ovary. Serum levels of IL-6 were significantly higher in the 13 patients with proven ovarian torsion compared with the 37 without ovarian torsion. Patients with IL-6 serum values &gt; or = 10.2 pg/mL had a 16 times higher risk of having ovarian torsion. No significant difference was found in TNF-alpha, IL-8, and E-selectin between the two groups.</p>	<p><b>CONCLUSIONS:</b></p> <p><b>The IL-6 levels might assist in the prompt diagnosis of ovarian torsion and allow a timely surgical intervention.</b></p>	



TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO & RISULTATI	ARGOMENTI & CONCLUSIONI	TRATTATI &
Plasma D-dimer level in the diagnosis of adnexal torsion <sup>44</sup>	Incebiyik AI, Camuzcuoglu A, Hitli NG, Vural M, Camuzcuoglu H. J Matern Fetal Neonatal Med. 2014 Jul 28;1-4. [Epub ahead of print]	To date, there is no clinical or laboratory examination particular to adnexal torsion (AT); therefore, the objective of this study was to evaluate whether the plasma D-dimer level has any merit in establishing a diagnosis in AT patients	Materials and methods: In total, 34 women who underwent laparoscopic surgery due to adnexal mass were incorporated into our study. While the study group consisted of 14 women operated on due to AT, the control group comprised of 20 patients operated on due to benign ovarian cysts. In order to study the plasma D-dimer level during the pre-operative period, venous blood samples were obtained from all the women who participated in this study.  Results: The plasma D-dimer level in the AT group was seen to be significantly higher than that of the control group ( $2.20 \pm 1.71 \mu\text{g/ml}$ , $0.43 \pm 0.21 \mu\text{g/ml}$ , $p = 0.002$ , respectively). When the cut-off value for the D-dimer level was taken as $0.65 \mu\text{g/ml}$ , the sensitivity in determining the AT was found to be 71.4%, whereas the specificity was 85%.	-adnexal torsion: definition, etiology -physiology: d-dimer formation  <b>CONCLUSIONS:</b> The results obtained from our present study suggest that the plasma D-dimer level could be a supplementary laboratory examination in establishing diagnoses in AT patients.	

TITOLO	AUTORIE RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO & RISULTATI	ARGOMENTI TRATTATI & CONCLUSIONI
<p><b>High-sensitivity C-reactive protein as a novel marker in early diagnosis of ovarian torsion: an experimental study</b><sup>45</sup></p>	<p>Bakacak M1, Kistiü B, Ercan O, Bostanci MS, Kiran G, Aral M, Çiralik H, Serin S. Arch Gynecol Obstet. 2015 Jan;291(1):99-104. doi: 10.1007/s00404-014-3400-8. Epub 2014 Jul 29.</p>	<p>To investigate the effect of ovarian torsion on plasma high-sensitivity C-reactive protein (hs-CRP) levels and to determine whether hs-CRP levels were a useful adjunct that could be used in the diagnosis of ovarian torsion.</p>	<p>Sixteen nulligravid 4-month-old female Wistar albino rats were randomly and equally allocated into two groups. Control group, sham operation (n = 8) group, and study group, ovarian torsion (n = 8) group. Ovarian torsion model was created using titanium vascular clips and vascular clips were kept for a 2-h period. Right ovaries were surgically removed at the end of the procedure in each group. Blood was sampled before and after operation to assess plasma hs-CRP levels. Ovarian histopathologic findings scores and plasma hs-CRP levels were evaluated.</p> <p>Results In study group, the mean plasma hs-CRP level was significantly higher than that in the control group. (<math>0.91 \pm 0.18</math> vs. <math>0.39 \pm 0.06</math> mg/l, respectively, <math>p &lt; 0.001</math>), following 2 h of ovarian torsion. Histologic examinations of the right ovary confirmed the torsion model. Histologic score of the specimens had higher scores for follicular cell degeneration (<math>p = 0.002</math>), vascular congestion (<math>p = 0.002</math>), inflammatory cell infiltration (<math>p = 0.003</math>), and hemorrhage (<math>p &lt; 0.001</math>) in the study group. For the change in the plasma hs-CRP value for a cut-off value of <math>[0.275</math> mg/l, sensitivity and specificity were calculated as 100 %.</p>	<p><b>CONCLUSIONS:</b> The measurement of hs-CRP in a rat model seems to be a valuable plasma marker in early detection and diagnosis of ovarian torsion. However, further clinical and experimental studies of a larger size are required.</p>

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE.	SCOPO	TIPO DI STUDIO & RISULTATI	ARGOMENTI & TRATTATI & CONCLUSIONI
<p>Significant simultaneous changes in serum CA19-9 and CA125 due to prolonged torsion of mature cystic teratoma of the ovary<sup>46</sup></p>	<p>Suh DS, Moon SH, Kim SC, Joo JK, Park WY, Kim KHI.  World J Surg Oncol. 2014 Nov 22;12:353. doi: 10.1186/1477-7819-12-353.</p>	<p>Report a case of ovarian torsion of MCT with rapid, significant changes in the serum levels of CA19-9 and CA125 in a postmenopausal woman.</p>	<p>56-year-old postmenopausal woman presented with a huge pelvic mass. The patient had experienced moderate pelvic pain for 5 days before visiting a local clinic.  Pelvic ultrasonography revealed a huge mass 11 cm in diameter in the right adnexa. Contrast-enhanced abdominopelvic computed tomography (CT) revealed an 11.0 x 7.5 cm mass containing a fat component arising from the right adnexa. She was referred to our hospital department due to abnormally high tumor markers and suspicion of a coexistent malignancy due to elevated serum CA19-9, CA125, and carcinoembryonic antigen (CEA) levels of &gt;700 U/ml, 282.5 U/ml, and 3.94 U/ml, respectively.  Laboratory examination revealed increased white blood cell count (18,500/uL) and erythrocyte sedimentation rate (90 mm/hour). Previous CT findings were reviewed and showed asymmetric wall thickening of the mass and increased fat strands in peritoneum. During laparotomy, a huge right ovarian tumor that appeared dark brown presumably due to torsion was observed and was surrounded by extensive adhesions to omentum, rectum, and the posterior wall of the uterus. The surface of the tumor was friable, discolored, and had an irregular contour, suggesting inflammatory change, probably due to torsion-induced necrosis. Right salpingo-oophorectomy was performed and adjacent adherent omentum was excised. Frozen section of the tumor revealed MCT. Pathologically, most of the tumor was necrotic and compatible with MCT. Following surgery the patient recovered without any complications, and serum levels of CA19-9, CA125, and CEA decreased to normal levels.</p>	<p><b>ARGOMENTI &amp; TRATTATI &amp; CONCLUSIONI</b></p> <ul style="list-style-type: none"> <li>-Ovarian torsion is a common complication and constitutes a surgical emergency, and the rate of torsion has been reported to range from 12.9% to 15% in mature cystic teratoma (MCT) patients.</li> <li>-The abnormally high serum tumor markers in our patient were probably due to prolonged torsion and subsequent peritoneal inflammation</li> <li>-Review: In another study, Fujiwara and colleagues observed that CA125 and CA19-9 levels increased dramatically prior to surgery following torsion of an ovarian tumor.</li> </ul> <p><b>CONCLUSIONS:</b> Our case suggests that concurrent abnormal elevations of CA19-9 and CA125 are manifestations of torsion of the ovary and subsequent necrosis and inflammation, which is consistent with the observations made in previous studies. In conclusion, a highly elevated serum CA19-9 level may be an adjunct serum marker for the diagnosis of ovarian teratoma, and could also provide useful information on the presence of torsion.</p>

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO & RISULTATI	ARGOMENTI & CONCLUSIONI	TRATTATI &
Is the Measurement of Serum Ischemia-Modified Albumin the Best Test to Diagnose Ovarian Torsion? <sup>1,2*</sup>	Güven Sİ, Kart C, Guvendag Guven ES, Çetin EC, Mentçe A. Gynecol Obstet Invest. 2015 Jan 9. [Epub ahead of print]	The aim of this study is to evaluate the diagnostic value of serum oxidative stress marker levels (ischemia-modified albumin, IMA; malondialdehyde, MDA) and total oxidant status (TOS), total antioxidant status (TAS) and oxidative stress index (OSI) levels that occur in ovarian torsion and to determine the threshold value of these markers in the diagnosis of ovarian torsion.	<p><b>Methods:</b> In this prospective case-control study, 34 women (the study group) with acute pelvic pain (20 with and 14 without ovarian torsion) and 40 control subjects were included. The diagnosis of ovarian torsion was confirmed with laparoscopy in all cases. Preoperative serum samples were collected in the study group. Serum oxidative stress marker levels (IMA and MDA) and TOS, TAS and OSI levels were measured.</p> <p><b>Results:</b> Serum MDA, TOS and IMA concentrations were significantly higher in women with ovarian torsion than in the healthy control group. However, serum TAS, TOS and OSI concentrations were significantly higher in women without ovarian torsion than within the healthy control group. Only IMA significantly distinguished patients with or without ovarian torsion. The best IMA value, according to the receiver operating characteristic curve, was 0.7045 absorbance units, with 90.00% sensitivity and 92.31% specificity. The patients in the ovarian torsion group had significantly lower serum TAS and OSI levels compared with patients without ovarian torsion.</p>	<p><b>CONCLUSIONS:</b> The elevated serum IMA levels with high sensitivity-specificity values observed in women with ovarian torsion seem to have a potential role as a serum marker in the preoperative diagnosis of ovarian torsion in emergency settings</p>	

TITOLO		AUTORI E RIVISTA DI PUBBLICAZIONE		SCOPO DELLO STUDIO E SUE MODALITA'	
Adnexal torsion: A multimodality imaging review <sup>28</sup>					
US	<p><i>US is neither 100% sensitive nor specific for the diagnosis of adnexal torsion with detection rates quoted at between 46 and 74%.</i></p> <p>enlargement of the ovary with volumes as high as 4308 ml reported</p> <p>ovarian mass</p> <p>stroma oedema and haemorrhage</p> <p>multiple small peripherally placed follicles within the ovary</p>	<p><b>DOPPLER</b></p> <p>Decreased or absent venous and/or arterial flow within the ovary</p> <p>visualization of normal arterial and venous flow <u>does not necessarily exclude torsion possibly due to intermittent torsion or dual ovarian blood supply.</u></p> <p>sonographic "whirlpool" sign of the vascular pedicle (round by perechoic structure with concentric hypoechoic stripes which represent vascular structures.</p>	<p>C. Wilkinson a*, A. Sanderson b</p> <p>Clinical Radiology 67 (2012) 476e-483</p>	<p>illustrate imaging features observed in adnexal torsion</p>	<p>ARGOMENTI AFRONTATI &amp; CONCLUSIONI</p> <p>-adnexal torsion: definition, epidemiology, causes, DD, US findings of normal adnexa</p> <p><b>CONCLUSIONS: it is important to know the findings of adnexal torsion on US, CT and MRI for an early diagnosis. Accurate radiological diagnosis is, therefore, paramount, increasing the chances of more timely treatment and possible ovarian salvage.</b></p>
CT	<p>enlargement of the ovary</p> <p>ovarian mass</p> <p>ovarian mal-location</p> <p>uterine deviation towards torsion</p> <p>Decreased contrast enhancement</p> <p>free pelvic fluid</p> <p>Adnexal fat stranding</p>	<p>enlargement of the ovary</p> <p>ovarian mass</p> <p>ovarian mal-location</p> <p>uterine deviation towards torsion</p> <p>Decreased contrast enhancement</p> <p>free pelvic fluid</p> <p>Adnexal fat stranding</p>	<p>RM</p> <p>enlargement of the ovary</p> <p>-ovarian mass</p> <p>-ovarian mal-location deviation towards torsion</p> <p>-free pelvic fluid</p> <p>-Adnexal fat stranding <u>in sensitivity</u></p> <p><u>demonstrating blood products within the lesion</u></p> <p>-ovarian oedema and peripheral follicles can be detected by stromal hyperintensity on T2-weighted images</p> <p>-Beaking of the margin of the ovary is often associated with twisting of the pedicle</p> <p>-Twisting of the vascular pedicle and thickening of the fallopian tube</p>		

<b>TITOLO.</b> <b>The positive and negative predictive value of transabdominal color Doppler ultrasound for diagnosing ovarian torsion in pediatric patients<sup>49</sup></b>	<b>AUTORI E RIVISTA DI PUBBLICAZIONE</b> Jessica A. Naiditch, Katherine A. Barsness Journal of Pediatric Surgery (2013) 48, 1283-1287	<b>SCOPO DELLO STUDIO E SUE MODALITA'</b> 1) determine the positive and negative predictive value (NPV) of transabdominal color Doppler ultrasound (CDU) for diagnosing ovarian torsion (OT) in pediatric patients 2) identify predictors of a false-positive CDU result for OT  An IRB-approved retrospective chart review was performed on all female patients who underwent transabdominal CDU evaluation of the ovaries (664 CDUs in 605 patients) for acute abdominal pain.	<b>RISULTATI</b> in 664 cases there were: 47 false-positive ultrasounds 3 false negatives 11 true positives 603 true negatives for OT.  Sensitivity was 78.6%, specificity 92.3%, positive predictive value (PPV) 19.0%, and NPV 99.5%. False-positive CDU when compared to true positives were more common in older patients (p = 0.004) and were more commonly read as "cannot rule out torsion" (p b 0.001). Ovarian cysts were larger in true-positive CDU than in false-positive CDU (p b 0.001). However, cyst presence/absence did not predict a true positive result.
<b>US</b>	<b>DOPPLER</b>	<b>CT</b>	<b>ARGOMENTI AFFRONTATI &amp; CONCLUSIONI</b> -ovarian torsion: Importance of early diagnosis <b>CONCLUSIONS: Transabdominal CDU has a low PPV and a high NPV for ovarian torsion in pediatric patients. False-positive results are more common in older patients and associated with small ovarian cysts.</b>
<b>TITOLO.</b> <b>Role of ultrasound in diagnosing isolated torsion of fallopian tube<sup>50</sup></b>	<b>AUTORI E RIVISTA DI PUBBLICAZIONE</b> Li-tao Sun1, Chun-ping Ning2, Xi-juan Gao1, Xiao-ying Li1, Wei Liu1 and Jia-wei Tian1  J. Obstet. Gynaecol. Res. Vol. 40, No. 1: 208-214, January 2014	<b>SCOPO DELLO STUDIO E SUE MODALITA'</b> To summarize the ultrasonic features of isolated fallopian tube torsion (IFTT) by retrospectively analyzing cases presenting at our hospital.  Eleven patients with IFTT were studied.	<b>RISULTATI</b> Sonograms of the 11 patients could be classified into four types: -cystic masses (4/11, 36.4%) -tube-like structures (3/11, 27.3%) -heterogeneous masses -whirlpool signs
<b>US</b> type 1: cystic walls are uneven and a little thicker than simple ovarian cysts+ visible mucosal folds or hyperchoic spots on the inside wall of the cyst type2: dilated, serpiginous, tubular structure	<b>DOPPLER</b> Spot-like blood flow signals	<b>CT</b>	<b>ARGOMENTI AFFRONTATI &amp; CONCLUSIONI</b> -IFTT: definition, importance of early diagnosis !!! Whirlpool sign was considered to be the specific sign of IFTT. It was described in detail by Vijayaraghavan and Senthil!! <b>CONCLUSIONS: Through review of the authors' experiences, it is possible to diagnose IFTT preoperatively by ultrasound. Sonograms of the IFTT could be divided into four types while clinical significance of this classification requires further confirmation.</b>

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO & RISULTATI	ARGOMENTI & CONCLUSIONI
<p><b>The utility of a composite index for the evaluation of ovarian torsion<sup>51</sup>.</b></p>	<p>King A1, Keswani S1, Briesada J2, Breech L3, Crombleholme T4, Huppert J3. Eur J Pediatr Surg. 2014 Apr;24(2):136-40. doi: 10.1055/s-0033-1343084. Epub 2013 Apr 15.</p>	<p>The aim of this study was to develop a practical scoring system to predict patients with OT in the pediatric population to facilitate more accurate diagnosis.</p>	<p><b>METHODS:</b> A retrospective study evaluating menarchal pediatric patients (1998 to 2005) with surgically confirmed OT (n = 28) compared with patients with abdominal pain and surgically confirmed non-OT (n = 26). Histogram analysis was performed to determine threshold values and used to generate the OT composite index (OT-CI). <b>RESULTS:</b> Four factors were independently associated with OT: ovarian ratio, ovarian volume, nausea, and duration of pain. Arterial and venous Doppler flows were not associated with OT. The OT-CI was more accurate than any individual factor. There were no cases of OT in patients with OT-CI scores &lt; 3. Patients with score <math>\geq</math> 3 had 100% sensitivity and 65.3% specificity. A score <math>\geq</math> 5 has 100% specificity.</p>	<p><b>CONCLUSIONS:</b> The OT-CI is a practical scoring system combining clinical and radiologic findings to more accurately predict OT. An OT-CI score &lt; 3 is strong evidence against OT in pediatric menarchal patients, which may minimize unnecessary surgical intervention. In contrast, scores <math>\geq</math> 3 should be considered for surgical intervention to maximize ovarian salvage.</p>

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO & RISULTATI	ARGOMENTI TRATTATI & CONCLUSIONI
<p><b>Protective effect of infliximab on ischemia/reperfusion injury in a rat ovary model: biochemical and histopathologic evaluation<sup>52</sup></b></p>	<p>Abali R1, Tasdemir N, Yuksek MA, Guzel S, Oznur M, Naibantoglu B, Tasdemir UG. Eur J Obstet Gynecol Reprod Biol. 2013 Dec;171(2):353-7. doi: 10.1016/j.ejogrb.2013.09.037. Epub 2013 Oct 11</p>	<p>The aim of this study was to investigate the effect of infliximab on experimentally induced ovarian ischemia/reperfusion injury (IRI).</p>	<p><b>STUDY DESIGN:</b> A total of 42 female rats were equally divided into 6 experimental groups; group 1: sham operation, group 2: 3-h ischemia, group 3 and 4: 3-h ischemia, 3-h reperfusion, group 5 and 6: 3-h ischemia, 24h reperfusion. In group 4 and group 6, 30 min before reperfusion, infliximab was administered intraperitoneally at a dose of 5mg/kg. Bilateral ovaries were removed for histopathologic and biochemical analysis. Serum MDA (sMDA), tissue MDA (tMDA), serum NO (sNO), tissue NO (tNO) and serum catalase concentrations were analyzed. Tissue damage of ovarian tissue was scored by histological examination.</p> <p><b>RESULTS:</b> The infliximab administration significantly lowered the sNO, tNO and sMDA concentrations in group 4 compared to group 3 (p=0.041, p=0.025 and p=0.035, respectively). sNO, tNO and sMDA concentrations were also lower in group 6 when compared to group 5, but this differences were not significant (p&gt;0.05). On the other hand, tMDA concentrations were lower in infliximab-applied groups when compared to ischemia/reperfusion groups (group 3 vs. 4 and 5 vs. 6) (p=0.045 and p=0.048, respectively). Moreover, histopathologic tissue damage scores in infliximab administration groups were significantly lower than in ischemia/reperfusion groups (p&lt;0.001).</p>	<p><b>CONCLUSIONS:</b> Infliximab attenuates I/R-induced ovarian tissue injury in rats subjected to ischemia/reperfusion.</p>



TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO DELLO STUDIO E SUE MODALITA'	RISULTATI
<p><b>Diagnostic efficacy of sonography for diagnosis of ovarian torsion<sup>53</sup></b></p>	<p>Rostanzadeh A, Mirfendereski S, Rezaei MJ, Rezaei S. Pak J Med Sci. 2014 Mar;30(2):413-6.</p>	<p>determine the diagnostic accuracy of sonography for ovarian torsion.</p> <p>In this study 323 women (&lt;40 years, mean age 26.3±7.8 years) with acute pelvic pain with highly suspected ovarian torsion signs and symptoms attending Imam Reza Medical Center in Kermanshah between 2011 through 2012 were included and underwent a transabdominal sonography (2-5 MHz probes). Then findings of sonography were compared with laparotomy.</p>	<p>Results: The ultrasound correctly diagnosed 72.1% of ovarian torsion and missed 27.9% of them (false negatives). However, one free subject (0.4%) was misclassified as ovarian torsion (false positive). There was a strong correlation between sonography and laparotomy with a kappa value of 84.0%.</p> <p>The sensitivity and specificity of sonography were 72.1% and 99.6%, respectively. Sonography had a positive predictive value of 96.9%, a negative predictive value of 95.9%, and a total accuracy of 96.0% for detection of ovarian torsion.</p>
<p>US multiple follicles (8-12 mm in size) in the cortical portion of a unilaterally enlarged ovary, diffuse swelling of the ovarian parenchyma</p>	<p>DOPPLER lack of flow</p>	<p>CT RM</p>	<p>ARGOMENTI AFRONTATI &amp; CONCLUSIONI -ovarian torsion: clinical features, DD, consequences</p> <p><b>CONCLUSIONS: Sonography appears to be an excellent method to evaluate patients with suspected ovarian torsion. Abnormal blood flow detected by sonography is highly predictive of ovarian torsion and is therefore useful in the diagnosis of this phenomenon.</b></p>

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO DELLO STUDIO E SUE MODALITA'	RISULTATI
<p>Ovarian torsion: Case-control study comparing the sensitivity and specificity of ultrasonography and computed tomography for diagnosis in the emergency department<sup>4</sup></p>	<p>David W. Swenson*, Ana P. Lourenco, Francesca L. Beaudoin, David J. Granda, Alison G. Killeka e, Alyson J. McGreggorb  European Journal of Radiology 83 (2014) 733–738</p>	<p>Evaluate the sensitivity and specificity of pelvic ultrasound (US) and abdominopelvic computed tomography (CT) for the identification of ovarian torsion in women presenting to the emergency department with acute lower abdominal or pelvic pain.  This is a retrospective study of 20 cases of ovarian torsion and 20 control patients, all of whom had both US and CT performed in the emergency department. Two radiologists who were blinded to clinical data interpreted all studies as (1) demonstrating an abnormal ovary or not, and (2) suggestive of torsion or not. Sensitivity, specificity and interobserver variation were calculated for each imaging modality</p>	<p>Results: Pelvic US was interpreted as demonstrating an abnormal ovary in 90.0% of ovarian torsion cases by reader 1, and in 100.0% by reader 2, whereas CT was interpreted as revealing an abnormal ovary in 100.0% of torsion cases by both readers.  Pelvic US for ovarian torsion was 80.0% sensitive (95% CI, 58.4–91.9%) and 95.0% specific (95% CI, 76.4–99.1%) for reader 1, while 80.0% sensitive (95% CI, 58.4–91.9%) and 85.0% specific (95% CI, 64.0–95.0%) for reader 2.  Interobserver agreement for pelvic US was fair (Kappa = 0.60).  Abdominopelvic CT for ovarian torsion was 100.0% sensitive (95% CI, 83.9–100.0%) and 85.0% specific (95% CI, 64.0–94.5%) for reader 1, while 90.0% sensitive (95% CI, 69.9–97.2%) and 90.0% specific (95% CI, 69.9–97.2%) for reader 2. Interobserver agreement was excellent (Kappa = 0.85).</p>
<p>US enlarged ovary 100% cystic or solid mass peripheral follicles 72% twisted vascular pedicle</p>	<p>DOPPLER</p>	<p>CT ovarian stromal heterogeneity or edema  numerous small peripheral follicles  inflammatory stranding of the parametrium ovarian fat twisted vascular pedicle, pelvic free fluid  deviation of the uterus</p>	<p>ARGOMENTI AFFRONTATI &amp; CONCLUSIONI ovarian torsion: definition, DD, clinical features  US and CT roles in ovarian torsion diagnosis  <b>CONCLUSIONS: The diagnostic performance of CT is not shown to be significantly different from that of US in identifying ovarian torsion in this study. These results suggest that when CT demonstrates findings of ovarian torsion, the performance of another imaging exam (i.e. US) that delays therapy is unlikely to improve preoperative diagnostic yield.</b></p>

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO DELLO STUDIO	MODALITA'	E SUE	RISULTATI
<b>Diffusion-weighted imaging of ovarian torsion: usefulness of apparent diffusion coefficient (ADC) values for the detection of hemorrhagic infarction<sup>35</sup></b>	Kato HI, Kanematsu M, Uchiyama M, Yano R, Furui T, Morishige K.  Magn Reson Med Sci. 2014;13(1):39-44. Epub 2014 Jan 31.	To evaluate the need for diffusion-weighted (DW) magnetic resonance (MR) imaging in detecting hemorrhagic infarction following ovarian torsion. 4 consecutive patients aged 12 to 74 years (average age, 36 years) with surgical confirmation of ovarian torsion who underwent 1.5-tesla MR imaging.			Results: Fallopian tube thickening was seen in all patients. In patients with ovarian cystic lesion, maximum cyst wall thickness was significantly higher in patients with hemorrhagic infarction (mean, 13.5 ± 4.1 mm) than those without (mean, 5.0 ± 1.0 mm) (P < .05). Signal intensity did not differ significantly on T1-weighted, T2-weighted, and DW images between patients with and without hemorrhagic infarction. ADCs were significantly lower in patients with hemorrhagic infarction (1.20 ± 0.50 [ $\times$ 10 <sup>-3</sup> mm <sup>2</sup> /s]) than those without (2.04 ± 0.26 [ $\times$ 10 <sup>-3</sup> mm <sup>2</sup> /s]) (P < .01). With an ADC threshold of 1.80 [ $\times$ 10 <sup>-3</sup> mm <sup>2</sup> /s], sensitivity for hemorrhagic infarction was 0.88 (7 of 8), and specificity was 1.00 (6 of 6).
US	DOPPLER	CT		RM	ARGOMENTI AFRONTATI & CONCLUSIONI
					<b>CONCLUSIONS : ADC measurements were useful for detecting hemorrhagic infarction in patients with ovarian torsion</b>

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO	ARGOMENTI TRATTATI & CONCLUSIONI
<p>Management of pediatric and adolescent adnexal masses by gasless laparoscopic single-site surgery<sup>56</sup></p>	<p>Takeda A1, Imoto S2, Nakamura H2 Eur J Obstet Gynecol Reprod Biol. 2014 Oct;181:66-71. doi: 10.1016/j.ejogrb.2014.07.021. Epub 2014 Jul 30.</p>	<p>Objective: To evaluate the safety and feasibility of gasless transumbilical laparoscopic single-site (LESS) surgery for the management of adnexal masses in pediatric and adolescent girls aged 19 years or younger.</p>	<p>Study design: Retrospective study between January 2005 and December 2013 of 28 pediatric and adolescent girls each undergoing gasless LESS surgery and gasless multiport laparoscopic surgery for adnexal masses. In each case, laparoscopic surgery was performed by the abdominal-wall lift method under endotracheal general anesthesia. The two groups were compared for their patient demographics and surgical outcome measures.</p> <p>Results: In the LESS surgery group, median age of the patients including three pre-menarcheal girls was 17.5 years. The most common symptom was abdominal pain. Median tumor diameter in the LESS surgery group was 7.4 cm. There were no statistical differences in clinical features between LESS surgery and multiport laparoscopic surgery groups. In the LESS surgery group, adnexal masses were managed by unilateral cystectomy (n = 20), unilateral salpingo-oophorectomy (n = 5), bilateral cystectomy (n = 2), and unilateral salpingectomy (n = 1). Emergency LESS surgery was performed for seven cases due to adnexal torsion and one case due to cyst rupture. Preservation of affected ovary was not achieved in three emergency cases with adnexal torsion due to severe necrosis, and in one case each of recurrent mucinous cystadenoma and huge mucinous cystadenoma.</p> <p>In 24 adnexal masses from 22 girls who received adnexal cystectomy by LESS surgery, LESS-assisted extracorporeal cystectomy, was possible in 14 masses while intracorporeal cystectomy was required in other 10. In a case of dermoid cyst managed by LESS-assisted extracorporeal cystectomy, additional hemostasis was required by intracorporeal suturing due to laceration of utero-ovarian ligament. Median-excised tissue weight in the LESS surgery group was 111 g. Significant differences between LESS surgery and multiport laparoscopic surgery groups were not noted in surgical outcomes and pathological diagnosis, except for significantly lower C-reactive protein value on postoperative day 3 in the LESS surgery group.</p>	<p><b>CONCLUSIONS: Gasless LESS surgery for pediatric and adolescent adnexal masses is a safe and feasible alternative to multiport laparoscopic surgery.</b></p>

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO	ARGOMENTI & CONCLUSIONI	TRATTATI &
Single incision laparoscopic surgery for pediatric adnexal pathology <sup>57</sup>	Litz C, Danielson PD, Chandler NM. J Pediatr Surg. 2014 Jul;49(7):1156-8. doi: 10.1016/j.jpedsurg.2013.10.017. Epub 2013 Oct 26.	Minimally invasive surgery is commonly used to treat gynecologic disease. Literature in the adult population supports that single incision laparoscopic surgery (SIL) is feasible and safe for the treatment of adnexal disease; however, there is little evidence for SIL in the pediatric population.	<p>Methods: A retrospective review of patients with gynecologic disease who underwent SIL from August 2009 to April 2012 was performed. All demographic data, clinical history, radiologic studies, indications for and type of operation, operative time and complications, and pathology were recorded.</p> <p>Results: Thirty-four patients with a mean age of 12.5 years (range 3.6–17.4 years) underwent SIL for adnexal pathology. Operative interventions included cystectomy (56%), salpingo oophorectomy (26.5%), detorsion (8.8%), adnexal biopsy (5.9%), and oophorectomy (2.9%). Forty-four percent of the patients also underwent appendectomy. The mean operative time was 42.8 minutes. There was 1 wound infection (2.9%) and 2 patients (5.9%) required additional ports.</p>	<p><b>CONCLUSIONS:</b> Single incision laparoscopy provides a safe and effective approach to diagnostic laparoscopy with the ability to carry out operative interventions in multiple quadrants without adding additional ports.</p> <p>Single incision laparoscopy may be particularly effective in young women with abdominal pain requiring operative intervention.</p>	

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO	ARGOMENTI TRATTATI & CONCLUSIONI
Laparoscopic management of an isolated left fallopian tube torsion due to twisted Morgagni Hydatid in a pre-menarcheal girl <sup>59</sup>	M. Cimador, I. M. Pensabene, I. F. Siracusa I  Ped. Med. Chir. (Med. Surg. Ped.), 2014, 36: 90-92	We report a case of isolated tubal torsion occurring in a pre-menarcheal girl successfully managed by laparoscopy.	<p>A 12-years-old girl was addressed to our attention because of severe abdominal pain occurred in preceding 24 h. The pain was localized in the right inferior abdominal quadrant, and appendicitis was suspected at history and clinical examination.</p> <p>Her previous medical and surgical history was not significant. There was no history of abdominal trauma and no bowel or urinary symptoms.</p> <p>EO right abdominal pain and defense were present but no rebound tenderness was found. External genitalia were normally developed with Tanner stage-II features of breast and pubic hair, according to her age.</p> <p>Body temperature of the patient was normal and white blood cell count was reported 9910/ml.</p> <p>US investigation showed, on the right side, a cystic mass beneath the bladder measuring about 7 cm in transverse diameter. The evidence of minor cysts beside the mass suggested the diagnosis of acute right ovarian torsion. The left ovary was normal. The color-Doppler US clearly excluded anomalies of tubal blood flow on the right side, while blood flow was not detected on the left one. Tubal wall appeared thickened. Our patient underwent urgent explorative laparoscopy because right ovarian torsion was suspected.</p> <p>Intra-abdominal hemorrhagic fluid was detected at laparoscopic exploration; this was found both in the Douglas and in the bladderuterine space. Unexpectedly, ovaries and right fallopian tube were normal.</p> <p>The left fallopian tube was extremely long and the distal segment twice (720°) twisted; moreover the twisted portion was also thickened for edema, hemorrhage and necrosis and it was found just on the right side, nearest the right ovary. Even the mesosalpinx was abnormally long. There were not any findings such as salpingitis, hydrosalpinx or inflammation, although necrotic degeneration of the fallopian tube might have changed the pathological pattern. Partial laparoscopic salpingectomy was performed because of the necrotic appearance of the mass.</p> <p>Afterward, the laparoscopic exploration showed a small right paratubal Morgagni hydatid cyst (TD 1,5 cm). This was also removed.</p> <p>Post operative was uneventful, and patient was discharged on postoperative day 4.</p> <p>At 3-months follow-up, she remains well.</p> <p>Hystopatology showed the presence of a Morgagni hydatid regarding the cystic formation at the end of the twisted fallopian tube associated to a hemorrhagic necrosis of the tubal walls.</p>	<p>adnexal torsion: incidence, localization, etiology</p> <p><b>CONCLUSIONS:</b> Surgical decision should be considered in order to preserve fertility especially in younger patients,12 especially when blood flow is impaired, or when ovarian/tubal suffering is suspected.</p> <p>Laparoscopic exploration revealed as an useful tool to make the diagnosis and also to safely treat this condition. Laparoscopy should be considered as the first approach in case of suspected ovarian/ tubal torsion.</p>

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO & RISULTATI	ARGOMENTI & CONCLUSIONI	TRATTATI &
<b>The impact of adnexal torsion on antral follicle count when compared with contralateral ovary<sup>69</sup></b>	Bozdog G1, Demir B2, Calis PT3, Zengin D3, Dilbaz B2.  J Minim Invasive Gynecol. 2014 Jul-Aug;21(4):632-5. doi: 10.1016/j.jmig.2014.01.007. Epub 2014 Jan 21.	<b>STUDY OBJECTIVE:</b> In women with adnexal torsion, there is an absence of data whether ovarian reserve is affected when treated by detorsion and conservative surgery. We aimed to evaluate ovarian reserve by counting the antral follicles and estimating the ovarian volume in the operated side compared with the contralateral ovary.	<b>DESIGN:</b> A case-control study (Canadian Task Force classification II-2). <b>SETTING:</b> In vitro fertilization center, Hacettepe University Faculty of Medicine and Etik Zubeyde Hanım Women's Health and Research Hospital, Ankara, Turkey. <b>PATIENTS:</b> Patients who underwent conservative surgery because of adnexal torsion between January 2008 and August 2012 were retrospectively investigated from patient files and computer-based data. Eighteen patients were eligible for the study protocol and further evaluated for their ovarian reserve with ultrasonography. <b>INTERVENTIONS:</b> Comparing ovarian reserve in the torsioned and contralateral sides with ultrasonography by physicians who were blind to the previously operated side. <b>MEASUREMENT AND MAIN RESULTS:</b> The mean age was $28.3 \pm 5.8$ years. The mean antral follicle count on the operated and contralateral ovaries were $12.3 \pm 8.4$ and $11.3 \pm 7.4$ , respectively ( $p = .23$ ). The respective figure for ovarian volume was $7.6 \pm 4.2$ and $9.1 \pm 5.3$ mL ( $p = .063$ ). Among 3 patients seeking to become pregnant, 1 of them conceived spontaneously and one achieved pregnancy with clomiphene citrate use.	<b>CONCLUSIONS:</b> The finding of the current study suggests that ovarian reserve reflected by the antral follicle count is not compromised in patients treated with detorsion of the twisted adnexa.	

TITOLO	AUTORE E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO & RISULTATI	ARGOMENTI & CONCLUSIONI	TRATTATI &
<b>Torsion of the gonad in the pediatric population: spectrum of histologic findings with focus on aspects specific to neonates and infants<sup>67</sup></b>	Mcinmneh WS1, Nazeer T, Jennings TA. Pediatr Dev Pathol. 2013 Mar-Apr;16(2):74-9. doi: 10.2350/12-07-1221-OA.1. Epub 2013 Jan 3.	Histopathologic findings of gonadal torsion in neonates and infants (GTNI) are poorly defined in the literature. We describe herein the histopathologic spectrum of GT with emphasis on the pediatric population and on features specific for NI ( $\leq 1$ year of age).	Twenty-four cases of GTNI (6 females/18 males), 33 cases of GT in an older pediatric population (OPP) (19 females/14 males), and 43 cases of GT in adults (35 females/8 males) were found in our pathology files between 2003 and 2011. Our findings disclosed 2 categories of GT: 1) the group of NI, and 2) that of OPP and adults who share a similar presentation as acute hemorrhagic necrosis of the gonad. Although findings in NI were rather uniform, a few differences were demonstrated between the 2 genders. All GTNI revealed calcifications, fibrosis, siderophages, and extensive necrosis. However, prominent necrotizing palisaded granulomas were seen in most (4 of 6) cases of ovarian torsion but not in the testicular counterpart. Furthermore, complete gonad regression was encountered exclusively in neonatal testicular torsion cases.	<b>CONCLUSIONS</b> 1) pathologic findings in GT are distinctly different between NI and OPP, the latter being more comparable to adults, presenting with acute hemorrhagic necrosis, Table 1; 2) the distinctive findings in GTNI of both genders include calcifications, siderophages, and fibrosis, in addition to background necrosis; 3) of particular note, complete gonadal regression is seen only in the testis in GTNI; and 4) necrotizing palisaded granulomas are unique to the ovarian subgroup and are often extensive, obscuring the nature of the process.	



TIPO DI STUDIO & RISULTATI	TIPO DI STUDIO & RISULTATI		
I case report	SCOPO	AUTORE RIVISTA DI PUBBLICAZIONE	TIPO DI STUDIO & RISULTATI
	To describe the technical details of neosalpingostomy as well as recently reported advantages and pitfalls of restorative surgery.	Višnjić S, Krajić R, Zupančić B. J Med Case Rep. 2014 Jun; 17:8:197. doi: 10.1186/1752-1947-8-197.	
CASE REPORT			
<p>An 11-year-old prepubertal Caucasian girl was admitted to our emergency room with complaints of abdominal pain in the right lower quadrant, as well as nausea and vomiting. Her symptoms had started 7 days prior to her visit, but her pain had intensified the evening before she presented to our emergency room. She described her pain as moderate and colicky in nature. Upon presentation, she was found to be afebrile, and her laboratory work-up revealed that her white blood cell count was 11,500/ml with 84% neutrophils. The other laboratory examination findings were within the reference ranges.</p> <p><u>EO</u>: right lower-quadrant pain without abdominal guarding.</p> <p><u>US</u>: revealed a hypoechogenic cyst in the right side of the pouch of Douglas measuring 9cm in diameter. Doppler ultrasonography revealed blood flow on the edges of the structure and absence in the central part. The finding was misinterpreted as torsion of the cystically altered right ovary. After a Pfannenstiel incision was made, surgical findings revealed that the uterus, right and left round ligaments, ovaries, cecum and appendix were all normal.</p> <p>The right fallopian tube was twisted and large, distended, cystic, convoluted and filled with fluid that was tapering as it approached the ampullar tube. The remaining proximal portion of the tube appeared viable. The contralateral fallopian tube was normal. After a meteuulous detorsion, the viable part of the fallopian tube and the cystic, convoluted portion of the hydrosalpinx were clearly exposed. We resected the cystically altered fimbrial part of the fallopian tube with a stainless steel probe and assessed the conductivity of the remnant, which consisted of the ampullary and isthmic parts of the tube, and then we placed a nylon suture which anchored the tube orifice and thus maintained its permeability. Subsequently, we created a neostomy with five radially placed 6-0 Vicryl sutures. The right ovary, uterus and left adnexa were left unchanged.</p> <p>The pathologic findings confirmed that the excised structure was a cystically altered fallopian tube with a thinned wall and preserved parietal cells. The postoperative period was uneventful. The patient was discharged on the third post-operative day. She is in being followed closely in regular monthly post-period intervals</p>			<p>ARGOMENTI TRATTATE E CONCLUSIONI</p> <p>-ITT: etiology</p> <p><b>CONCLUSIONS: The surgical procedure described in this report is technically simple and feasible, but leaves doubts about the final outcome.</b></p>

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO & RISULTATI	ARGOMENTI TRATTATI & CONCLUSIONI
<p><b>Concomitant bilateral adnexal entanglement in a 7-year-old girl with precocious puberty<sup>68</sup></b></p>	<p>Boettcher M1, Kanellos-Becker I, Akkurt I, Reinshagen K.  <i>Int J Gynaecol Obstet</i> 2013 Dec;123(3):248-9.  doi: 10.1016/j.ijgo.2013.06.021. Epub 2013 Aug 30</p>	<p>to report a case of concomitant bilateral adnexal entanglement.</p>	<p>A 7-year-old white girl with no signs of pubertal development presented with lower abdominal pain for 2 days. She was premenarcheal and previously healthy, and had no fever, nausea, or vomiting. No medication or exogenous hormones had been taken.  EO: tenderness on the left lower abdomen but no distension.  US e MRI: a cystic lesion on the right lower abdomen (5.5 × 5.1 cm) and an enlarged uterus (diameter 66 mm).  Doppler displayed profuse signs of arterial and venous perfusion within the lesion. Lactate dehydrogenase and ovarian tumor markers (<math>\alpha</math>-fetoprotein and <math>\beta</math>-human chorionic gonadotropin) were within normal limits.  Immediate exploratory laparotomy was scheduled, revealing an entanglement of both adnexa. The right ovary was enlarged (diameter 10 cm), appeared necrotic, and was twisted twice around the proper ligament of the left ovary. Because perfusion of the right ovary did not recover after detorsion, oophorectomy was performed. The postoperative period was uneventful; histopathologic examination revealed an ovarian follicular cyst within the necrotic right ovary and negative tumor markers.  Three months later, the patient presented with pubertal signs. The patient in the reported case presented postoperatively with signs of precocious puberty. Bilaterally enlarged, cystic ovaries combined with premature breast enlargement without hormonal changes are indicative of an autonomous ovarian cyst rather than endocrine ovarian activity as seen in secreting ovarian tumors (typically unilateral) or central precocious puberty (maturation of the entire hypothalamic–pituitary–gonadal axis) with the full spectrum of physical and hormonal changes of puberty.</p>	<p>-bilateral adnexal incidence  <b>CONCLUSIONS: In cases of concomitant bilateral adnexal entanglement, clinical presentation seems to be less typical compared with unilateral torsion— with short onset of lower abdominal pain being the sole symptom</b></p>

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO & RISULTATI	ARGOMENTI TRATTATI & CONCLUSIONI
<p><b>Protective effect of ethyl pyruvate on ischemia-reperfusion injury in rat ovary: biochemical and histopathological evaluation<sup>78</sup></b></p>	<p>Caglayan EK1, Caglayan K2, Gocmen AY3, Cinar H4, Seckin L5, Seckin S6, Gungör B7. European Journal of Obstetrics &amp; Gynecology and Reproductive Biology 182 (2014) 154–159</p>	<p>To investigate the protective effect of ethyl pyruvate (EP), an anti-oxidant agent, against ischemia-reperfusion injury in a rat model of ovarian torsion, considering biochemical and histopathological aspects.</p>	<p>40 Wistar Albino rats were divided into five groups: Group I, sham operation; Group II, ischemia alone, Group III, ischemia-reperfusion; Group IV, ischemia-reperfusion + 50 mg/kg EP; and Group V, ischemia-reperfusion + 100 mg/kg EP. Through laparotomy, 3608 torsion was performed and maintained for 3 h, and detorsion was maintained for a further 3 h. Intraperitoneal EP was given 30 min before the surgical procedure. Ovarian tissues and blood samples were obtained after surgery. Malondialdehyde (MDA) and asymmetric dimethyl arginine (ADMA) levels were measured in both plasma and tissue samples. Tissue sections were evaluated histopathologically. Analysis of variance was used for statistical analyses.</p> <p>Results: In both serum and tissue samples, ADMA and MDA levels were found to be significantly lower in the EP groups compared with the ischemia alone and ischemia-reperfusion groups (<math>p = 0.0001</math>). However, no significant difference was found between groups treated with 50 mg/kg or 100 mg/kg EP. On histopathological evaluation, the total tissue injury score was found to be lower in rats treated with EP. No significant difference was detected between groups treated with 50 mg/kg or 100 mg/kg EP.</p>	<p>-ovarian torsion: definition, epidemiology, pathophysiology</p> <p>-ischemia-reperfusion injury: how, why</p> <p>-Ethyl pyruvate (EP) is an aliphatic ester derived from pyruvic acid, and is used in several experimental models to improve survival in organ dysfunction.</p> <p><b>CONCLUSIONS: Ethyl pyruvate may exert positive effects in ischemia-reperfusion injury in cases of ovarian torsion. However, no difference was detected between 50 mg/kg and 100 mg/kg EP.</b></p>

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO & RISULTATI	ARGOMENTI TRATTATI & CONCLUSIONI
Does gradual detorsion protect the ovary against ischemia-reperfusion injury in rats? <sup>21</sup>	Sezen Ozkisacik Mesut Yazici Harun Gursoy Nil Culhaaci Pediatr Surg Int (2014) 30:437-440 DOI 10.1007/s00383- 014-3480-3	The present study aimed to investigate the protective effect of gradual detorsion on adnexal torsion	21 adult female rats were divided into three groups as -sham-operated (Sh group, n = 7); -torsion- detorsion (TD group, n = 7); -torsion- gradual detorsion (TGD group, n = 7).  A midline laparotomy was performed under anesthesia. In the TD and TGD groups, the left adnexa along with tubal and ovarian vessels were twisted three times in a clockwise direction and fixed to the abdominal wall. After 30 h, detorsion was performed on the mesenteries of both TD and TGD groups.  In the TGD group, however, detorsion was performed gradually: the ovarian mesentery was detorsioned 360°, followed by a 5-min pause, then a repeat of the cycle until full detorsion was achieved.  Rats were killed 1 week later.  Left ovaries were removed and evaluated histopathologically.  Results: The histopathological mean grade was significantly higher in the TD than in the TGD group (p<0.05).	-Early diagnosis and emergency surgical treatment (detorsion) are important to preserve fertility and to prevent peritonitis or loss of the adnexa. However, during reperfusion, tissue damage is more severe than during ischemia because of oxygen derived radicals.  -ovarian torsion: definition, epidemiology, management -physiopathology of torsion  <b>CONCLUSIONS: Gradual detorsion can reduce reperfusion injury in a rat model of ovarian torsion. This method is easily applicable and may be a useful method for human patients with ovarian torsion.</b>

TITOLO	AUTORI RIVISTA PUBBLICAZIONE	SCOPO	TIPO DI STUDIO & RISULTATI	ARGOMENTI TRATTATI & CONCLUSIONI
<b>Antioxidant effect of erdoisteine and lipoic acid in ovarian ischaemia-reperfusion injury<sup>72</sup></b>	Dokuyucu R1, Karateke A2, Gokce H3, RK4, Ozcan O5, Ozturk S5, Tas ZA3, Karateke F6, Duru M7.  Eur J Obstet Gynecol Reprod Biol. 2014 Dec;183:23-7. doi: 10.1016/j.ejogrb.2014.10.018. Epub 2014 Oct 24.	To investigate the effects of erdoisteine and alpha lipoic acid (ALA) in a rat model of ovarian ischaemia-reperfusion injury	48 female Wistar albino rats were separated, at random, into 6 groups of eight rats. The groups were classified as: sham, torsion, de-torsion, de-torsion+erdoisteine 100mg/kg, de-torsion+alpha lipoic acid (ALA) 100mg/kg, and de-torsion+erdoisteine+ALA. The investigators executing the biochemical and histological analyses were blinded to the randomization until the end of the study.  Results: The TOS (Total Oxidant Status) and OSI (Oxidative Stress Index) levels are higher in the Torsion and De-torsion groups when compared with the ones in the Sham group (p < 0.05). Strong correlation was found between OSI and total histological score in the sham, torsion and de-torsion groups (r = 0.765, p < 0.001). The mean levels of TOS and OSI in the rats that received erdoisteine and/or ALA were significantly lower compared with the sham, torsion and de-torsion groups (p < 0.05). Mean TOS and ALA group compared with the de-torsion + erdoisteine + de-torsion + ALA groups (p < 0.05). In comparison with the de-torsion group, the numbers of primordial follicles (p = 0.006) and primary follicles (p = 0.036) were increased in the groups that received erdoisteine and/or ALA	Erdoisteine [N-(carboxymethylthioacetyl)-homocysteine thiolactone], a mucolytic drug, is used widely in clinical practice. Functioning erdoisteine metabolites show free radical de-purification activity, with sulphhydryl groups released following the catabolism of erdoisteine in the liver.  ALA and its reduced form dihydroliipoic acid work as antioxidants by fighting free radicals and reprocessing other cellular antioxidants.  <b>CONCLUSIONS: Erdoisteine and ALA decreased ischaemia-reperfusion injury in an experimental rat ovarian torsion model; combination treatment had a greater effect than either agent alone. Treatment with erdoisteine and/or ALA was found to preserve the loss of reproductive capacity normally observed after ovarian torsion.</b>

TITOLO	AUTORE E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO & RISULTATI	ARGOMENTI TRATTATI & CONCLUSIONI
The biochemical and histologic effects of adnexal torsion and early surgical intervention to unwind detorsion on ovarian reserve: an experimental study <sup>3</sup>	Ozler A1, Turgut A, Soyding HE, Sak ME, Evsen MS, Alabalik U, Basarali MK, Devcci E.  Reprod Sci. 2013 Nov;20(11):1349-55. doi: 10.1177/1933719113485300. Epub 2013 Apr 12.	The aim of the present study was to determine to what extent ovarian reserves are affected by ischemia-reperfusion injury, evaluating the number of growing follicles and the serum levels of the ovarian hormones.	Thirty female fertile adult Wistar albino rats, weighing 200 to 220 g, were previously numbered to randomization, and then randomly divided into 3 equal groups (n = 10): sham, torsion, and detorsion groups. In torsion and detorsion groups, bilateral adnexal torsion (3-hour ischemia) was carried out. Bilateral adnexal detorsion (3-hour reperfusion) was performed in the detorsion group.  The mean number of preantral and small antral follicles in detorsion group were lower than those of the sham group (P < .01). After torsion, anti-Müllerian hormone (AMH), estradiol, and inhibin B levels decreased significantly compared to the preoperative and postoperative periods (P = .003, P = .032, and P = .014, respectively). In detorsion group, only AMH levels were found to decrease significantly following the 3-hour ischemia and 3-hour reperfusion (P < .05).	<b>CONCLUSIONS:</b> After adnexal torsion, a significant decrease in ovarian reserve has been detected for the first time in this study. Additionally, the results of this study suggest that conservative surgery alone is insufficient to protect ovarian reserve.

TTITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO & RISULTATI	ARGOMENTI TRATTATI & CONCLUSIONI
<p><b>Does sildenafil have protective effects against ovarian ischemia-reperfusion injury in rats?</b><sup>24</sup></p>	<p>Incebiyik A I, Seker A, Camuzcuoglu H, Kocaslari S, Camuzcuoglu A, Hilali NG, Vural M, Taskin A, Aksoy N Arch Gynecol Obstet. 2014 Nov 22. [Epub ahead of print]</p>	<p>The aim of this study was to evaluate the protective activity of sildenafil treatment against ischemia-reperfusion damage created experimentally in rat ovaries.</p>	<p>42 female Wistar rats were used, and the rats were separated randomly into six groups consisting of seven rats each: sham, torsion, torsion-detorsion, torsion-detorsion + saline, torsion-detorsion + sildenafil 0.7 mg/kg and torsion-detorsion + sildenafil 1.4 mg/kg. With the exception of the sham group, an ovarian torsion procedure was implemented in all other groups for 2 h. Then, a detorsion procedure was implemented to the groups for 2 h, with the exception of the torsion group. Medications were given intraperitoneally, one-half hour before the detorsion procedure in the saline, 0.7 and 1.4 mg/kg sildenafil groups. Finally, 2 ml of blood samples was drawn for markers of oxidative stress, while the ovaries which were torsioned for the histological examination were extracted from all rats.</p> <p><b>RESULTS:</b> According to the histopathological damage scores, the least damage was seen in the sham group and the most damage was seen in the torsion-detorsion group. The sildenafil treatment appeared to be effective in decreasing tissue damage; however, there were no differences between the dosages. Additionally, it was determined that the oxidative stress levels were higher in the torsion-detorsion group, while the sildenafil treatment caused a significant decrease in the oxidative stress levels.</p>	<p>Sildenafil is a vasoactive medication that is commonly used for the treatment of erectile dysfunction. In experimental animal models, the protective effect of sildenafil against ischemia-reperfusion damage (IRD) has been shown in the heart, liver and brain. It is asserted that the protective effect of sildenafil is arise from nitric oxide production and antioxidant properties.</p> <p><b>CONCLUSIONS:</b> The results of the current study showed that the sildenafil treatment can be effective in preventing tissue damage and oxidative stress induced by the ischemia-reperfusion created in rat ovaries.</p>

TITOLO	AUTORI E DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO & RISULTATI	ARGOMENTI TRATTATI & CONCLUSIONI
<b>Protective Effect of Colchicine on Ovarian Ischemia-Reperfusion Injury: An Experimental Study</b> <sup>75</sup>	Kurt RK1, Degan AC2, Dogan M3, Albayrak A4, Kurt SN3, Eren F3, Okyay AG5, Karateke A5, Duru M6, Fadilioglu E3, Delibasi T7  Reprod Sci. 2014 Oct 9. pii: 1933719114553065	The aim of the present study is to investigate the efficiency of colchicine in the experimental rat ovarian torsion model in the light of histological and biochemical data.	<b>STUDY DESIGN:</b> A total of 35 Wistar albino female rats were randomly divided into 5 groups, group 1: (control-sham operated, n = 7); group 2: (torsion/detorsion, n = 7) 2 hours of ischemia and 2 hours of reperfusion; group 3: (torsion/detorsion, n = 7), 2 hours of ischemia and 5 days of reperfusion; group 4: (torsion/detorsion, n = 7) 2 hours of ischemia and 2 hours of reperfusion and a signal dose of oral 1 mL/kg colchicine; and group 5: (torsion/detorsion, n = 7), 2 hours of ischemia and 5 days of reperfusion and 5 days of oral 1 mg/kg colchicine. Histopathologic evaluation was performed by a scoring that assesses congestion, bleeding, edema, and cellular degeneration in the ovarian tissue. Catalase, tissue malondialdehyde (MDA), and protein carbonyl levels were calculated.  <b>RESULTS:</b> The histopathologic scores, MDA, and protein carbonyl levels in the control and colchicine groups were significantly lower than groups 2 and 3 (P < .001). Catalase activities were significantly higher in the control and colchicine groups than in groups 2 and 3 (P < .001). The results of the histopathologic parameters and biochemical markers showed that protective effects of colchicine treatment persisted up to 5 days	<b>CONCLUSIONS:</b> <b>Study results revealed that colchicine reduced ovarian ischemia-reperfusion injury in experimental rat ovarian torsion model. As the ovarian detorsion is the first choice of the treatment modality in the early phase, antioxidant and anti-inflammatory treatment modalities like colchicine might be used to reduce ovarian ischemia-reperfusion injury.</b>



TITOLO	AUTORI E DI RIVISTA PUBBLICAZIONE	SCOPO	TIPO DI STUDIO & RISULTATI	ARGOMENTI TRATTATI & CONCLUSIONI
Does Omegaven have beneficial effects on a rat model of ovarian ischemia/reperfusion? <sup>76</sup>	Gungor AN1, Turkon H2, Albayrak A3, Ovali M4, Ishiye M5, Gencer M6, Hacivelioglu S6, Cevizci S7, Cesur I8, Cosar E6.  Eur J Obstet Gynecol Reprod Biol. 2014 Oct;181:240-5. doi: 10.1016/j.ejogrb.2014.08.001. Epub 2014 Aug 13.	The beneficial effects of omega-3 fatty acids on an intestinal ischemia/reperfusion (I/R) model was shown previously. Therefore, we aimed to examine the potential beneficial effects of parenteral omega-3 fatty acids, a safe and inexpensive product, on a rat model of ovarian I/R.	<p><b>STUDY DESIGN:</b> A group of 39 rats was divided into six groups. Group 1 (Sham Group; n=6) underwent two laparotomies with a 3-h interval and their ovaries were removed 3h later. Group 2 (torsion-detorsion Group; n=7) had their ovaries torsioned clockwise and fixed at 72.0°; 3h later a detorsion operation was done and after another 3h, their ovaries were removed. Group 3 (n=7) and Group 4 (n=7) received the same treatment as Group 2; however, half an hour prior to detorsion, these rats received Omegaven at 1mL/kg and 5mL/kg, respectively. Group 5 (n=6) and Group 6 (n=6) received the same treatment as Group 1; however, half an hour prior to the second laparotomy, these rats received Omegaven at 1mL/kg and 5mL/kg, respectively. One ovary from each rat was evaluated histologically by hematoxylin and eosin (H&amp;E) staining and the other ovary was homogenized and evaluated for total oxidant status (TOS), total antioxidant status (TAS) and oxidative stress index (OSI).</p> <p><b>RESULTS:</b> While we failed to show any significant relationship among groups in oxidative parameters, there was a significant worsening in the torsion-detorsion group in histological evaluation. High Omegaven doses, but not low doses, improved tissue injury scores of torsioned and detorsioned ovaries to the levels observed in the control group.</p>	<p><b>CONCLUSIONS:</b> Omegaven improves the detrimental effects of ovarian I/R when used in sufficient doses. Its effects and dose adjustment on women with ovarian torsion must be investigated by further studies.</p>

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO & RISULTATI	ARGOMENTI TRATTATI & CONCLUSIONI
The effect of hesperetin on ischemia-reperfusion injury in rat Ovary <sup>77</sup>	Cakir Gungor ANI, Gencer M., Karaca T., Hacıvelioğlu S, Uysal A., Korkmaz F., Demirtas S, Cosar E.  Arch Gynecol Obstet. 2014 Oct;290(4):763-9. doi: 10.1007/s00404-014-3267-8. Epub 2014 May 8.	Hesperidin (HES), a citrus fruit extract, has beneficial effects on various ischemia/reperfusion (I/R) models. We aimed to evaluate the possible positive effects of hesperetin (HPT), an active metabolite of HES, on a rat ovarian I/R model.	<b>METHODS:</b> We divided 24 Wistar Albino rats into four groups. Group I (n = 6) was sham operated, Group II (n = 6) was the I/R group, Group III (n = 6) was the I/R + solvent group and Group IV (n = 6) was the I/R + HPT group. Three hours of ischemia and 3 h of reperfusion were performed on each rat in Groups II, III, and IV. Dimethyl sulfoxide (DMSO) was given intraperitoneally to the rats in the III. Group, and 50 mg/kg of HPT dissolved in DMSO was given intraperitoneally to the rats in the IV. Group 30 min before reperfusion. After 3 h of reperfusion, the ipsilateral ovaries of the rats were examined immunohistochemically to detect apoptosis.  <b>RESULTS:</b> Hematoxylin and eosin (H and E) staining demonstrated less edema and hemorrhage in the group where HPT was applied. Caspase-3 and terminal deoxynucleotidyl transferase-mediated dUTP nick end labeling (TUNEL) staining showed significantly lower apoptosis in the group where HPT was used when compared to either the I/R or solvent group.	Experimental studies revealed that ovarian torsion and detorsion result in severe hemorrhage, congestion, and apoptosis  <b>CONCLUSIONS:</b> <b>To the best of our knowledge, this is the first study that shows the beneficial effects of HPT in an ovarian I/R injury. HPT improved tissue damage and apoptosis caused by I/R injury. To identify the possible positive effects of HPT in ovarian torsion of humans and use in clinical practice, more studies must be performed.</b>

TITOLO	AUTORI E DI RIVISTA PUBBLICAZIONE	SCOPO	TIPO DI STUDIO & RISULTATI	ARGOMENTI TRATTATI & CONCLUSIONI
<p><b>The protective effect of quercetin on IMA levels and apoptosis in experimental ovarian ischemia-reperfusion injury<sup>78</sup></b></p>	<p>Çencer M1, Karaca T2, Güngör AN3, Hacivelioglu SO3, Demirtaş S2, Turkon H4, Uysal A3, Korkmaz F5, Coşar E3, Hancı V6.  Eur J Obstet Gynecol Reprod Biol. 2014 Jun;177:135-40. doi: 10.1016/j.ejogrb.2014.03.036. Epub 2014 Apr 13.</p>	<p>To investigate the protective effect of quercetin (QE), an anti-inflammatory and anti-oxidant agent, on torsion-detorsion induced histopathological changes and blood IMA levels in experimental ovarian ischemia-reperfusion (IR) injury.</p>	<p><b>STUDY DESIGN:</b> 44 female Wistar rats were randomly divided into four groups in this study (n=6). Group I, (sham operation); Group II, torsion-detorsion plus saline (IR); Group III, torsion-detorsion plus solvent (dimethylsulfoxide; DMSO, IR+DMSO); Group IV, torsion-detorsion plus 15 mg/kg/bw quercetin (IR+QE) injected intraperitoneally 30 min prior to detorsion. After 3h of reperfusion, the right ovaries were removed surgically. The ovary tissue samples were fixed in 10% formalin solution for histopathological and immunohistochemical examination. Blood samples were obtained at the end of the procedures for each group of animals.</p> <p><b>RESULTS:</b> Ovarian sections in Groups II and III showed higher follicular cell degeneration, hemorrhage, vascular congestion and edema when compared with Group I. Administration of quercetin in rats significantly prevented degenerative changes in the ovary. Significantly less histopathological changes were found in Group IV compared with Groups II and III. Caspase-3 and TUNEL positive cells were detected in the ovarian surface, follicle epithelium, and stromal cells in all experimental groups, and there was a significant increase in Groups II and III compared with Group I (P&lt;0.05). Treatment with quercetin decreased the number of caspase-3 and TUNEL positive cells. IR increased the ischemia modified albumin (IMA) levels in comparison to the sham group (1.06 ± 0.10 ABSU and 0.92 ± 0.08 ABSU, P&lt;0.05). Quercetin administration before IR reduced the levels of IMA (0.93 ± 0.08 ABSU, P&lt;0.05)</p>	<p><b>CONCLUSIONS:</b> Administration of quercetin is effective in preventing tissue damage induced by IR injury in ovaries.</p>

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO & RISULTATI	ARGOMENTI TRATTATI & CONCLUSIONI
Effect of 2-aminoethoxydiphenyl borate on ischemia-reperfusion injury in a rat ovary model <sup>29</sup>	Taskin M11, Hisiogullari AA2, Yay A3, Adali E4, Gungor AC5, Korkmaz GO3, Inceboz U4, Eur J Obstet Gynecol Reprod Biol. 2014 Jul;178:74-9. doi: 10.1016/j.ejogrb.2014.03.049. Epub 2014 Apr 18.	The aim of this study is to evaluate the effects of 2-aminoethoxydiphenyl borate (2-APB) as an antioxidant and analyze biochemical and histopathologic changes in experimental ischemia-reperfusion (I/R) injury in rat ovaries.	<p><b>STUDY DESIGN:</b> 30female rats were utilized to create four groups. Group 1: I/R and 2-APB (2mg/kg); Group 2: I/R and 2-APB (4mg/kg); Group 3: I/R; Group 4: sham operation. Ovarian tissue and serum malondialdehyde, nitric oxide (NO) levels; ovarian tissue and serum total antioxidant status (TAS), total oxidant status (TOS), oxidative stress index (OSI) were determined. In ovarian tissue samples histopathologic examination, immunofluorescence staining by TUNEL method was studied.</p> <p><b>RESULTS:</b> Tissue TOS, serum TOS, and OSI levels were elevated in I/R group. After treatment with 2-APB, tissue and serum TOS levels and OSI levels were markedly decreased. There was a significant difference in terms of tissue and serum NO levels between the sham group and I/R group. Elevation in tissue NO and serum NO levels were decreased after treatment with 2-APB. TUNEL-positive cell number gradually decreased with dose of 2-APB in groups 1 and 2.</p>	<p><b>CONCLUSIONS:</b> Conservative treatment with 2-APB is beneficial for mitigation of I/R injury, and the ovarian protective effect of 2-APB appears to be mediated through its antiapoptotic and antioxidative effects.</p>

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO & RISULTATI	ARGOMENTI TRATTATI & CONCLUSIONI
<p><b>Protective effect of oxytocin on ovarian ischemia-reperfusion injury in rats<sup>30</sup></b></p>	<p>Akdemir A1, Erbas O2, Gode F3, Ergenoglu M1, Yemci O1, Oltulu F4, Yavasoglu A4, Taskiran D2.  Peptides. 2014 May;55:126-30. doi: 10.1016/j.peptides.2014.02.015. Epub 2014 Mar 11.</p>	<p>Oxytocin (OT), a neurohypophysial nonapeptide, plays a dual role as a neurotransmitter/neurotransmitter and a modulator and a hormone. It has also well known protective properties against ischemia/reperfusion organ damage. This study investigated the effect of OT on experimentally induced ovarian torsion/de-torsion ischemia/reperfusion (I/R) injury in rats</p>	<p>Sprague-Dawley rats were assigned to five treatment groups (n=7/group): Group 1, sham-operated; Group 2, torsion; Group 3, 80 IU/kg of OT administration 30 min prior to torsion; Group 4, torsion/de-torsion; and Group 5, torsion followed by 80 IU/kg of OT administration 30 min prior to de-torsion.</p> <p>Results: OT administration significantly decreased the tissue malondialdehyde (MDA) levels in both the torsion and OT group (Group 3), and torsion/de-torsion OT group (Group 5) in comparison with the torsion-only group (Group 2) and torsion/de-torsion group (Group 4). Histopathological finding scores including follicular degeneration, edema, hemorrhage, vascular congestion, and infiltration by inflammatory cells were found to be significantly decreased in the torsion and OT group (Group 3), and torsion/de-torsion OT group (Group 5) when compared with the torsion-only group (Group 2) and torsion/de-torsion group (Group 4).</p>	<p>-ovarian pathophysiology, clinical features, diagnosis, treatment</p> <p>torsion: epidemiology,</p> <p><b>CONCLUSIONS: these results, verified with histopathologic evaluation and biochemical assays, suggest a probable protective role for OT in ischemia and I/R injury in rat ovaries.</b></p>

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO & RISULTATI	ARGOMENTI TRATTATI & CONCLUSIONI
<p>The protective effect of curcumin on ischemia-reperfusion injury in rat Ovary<sup>81</sup></p>	<p>Sak MEI, Soydinc HE, Sak S, Evsen MS, Alabalik U, Akdemir F, Gul T. Int J Surg. 2013;11(9):967-70. doi: 10.1016/j.ijsu.2013.06.007. Epub 2013 Jun 21.</p>	<p>To evaluate the protective effects of curcumin in experimental ischemia and ischemia/reperfusion (IR) injury of rat ovaries</p>	<p><b>METHODS:</b> 48 female adult Wistar Albino rats were used. Rats divided into six groups and designed: Sham, Torsion, Detorsion, Sham + Curcumin, Torsion + Curcumin, and Detorsion + Curcumin. Except for the Sham and Sham + Curcumin group, all groups were performed to bilateral adnexal torsion for 3 h. Bilateral adnexal detorsion was implemented in the Detorsion and Detorsion + Curcumin groups. The injection of curcumin was intraperitoneally achieved 30 min before the sham, torsion and detorsion.</p> <p><b>RESULTS:</b> Total oxidant status levels (TOS), oxidative stress index (OSI) and histologic scores values of ovarian tissue were higher in the torsion and detorsion groups than the sham group (<math>p &lt; 0.05</math>). There was a strong correlation between the total histologic scores of IR injury and the OSI (<math>r = 0.809</math>, <math>p &lt; 0.001</math>). By the use of curcumin, a significant decrease was established in the mean levels of oxidant markers and histopathologic scores of the ovarian tissues.</p>	<p><b>CONCLUSIONS:</b> Administration of curcumin is effective in reversing tissue damage induced by ischemia-reperfusion injury in ovarian torsion.</p>

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO & RISULTATI	ARGOMENTI TRATTATI & CONCLUSIONI
<b>Vitamin E modulates Jun N-terminal kinase activation in ovarian torsion-detorsion injury<sup>82</sup></b>	Sapmaz-Metin M1, Topcu-Tarlacalisir Y, Uz YH, Inan M, Omurlu IK, Cerbekayabekir A, Kizilay G, Akpolat M. Exp Mol Pathol. 2013 Oct;95(2):213-9. doi: 10.1016/j.yexmp.2013.07.007. Epub 2013 Jul 31.	The aim of this study was to evaluate the role of vitamin E in follicular degeneration and to assess histopathological and biochemical changes following ischemia-reperfusion (IR) injury in rat ovaries.	28 Wistar albino rats were randomly divided into four groups: sham, 4h torsion, 24h detorsion, and a vitamin E group. Thirty minutes before detorsion, a single dose of 200mg/kg vitamin E was administered intraperitoneally.  The ovarian histology score was determined, serum levels of malondialdehyde (MDA) and myeloperoxidase (MPO) were measured. The apoptosis of granulosa cells and the phospho-c-jun N-terminal kinase (p-JNK) and phospho-p38 (p-p38) immunoreactivities of these cells were determined. <b>RESULTS:</b> MDA and MPO levels were significantly increased in the torsion and detorsion groups. Hemorrhage, edema, and congestion were also apparent in these groups. In addition, the apoptotic index and the immunoreactivity of p-JNK were highest in the detorsion group, which also showed marked follicular degeneration. However, p-p38 activity was not affected by torsion-detorsion (TD) induction. Vitamin E ameliorated TD-induced histological alterations. It also decreased serum levels of MDA and MPO, reduced the activity of p-JNK in the ovaries, and reduced numbers of apoptotic follicular cells.	<b>CONCLUSIONS:</b> these data indicate that vitamin E attenuated ovarian follicular degeneration by inhibiting the immunoreactivity of p-JNK and reducing the apoptosis of granulosa cells.

TITOLO	AUTORI RIVISTA PUBBLICAZIONE.	SCOPO	TIPO DI STUDIO & RISULTATI	ARGOMENTI TRATTATI & CONCLUSIONI
<p><b>Zofenopril attenuates injury induced by ischemia-reperfusion on rat ovary.<sup>35</sup></b></p>	<p>Keskin Kurt R1, Dogan AC, Dogan M, Albayrak A, Kurt SN, Eren F, Silfeler DB, Karateke A, Fadilioglu E, Delibasi T.  J Obstet Gynaecol Res. 2014 Dec 29; doi: 10.1111/jog.12658.</p>	<p>The aim of the study was to investigate the effectiveness of zofenopril in an experimental model of ovarian torsion in rats with histologic and biochemical assessments.</p>	<p><b>MATERIAL AND METHODS:</b> Experimental procedures were performed on 35 female rats (Wistar albino). Rats were randomly divided into five groups as: sham (sham operated, n = 7); vehicle group 1 (torsion-detorsion, n = 7) with 2 h ischemia and 2 h reperfusion; vehicle group 2 (torsion-detorsion, n = 7) with 2 h ischemia and 5 days' reperfusion; zofenopril group 1 (torsion-detorsion, n = 7) with 2 h ischemia, 2 h reperfusion and a signal dose of oral 15 mg/kg zofenopril; and zofenopril group 2 (torsion-detorsion, n = 7) with 2 h ischemia, 5 days' reperfusion and 5 days' oral 15 mg/kg zofenopril. A scoring of histopathologic evaluation was performed on the ovaries according to congestion, bleeding, edema, and cellular degeneration. Biochemical assessments included catalase, tissue malondialdehyde and protein carbonyl.</p> <p><b>RESULTS:</b> Compared with the vehicle groups, histopathologic scores, tissue malondialdehyde and protein carbonyl levels, which reflect oxidative stress markers, were significantly lower in the zofenopril groups. Furthermore, catalase levels were significantly increased in the zofenopril group.</p>	<p><b>CONCLUSIONS:</b> Study results revealed that zofenopril attenuates injury induced by ischemia-reperfusion on rat ovary.</p>



TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO & RISULTATI	ARGOMENTI TRATTATI & CONCLUSIONI
Benefits of the antioxidant and anti-inflammatory activity of etoricoxib in the prevention of ovarian ischemia/reperfusion injury induced experimentally in rats <sup>84</sup>	Yapca OEI, Turan MI, Yilmaz S, Gulapoglu M, Suleyman H.  J Obstet Gynaecol Res. 2014 Jun;40(6):1674-9. doi: 10.1111/jog.12373.	This study is a biochemical investigation of the effect of etoricoxib, a selective cyclooxygenase (COX)-2 inhibitor, on ischemia/reperfusion (I/R) injury experimentally induced in rat ovaries.	<p><b>METHODS:</b> Experimental animals were divided into four groups: (i) ovarian ischemia/reperfusion (IRG); (ii) 30 mg/kg etoricoxib + ovarian ischemia/reperfusion (EIRG-30); (iii) 60 mg/kg etoricoxib + ovarian ischemia/reperfusion (EIRG-60); and (iv) a sham operation (SG) control group.</p> <p><b>RESULTS:</b> The results showed levels of malondialdehyde in the IRG, EIRG-30, EIRG-60 and SG group ovarian tissue of 20.2 ± 3.4, 11.2 ± 3.2, 5.5 ± 1.9 and 3.8 ± 1.5 μmol/g protein, respectively. Myeloperoxidase activity for these groups was 24.2 ± 6.7, 13 ± 2.4, 4 ± 1.8 and 3.5 ± 1.9 U/g protein, and total glutathione levels were 1.6 ± 0.8, 4.5 ± 1.9, 6.5 ± 1.9 and 7.5 ± 2.4 nmol/g protein, respectively. COX-1 activity in IRG, EIRG-30, EIRG-60 and SG group rat ovarian tissue was 5.0 ± 2.8, 12.2 ± 2.4, 16.7 ± 2.8 and 17.5 ± 4.7 U/mg protein, and COX-2 activity was 18.3 ± 2.7, 3.5 ± 1, 1.8 ± 0.7 and 0.7 ± 0.3 U/mg protein, respectively.</p>	<p><b>CONCLUSIONS:</b> Etoricoxib prevented damage induced with I/R in rat ovarian tissue. This property of etoricoxib suggests that it can be clinically beneficial in the prevention of damage that may arise with reperfusion by detorsion for the protection of the ovaries against torsion.</p>

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO & RISULTATI	ARGOMENTI TRATTATI & CONCLUSIONI
<p><b>Atorvastatin for ovarian torsion: effects on follicle counts, AMH, and VEGF expression<sup>45</sup></b></p>	<p>Parlakgumus H.A1, Aka Bolat F2, Bulgan Kificdag E3, Simsek E3, Parlakgumus A4.</p> <p>Eur J Obstet Gynecol Reprod Biol. 2014 Apr;175:186-90. doi: 10.1016/j.ejogrb.2014.01.017. Epub 2014 Jan 20.</p>	<p>To determine if atorvastatin protects ovarian follicles against ischemia reperfusion (I/R) injury and to determine how anti-Müllerian hormone (AMH) and vascular endothelial growth factor-A (VEGF-A) expression is altered.</p>	<p><b>STUDY DESIGN:</b> This experimental study was conducted at the Baskent University Animal Research Laboratory. 44 rats were arbitrarily assigned into four groups of 11 rats each. The control group underwent a laparotomy. The atorvastatin group received atorvastatin (10mg/kg/day), by oral gavage 7 days before and 7 days after the sham operation. The torsion group had bilateral torsion and detorsion of the ovaries. The atorvastatin+torsion group received atorvastatin (10mg/kg/day) 7 days before and 7 days after the torsion/detorsion operation. At day 7, the animals were euthanized and their ovaries were removed. Ovarian follicles were counted, and AMH and VEGF-A expression was determined. The Kruskal-Wallis, <math>\chi^2</math>, or Fisher's exact test were used when appropriate.</p> <p><b>RESULTS:</b> Primordial follicles (p=0.001), VEGF-A expression (p=0.018) and vascularization (p=0.02) were significantly higher in the atorvastatin group compared to controls. Primordial (p=0.002), primary (p=0.001), and secondary follicles (p=0.001), AMH expression (p=0.001), and vascularization (p=0.001) were lower in the torsion group compared with the control group. Primordial follicles (p=0.001), AMH (p=0.001) and VEGFA expression (p=0.001), and vascularization (p=0.001) were significantly higher in the atorvastatin+torsion group compared to the torsion group.</p>	<p><b>CONCLUSIONS:</b> Atorvastatin increased the primordial follicle pool and vascularization and protected primordial follicles and vascular structures against I/R injury.</p>

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE.	SCOPO	TIPO DI STUDIO & RISULTATI	ARGOMENTI TRATTATI & CONCLUSIONI
<p><b>Follicular reserve changes in torsion-detorsion of the ovary: an experimental study</b><sup>86</sup></p>	<p>Yucel B1, Usta TA2, Kaya E3, Turgut H4, Ates U5.  Eur J Obstet Gynecol Reprod Biol. 2014 Jun;177:126-9. doi: 10.1016/j.ejogrb.2014.03.029. Epub 2014 Apr 8.</p>	<p>To assess follicular reserve changes by follicle count in torsion-detorsion rat model.</p>	<p><b>STUDY DESIGN:</b> 30 albino rats were randomly divided into 3 groups: sham group (SG), detorsion after 24-hour torsion group (24hTG) and detorsion after 72-hour torsion group (72hTG). Ovaries were torsioned and fixed. They were untwisted 24 and 72 h later. Oophorectomies were performed at 14th day after detorsion. Tissue damage scoring and follicle counts were evaluated microscopically.</p> <p><b>RESULTS:</b> Tissue damage scores (TDSs) were higher in 72hTG and 24hTG compared to SG. In addition, as we increase torsion duration, TDSs also increased. There was no statistically significant difference in follicle numbers (primordial, primary, secondary and tertiary).</p>	<p>Ovarian torsion is the fifth common gynecological emergency. Ovaries partially or totally twist around their own vascular pedicles. Venous and lymphatic occlusion are followed by arterial insufficiency. These first cause congestion followed by hemorrhagic infarction, gangrene and finally necrosis. The characteristic symptom of ovarian torsion is the sudden onset of lower abdominal pain. Non-specific symptoms may delay diagnosis and treatment.</p> <p>Torsioned ovaries with dark blue-black discoloration are observed during laparotomies or laparoscopies. Oophorectomy has been the traditional treatment due to 3 reasons: Firstly ovarian tissue is considered to have lost its viability, risk of embolism and finally torsioned tissue might hide a malignancy. This surgical approach might precipitate infertility or early onset of menopause. Many studies have demonstrated that the ovarian tissue maintains its viability after detorsion. Recently, an organ preserving approach has been proposed. This conservative approach has been accepted worldwide. Several studies used follicle count to demonstrate the effect of ovarian injury on ovarian reserve.</p> <p><b>CONCLUSIONS:</b> <b>Duration of torsion and intensity of ovarian damage do not affect follicular reserve in a rat model. Regardless of their macroscopic appearance, ovaries maintain their follicle reserves after torsion. Thus, surgeons should be reassured and encouraged to untwist torsioned ovaries rather than removing them.</b></p>

TITOLO	AUTORI RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO & RISULTATI	ARGOMENTI TRATTATI & CONCLUSIONI
Does ischemia-reperfusion injury affect ovarian reserve and follicle viability in a rat model with adnexal torsion? <sup>98</sup>	Calis P1, Bozdogan G2, Sokmensuer LK3, Kender N2.  Eur J Obstet Gynecol Reprod Biol. 2015 Feb;185:126-30. doi: 10.1016/j.ejogrb.2014.12.006. Epub 2014 Dec 23.	To evaluate the effect of ischemia-reperfusion on follicle count and viability of follicles in a rat model with adnexal torsion.	<p><b>STUDY DESIGN:</b></p> <p>A total of 24 female adult Wistar albino rats were included in the study. In the first laparotomy, right ovaries were twisted at 720° in the counter-clockwise for a duration of two (n=12), four (n=6) or 16hours (n=6), whereas contralateral sites were kept as controls. In the second laparotomy, the right ovaries were detorsioned. Twenty-eight days after the detorsion, both ovaries were retrieved with the third laparotomy and placed in formaldehyde for subsequent examination under light microscopy and immunohistochemistry for proliferating cell nuclear antigen (PCNA). Besides histological evaluation by only using a standard scoring system, the viability of the follicles was also assessed by PCNA with immunohistochemical staining.</p> <p><b>RESULTS:</b></p> <p>Macroscopically, after two, four and 16hours of torsion, all the twisted ovaries had enlarged and demonstrated a dark, dusky appearance. However, under light microscopy with 10X magnification, the mean primordial+primary follicle count was comparable in twisted and control sides (26.7±7.6 vs. 28.1±5.9 respectively). In terms of the means of total tissue damage, only the loss of cohesion was found to be significantly different compared to the control sides (2.78±0.86 vs. 2.17±0.86, p=0.017). Immunohistochemical staining revealed significantly lower PCNA counts in the 16-hour torsion group only.</p>	<p><b>CONCLUSIONS:</b></p> <p>Even though ovarian reserves, reflected by primordial and primary follicle count, are similar between torsioned and contralateral ovaries, the viability of the remaining follicles might be affected by a long-standing ischemia-reperfusion phenomenon. Follicle count may reflect an idea of fertility potential, but immunohistochemical staining using viability markers such as PCNA confirms the viability of the counted follicles and appears to be a more precise approach necessary for demonstrating the functional status.</p>

TITOLO	AUTORI E RIVISTA DI PUBBLICAZIONE	SCOPO	TIPO DI STUDIO & RISULTATI	ARGOMENTI & TRATTATI & CONCLUSIONI
Assessing gonadal function after childhood ovarian surgery <sup>88</sup>	Zhai A1, Axt J, Hamilton EC, Kochler E, Lovvorn HN 3rd. J Pediatr Surg. 2012 Jun;47(6):1272-9. doi: 10.1016/j.jpedsurg.2012.03.038.	The aim is to assess the late effects of ovarian salvage oophorectomy on gonadal function and fertility as measured by menstrual regularity	<p>A 10-year retrospective review of females aged 20 years or younger who required surgery to treat an ovarian disorder. A mail survey was distributed to these patients to evaluate the effects of ovarian surgery on menarche, menstrual regularity, and pregnancy.</p> <p>Results: A total of 180 females (mean age, 11.5 years; range, 4 days to 20 years) had surgery to treat an ovarian disorder.</p> <p>-86 of these underwent unilateral oophorectomy (48%), -94 (52%) had an ovary sparing procedure (partial oophorectomy, cystectomy, salpingectomy only, tumor enucleation, detorsion, oophoropexy, or drainage).</p> <p>81 patients (45%) returned completed surveys. Simple cyst, benign tumor, and torsion owing to mass were the most common diagnoses in both groups.</p> <p>Of the respondents:</p> <p>44 had oophorectomy and 37 had ovarian salvage.</p> <p>Ages of menarche were similar between surgical groups.</p> <p>Symptoms of menstrual irregularity differed most significantly according to painful menses: oophorectomy 27.3%; salvage 59.5%;</p> <p>Interestingly, continuation of regular menses after surgery was higher in the oophorectomy group (oophorectomy, 70%; salvage, 15%; P = .013).</p>	<p>-adnexal torsion: definition, epidemiology;</p> <p>Studies in adults suggest an association between type of ovarian surgery and subsequent fertility as measured by achievement of pregnancy. When we compared females with ovary-sparing procedures to females with unilateral oophorectomies, there was a notable increase in menstrual irregularity and painful menses in the ovarian salvage group.</p> <p>Absence of an ovary does not reduce fertility potential.</p> <p><b>Conclusions: Unilateral oophorectomy does not appear to impair late gonadal function when compared with ovarian salvage. Surprisingly, oophorectomy appears to maintain more normal ovarian activity as estimated by menstrual regularity. Oophorectomy may be performed without apparent adverse effect on gonadal activity.</b></p>

<b>TITOLO</b> <b>Effects of unilateral ovariectomy on female fertility outcome<sup>89</sup></b>	<b>AUTORI E RIVISTA DI PUBBLICAZIONE</b> Bellati FI, Ruscito I, Gasparri ML, Antonilli M, Pernice M, Vallone C, Morano G, Chirietti P, Berloco PB, Panici PB.  Arch Gynecol Obstet. 2014 Aug;290(2):349-53. doi: 10.1007/s00404-014-3194-8. Epub 2014 Mar 11.	<b>SCOPO</b> To compare the fertility outcome among women subjected to unilateral ovariectomy and other abdominal or non-gynaecologic pelvic surgery.	<b>TIPO DI STUDIO &amp; RISULTATI</b> <b>METHODS:</b> In this retrospective cohort study, 113 fertile women, surgically treated between 1990 and 2001 at Sapienza University of Rome with unilateral ovariectomy (UO), appendectomy (AP) or cholecystectomy (CO) for benign disease, were analysed for fertility outcome. Patients with assessed pre-surgical fertility defects, previous abdominal or pelvic surgeries and post-surgical contraception were not included. <b>RESULTS:</b> Thirty-five women underwent UO, 39 were subjected to AP and 39 were treated with CO. After a minimum 10-year post-surgical interval, the overall number of successful pregnancies was 75. The rate of women who experienced at least one post-operative successful pregnancy was: 48.5 % in UO, 41 % in AP and 53.8 % in CO (UO vs. AP, P = 0.55; UO vs. CO, P = 0.99; AP vs. CO, P = 0.53). One patient (2.8 %) in UO, one patient (2.6 %) in AP and two patients (5.1 %) in CO underwent Assisted Reproductive Technology to become pregnant. The rate of women who reported at least one miscarriage was: 10/35 (28.5 %) in UO, 11/39 (28.2 %) in AP, 12/39 (30.8 %) in CO (UO vs. AP, P = 0.93; UO vs. CO, P = 0.89; AP vs. CO, P = 0.81). One ectopic pregnancy was reported in CO group and one stillbirth occurred in one AP patient.	<b>ARGOMENTI TRATTATI &amp; CONCLUSIONI</b> <b>CONCLUSIONS:</b> No statistical difference in terms of operative fertility outcome between patients subjected to UO, AP or CO was found, thus allowing to suppose that the removal of one ovary does not significantly worsen the female fertility outcome respect to other abdominal or pelvic procedures.
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## CURRENT OPINION IN OBSTETRICS AND GINECOLOGY

Il lavoro svolto per questa tesi ha permesso la realizzazione dell'articolo "Adnexal torsion in children and adolescents: update and review of the literature" pubblicato sulla prestigiosa rivista internazionale Current Opinion in Obstetrics and Gynecology.

*Spinelli C, Piscioneri J, Strambi S.*

*"Adnexal torsion in adolescents: update and review of the literature."*

*Curr Opin Obstet Gynecol. 2015; 22: 22.*

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**Adnexal torsion in adolescents: update and review of the literature.**

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**Abstract**

**PURPOSE OF REVIEW:** Adnexal torsion is a surgical emergency, which requires immediate recognition and prompt treatment. This article aims to systematically illustrate the most relevant approach to follow in cases of suspected adnexal torsion in adolescents. We based our evaluation of the role of clinical features, laboratory tests, and imaging on recent literature, till we consider the most appropriate surgical treatment.

**RECENT FINDINGS:** The literature describes the conservative treatment for adnexal torsion, consisting of detorsion, as the best surgical approach to guarantee the future reproductive capacity of patients. Recent experimental studies have focused on the consequences of detorsion, which may cause ischemia-reperfusion damage and have speculated about the role of different drugs for its avoidance.

**SUMMARY:** A systematic review of physiopathology, clinical picture, and imaging of adnexal torsion is certainly useful to identify as soon as possible this emergency condition. An early identification and an adequate treatment are indispensable in order to achieve a proper outcome for the patient. The choice of the appropriate surgical approach can be challenging and should be made on the basis of an accurate evaluation of the ovarian lesion. Therefore, it would be useful to perform an intraoperative frozen section analysis in selected cases.

PMID: 26204167 [PubMed - as supplied by publisher]

## RINGRAZIAMENTI

*Ringrazio il Prof. Claudio Spinelli per la fiducia e la disponibilità accordatami nel corso di questo anno e mezzo. Oltre ad avermi avvicinato al mondo della Chirurgia Pediatrica, tanto agognato, mi ha dato l'opportunità di partecipare attivamente alla realizzazione di importanti progetti in ambito scientifico-letterario, ottenendo risultati rilevanti. A Lei va tutta la mia gratitudine e stima.*

*Ringrazio la Dott.ssa Alessia Bertocchini dell'Ospedale Meyer per avermi aiutato nella raccolta dei dati per la stesura della tesi.*

*Ringrazio i miei genitori per avermi sempre supportato e incoraggiato in questo percorso di studio che finalmente è volto al termine; Giada, sorella-amica, per aver condiviso in ogni momento gioie e tormenti della vita universitaria.*

*Ringrazio Alessandro per l'amore, la pazienza e la partecipazione che mi ha sempre dimostrato, "nel sole, nel vento, nel sorriso e nel pianto": questo traguardo è anche tuo.*

*Un ringraziamento a Marco, Claudia, Marika, Martina e Priscilla, compagni d'avventura e amici di una vita. Ad Elda, Mario, Gianluca e Valentina che considero di famiglia.*

*Dedico questa tesi a Te:  
so quanto saresti stato fiero  
di avere una "dottorina" in famiglia,  
mi dispiace solo non aver avuto tempo.*

*Questa è per Te.*