

Research Article

Original research article on cystic ovarian lesions diagnosed as teratomas - a 2 year study in a tertiary care hospital

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ABSTRACT

Background: The incidence of dermoid cyst accounts for approximately 20% of all ovarian tumours. They occur more commonly in reproductive age group of women and are usually unilateral. This study is conducted to evaluate the clinical and pathologic presentation of mature cystic teratomas. Dermoid cyst is the most common type of ovarian germ cell tumor.

Methods: A 2yr retrospective and prospective study is done at tertiary care centre hospital of which around 180 patients with ovarian cysts were included of which 29 cases are diagnosed as teratomas are included. . Hysterectomy specimens along with adnexa were received for histopathological examination, and tissues were fixed in 10% formalin for processing. Sections were processed routinely with paraffin embedding and stained with haematoxylin and eosin.

Results: Cystic teratomas constituted 16.1% of all ovarian cystic lesions diagnosed and treated at our institution during the study period. The median of age was 34years. Abdominal or pelvic pain was the most frequent symptom for presentation in 62%of the cases. The rate of bilateral cystic teratomas of the ovary was 7%. The incidence of torsion was 3.3%, and was the highest in all complications. Histopathological evaluation has detected 96.6 % cases of mature teratomas, and 3.4% cases of immature teratomas.

Conclusions: Mature cystic teratoma is the most common germ cell tumor and accounts for about 33% of all ovarian neoplasm.

Keywords: Mature cystic teratoma, Bilateral ovaries, Immature teratoma, Germ cell tumour

INTRODUCTION

Germ cell tumors are composed of a number of histologically different tumor types derived from the primitive germ cells of the embryonic gonad. Teratomas are histological subgroup of germ cell tumors, originating from primordial germ cell. Dermoid cyst or mature teratoma is the most common benign ovarian neoplasm in young and middle aged women. It accounts for approximately 20% and 50% of adult and pediatric

ovarian tumors, moreover, malignant transformation occurs in 1-3% of cases.^{1,2} Most common being squamous cell carcinoma. Other tumors arising in a mature cystic teratoma include adenocarcinoma, thyroid carcinoma, malignant melanoma, transitional cell carcinoma, sarcoma, carcinoid tumor, and neuroectodermaltumor.³

The frequency of malignant change increases with increasing age rising to 19% after menopause. However,

it has been reported in young women of around 30 year, common symptoms are abdominal pain and mass per abdomen. Symptoms due to invasion of nearby organs may also be present. Oophorectomy is the operative procedure of choice and is usually curative.³

Functional ovarian cysts are common in women of reproductive age, but rare after menopause. It can occur at any age including the fetus (in uterus). The word teratoma is derived from Greek 'teras' which means 'Monster' coined by Virchow. Most of the Teratomas have 46xx karyotype and thought to develop by parthenogenesis from a single haploid germ cell. Mature cystic teratomas, often referred to as dermoid cysts.

The term "teratoma" comprises several histological types of tumor containing mature or immature tissue of the three germ cell layers: the ectoderm (skin, brain), mesoderm (muscle, fat), and endoderm (mucinous or ciliated epithelium).⁴⁻⁶ Mature teratoma is the most common benign ovarian tumor in women aged <45 years. The clinical manifestations of ovarian teratoma range from an incidentally detected small mass to a malignantly transformed tumor associated with high mortality.⁵ Most mature cystic teratomas are asymptomatic. Abdominal pain or other nonspecific symptoms occur in a minority of patients.⁶

The majority of dermoid cysts are monolateral with equal frequency in both ovaries; moreover, bilateral tumors are found approximately in 10% of cases.^{1,2,7} Immature teratoma (IT) represents 3% of all teratomas, 1% of all ovarian cancers and 20% of malignant ovarian germ cell tumors. According to WHO, immature teratoma is defined as a teratoma containing a variable amount of immature embryonal type (generally) neuroectodermal tissue.^{8,9}

Mature teratomas, can be classified as cystic, solid, or monodermal. Mature cystic teratomas may contain tissue derived from all 3 primary cell layers, with ectodermal component predominantly present. These tumors account for approximately 15% of all ovarian tumors, and about 95% of these will be dermoids. In the reproductive years, they constitute 43% to 70% of all benign ovarian neoplasms, with their frequency being highest in adolescents. They develop bilaterally in up to 15% of cases. Despite the frequency of this neoplasm, the appearance of multiple synchronous ovarian teratomas within the same ovary is a rare occurrence. Laparotomy has been traditionally referred as the preferred procedure for the management of dermoid cysts because of the risk of chemical peritonitis resulting from spillage of its contents.¹⁰

METHODS

A 2 year retrospective and prospective study was done at tertiary care hospital, modern government maternity hospital, Petlaberz/OMC, Hyderabad, India and

Department of Pathology. The studies included around 180 patients with ovarian cysts were included of which 29 cases are diagnosed as teratomas. The data collected included age at presentation, number of cysts, laterality, variability of cyst and type (functional, simple clear, dermoid, endometriosis, cystadenoma, malignant, and complicated) were all recorded. Hysterectomy specimens along with adnexae were received for histopathological examination and tissue were fixed in 10% formalin for processing. After routine grossing sections were processed routinely with paraffin embedding and stained with haematoxylin and eosin.

RESULTS

The study included a total of 180 patients with ovarian cysts diagnosed as neoplastic on ultrasound, of which 104 (57.7%) were serous cysts, 28 (15.5%) were mucinous cysts, 29 (16.1%) were dermoid cysts, 13 (7.22%) were hemorrhagic cyst and 6 (3.33%) were torsion (Figure 1). In the present study teratomas constituted 15.02% of all ovarian tumors.

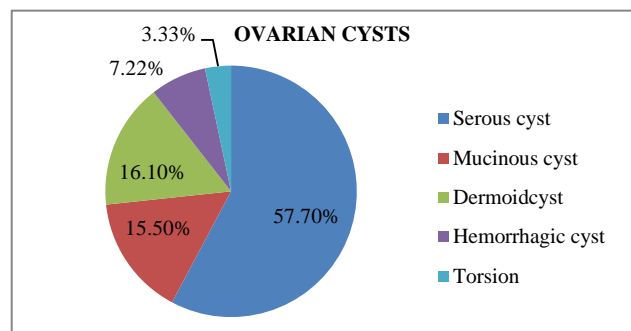


Figure 1: Incidence of various cystic lesions of ovary.

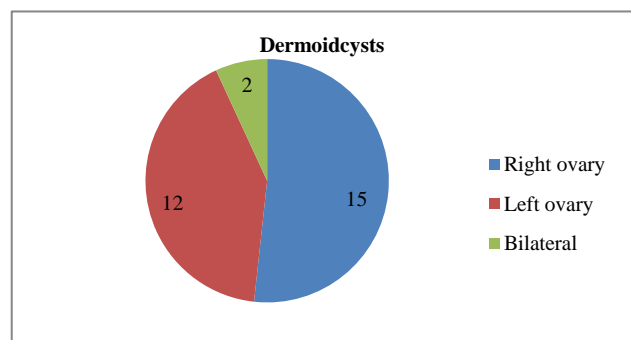


Figure 2: Laterality of dermoid cyst.

The size of the dermoid cysts ranged from 3cm to 15cm with a mean of 7.4. Of the 29 dermoid cysts 15 (41%) were right sided, 12 (52%) were left sided and 02 (7%) bilateral (Figure 2).

The age at presentation ranged from 14 years to 65 years with a mean age of 34 years (Figure 3). Two patients were unmarried and 27 patients were married. 3 patients were pregnant at the time of presentation, of which one

presented with left tubal ectopic pregnancy. The incidence of torsion was 3.4%, and was the highest in all complications.

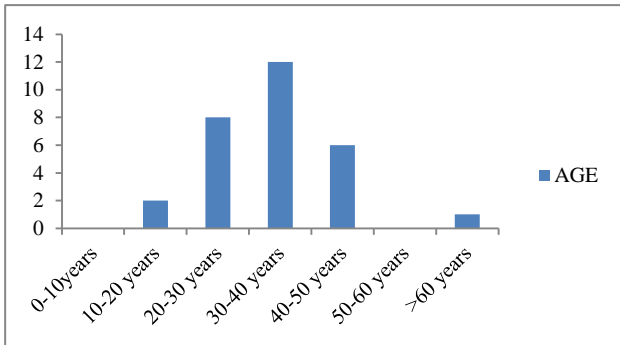


Figure 3: Age distribution of cystic teratomas.



Figure 4: Hysterectomy specimen along with bilateral ovarian dermoid cysts.



Figure 5: Hysterectomy specimen along with right ovarian dermoid cyst with rokitansky protuberance showing tooth.

Gross examination

Majority of the ovaries are cystic, multiloculated and filled with pultaceous material with hair. One case is showing rokitansky protuberance with tooth Figures 4-7. Microscopic examination of all cases shows cyst wall lined by stratified squamous epithelium and pilosebaceous unit, adipose tissue, cartilage are seen in Figure 8-10.



Figure 6: Hysterectomy specimen along with left ovarian dermoid cyst showing pultaceous material.



Figure 7: Ovarian cystectomy specimen showing hair and pultaceous material.

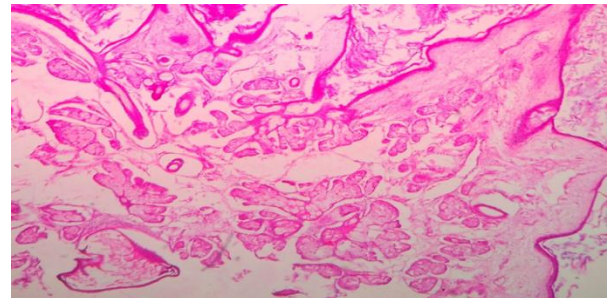


Figure 8: Ovary showing stratified squamous epithelium lining with keratin material and pilosebaceous units (10X magnification).

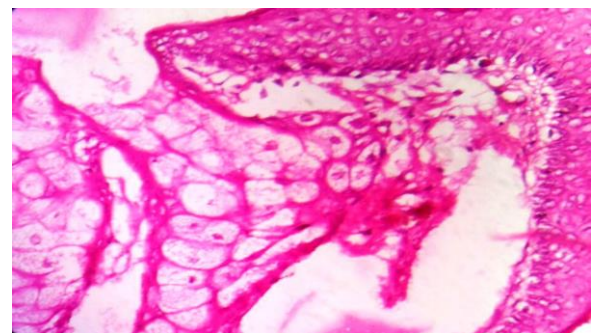


Figure 9: Ovary showing stratified squamous epithelium with sebaceous glands (40X magnification).

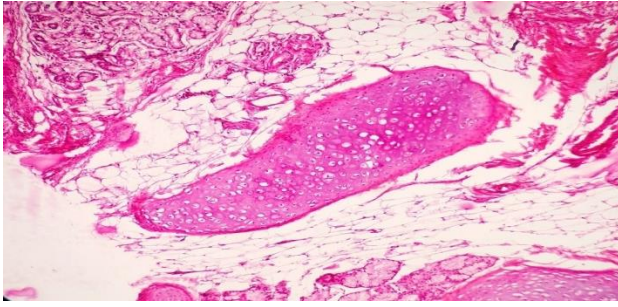


Figure 10: Ovarian cyst showing cartilage, adipose tissue and adnexal glands.

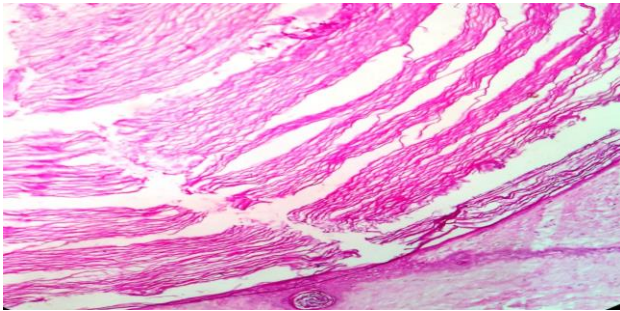


Figure 11: Epidermal cyst showing stratified squamous epithelium with keratin material.

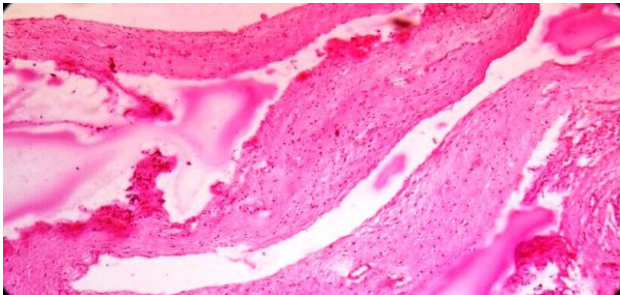


Figure 12: Immature teratoma of ovary showing neural tissue.

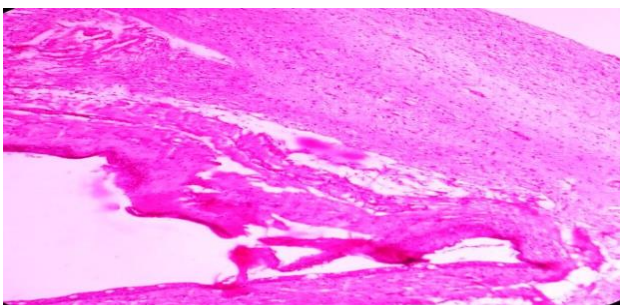


Figure 13: Immature teratoma of ovary showing neural tissue.

Of the 29 cases of Dermoid cyst 1 (3.4%) case was diagnosed as monodermal teratoma (Epidermalcyst) seen in Figure 11. Of the 29 cases of Dermoid cyst 1 (3.4%)

case was diagnosed as immature teratoma showing neural tissue seen in Figure 12, 13.

DISCUSSION

Benign mature teratoma is the most common benign tumor in young age, but malignant version (immature teratoma) is uncommon tumor comprising less than 1% of teratomas of the ovary. Immature teratoma has specific age incidence, occurring most commonly in first two decades of life.¹¹ Overall malignant germ cell tumors (MGCT) are relatively rare and represent about 20% of all ovarian tumors, but in children and adolescents more than 60% of ovarian neoplasms are of germ cell origin.

Mature cystic teratomas are usually asymptomatic and in many cases are discovered incidentally imaging.^{12,13} The most frequent symptom described is lower abdominal pain (44.1%).¹⁴ At gross pathological examination, mature cystic teratomas are unilocular and frequently filled with sebaceous material and lined by squamous epithelium.

Hair follicles, skin glands, muscle, and other tissues lie within the wall. A raised protuberance (Rokitansky nodule) usually projects into the cyst cavity. At any imaging modality, mature teratomas demonstrate a broad spectrum of findings ranging from purely cystic to mixed masses with components of all three germ cell layers, to solid masses composed predominantly of fat. Adipose tissue is present in 67-75% of cases, and teeth are seen in 31%.^{4,6}

They have a characteristic CT scan appearance with fat/fluid level attenuation and calcification or ossification.¹⁵ The classic sonographic appearance is of a hyperechoic mass known as a dermoid plug or Rokitansky protuberance.¹⁵ The Rokitansky protuberance is composed of the thickened area of ectodermal tissue from which hair and teeth arise. Pain is often related to the size of the mass, and ovarian torsion is common. Mature cystic teratomas grow slowly at an average rate of 1.8 mm each year, prompting some investigators to advocate non-surgical management of smaller (6cm) tumors.¹⁵

Mature cystic teratomas are indolent tumors with an estimated growth rate of 1.8 mm per year. It is unclear what signals these lesions to grow. It has been suggested that increasing estrogen and progesterone stimulate the sebaceous gland component of these tumors and in part can explain the increase in size seen in mature cystic teratomas after puberty and the arrested growth after menopause.¹²

Mature cystic teratomas are bilateral in approximately 10–20% of cases.¹² Immature teratomas represent <1% of all ovarian teratomas and are also composed of tissue from the three germ cell layers, however unlike mature

cystic teratomas, the cells are not fully differentiated and are arranged in a haphazard manner.¹⁰

Most are 5-10 cm in diameter when diagnosed and on sectioning they usually contain thick sebaceous material,

tangled hair and various dermal structures. Ovarian teratomas have a predisposition to right lateral side. In the present study teratomas constituted 15.02% of all ovarian tumors. Immature teratomas constituted 3.44% of total dermoid cysts.

Table 1: Comparison of present study with the other.

	Present study	Papadias K et al ¹⁶	Wu RT et al ¹⁷	Comerci JT et al ¹⁸	Sahraoui W et al ¹⁹	MorilloConejo M et al ²⁰
Incidence	15.02%	5%	32.6%	--	12.13%	--
Age	34 years	35 years	35.4 years	30 years	33.35years	36.2 years
Abdominal Pain	62%	68%	48.1%	--	67%	50.9%
Bilaterality	6.89%	--	8.2%	10.8%	14.3%	9.8%
Mean size	7.4cm	--	--	--	10cm	7.6cm
Torsion	3.4%	--	9.2%	3.5%	--	--
Pregnancy	10.3%	--	3.5%	--	19.8%	--

The mean age of presentation was 34 years which was comparable to Sahraoui W et al and Papadias K et al in which the mean age was 33.35 and 35 years respectively. Most common mode of presentation in present study was abdominal pain (62%) and means size was 7.4cm which was comparable to other studies. Bilateral dermoids were found in 2 out of 29 cases (6.89%) which were comparable to Wu RT et al in which it was 8.2% Table 1.

Ovarian teratomas may cause various complications (e.g. torsion, rupture, malignant transformation, infection, autoimmune haemolytic anemia) with a wide spectrum of clinical and imaging features.²¹ Torsion has been considered as the most common complication associated with mature teratomas, with the reported rate varying from 3% to 16%. It is most frequent in intermediate-size tumors than in small or very large tumors.²² In this present study torsion was seen in 3.4% which was comparable to Comerci JT et al in which the torsion was seen in 3.5%.

The only type of neural tissue that should be counted in grading a tumor for immaturity is primitive neural tubes and immature rosettes.²³ These tissue simulate the various patterns of stroma poor undifferentiated neuroblastoma, primitive neuroectodermal tumor or peripheral neuroepithelioma.²³ The type of neural tissue most often misinterpreted as immature in the grading of IT are cellular areas of differentiating neural tissue. These are often more densely cellular areas with a negligible mitotic rate, and, small nuclei and more distinct nuclear membranes than the truly significant immature neural cells.²³

Pre-operative diagnosis of malignant transformation is very difficult clinically as well as sonologically because this tumour cannot be readily differentiated from an uncomplicated dermoid cyst or other ovarian tumours.^{3,24}

Malignant transformation in mature cystic teratoma occurs at an older age when compared to the age incidence of other malignant germ cell tumors.²⁵ It is important to differentiate mature cystic teratoma from malignant transformation preoperatively because the surgery performed is different in both the conditions.

Endometriosis co-existing with bilateral dermoid cysts of the ovaries is a rare occurrence although both benign conditions are said to be common in women in reproductive age group.^{26,27} This association has a clinical relevance because an endometriotic pathology can reveal a silent teratoma with bilateral ovarian localization. Autoimmune haemolytic anemia has been noted occasionally in patients with teratoma of the ovary, especially mature cystic teratoma.²⁸

Ovarian teratoma commonly has an indolent course and presents with abdominal pain due to complications such as torsion, hemorrhage, or infection. Spontaneous rupture of teratoma is rare due to its thick wall and it usually occurs in the peritoneal cavity. Rupture into a hollow viscus due to adhesions is extremely rare complication, which may present as perforation peritonitis.²⁹

In general, removing a dermoid cyst is not an emergency procedure. If a dermoid cyst ruptures, becomes inflamed, or causes pain or fever, a person should seek immediate medical advice. Treatment depends also upon the patients age. In younger woman, it may be possible to remove the dermoid cyst while still leaving behind normal ovary tissue for needed hormone benefits or future pregnancy. If intraoperative spillage does occur, cyst contents should be removed immediately from the peritoneal cavity by repeated washing and aspiration.³⁰

The recognition of multiple smaller teratomas, rather than a single large teratoma, would aid in planning surgical

treatment, because the smallest tumors would be more amenable to laparoscopic excision.¹⁰ The recurrence risk of dermoids is 3% to 4%. Recurrence risk is considered to be higher after laparoscopic treatment of dermoids compared with laparotomy, with the probability of recurrence at 2 years being 7.6% in the laparoscopy group and 0% in the laparotomy group.³¹

CONCLUSION

The article shows that bilateral dermoid cysts, dermoids associated with gestations and ectopic gestations may be detected underlining the importance of an accurate postoperative histopathological examination. It also emphasizes the importance of histopathological examination in identifying malignancies in dermoid cysts which may sometimes be overlooked. Even though it is benign tumor, because of the complications close follow up of patients is required.³² Mature cystic teratoma is the most common germ cell tumor and accounts for about 33% of all ovarian neoplasm.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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