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Case Report

## Surgically assisted medical management of interstitial ectopic pregnancy

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### ABSTRACT

An interesting case of interstitial ectopic pregnancy in a primigravida managed by surgically assisted medical management with intracardiac instillation of KCl and methotrexate. It was diagnosed based on transvaginal and transabdominal ultrasound and procedure was done as USG guided under local anaesthesia in OPD by transabdominal route and immediate disappearance of foetal cardiac activity was noted on Doppler. She was followed up with serial sβ-hCG and TVS. She had no post procedure complication and was discharged on day 2 of procedure.

**Keywords:** Fertility sparing, Conservative management, Interstitial ectopic pregnancy, SAM

### INTRODUCTION

Interstitial pregnancy (IP); is anatomically, the interstitial part of the fallopian tube (the intramural portion) is 0.7 mm wide and approximately 1-2 cm long with a slightly tortuous course within the muscular wall of the uterus extending obliquely upward and outward from the uterine cavity. Therefore, an interstitial ectopic pregnancy is defined as pregnancy (blastocyst) implanted in the interstitial portion of the fallopian tube that is within the muscular wall of the uterus, lateral to the round ligament of the uterus.<sup>1-3</sup>

### CASE REPORT

Twenty four years old primigravida, spontaneous conception presented with amenorrhoea at POG of 8 weeks and 1 day, on 22 September 2020 (D1), with an LMP of 27 July 2020. She was asymptomatic. Routine transvaginal (TVS) examination revealed trilaminar ET of 11 mm with left live interstitial pregnancy of

approximately USMA 8 weeks with cardiac activity with a thin echogenic line connecting sac and endometrial canal (Figure1). A diagnosis of left complete interstitial pregnancy was made. She was haemodynamically stable. Her sβ-hCG was 61270 mIU/ml.

**Table 1: sβ-hCG on follow up in mIU/ml.**

Date	sβ-hCG level (mIU/ml)
26 September 2020 (D5)	25786
30 September 2020 (D9)	13174
14 October 2020 (D23)	275.80

She was planned for surgically assisted medical management (SAM) after well informed written consent and due caution for laparotomy. Procedure of fetal reduction by intra-cardiac methotrexate (MTX) and KCl was preferred as sβ-hCG was higher than prescribed guidelines with POG of approximately 8 weeks and presence of FCA.

**Table 2: The diagnostic criteria of different types of laterally implanted pregnancies which can be confused with interstitial pregnancy.<sup>5</sup>**

Location of gestational sac	Helpful scan findings	Helpful MRI findings	Laparoscopy
Early eccentrically located intrauterine pregnancy	<p>The gestational sac is usually located eccentrically within the uterine cavity and is surrounded by an echogenic ring of trophoblast.</p> <p>The endometrial midline echo is intact and the pregnancy can be seen implanted below the endometrial surface.</p> <p>The endomyometrial junction extends around the gestational sac. There is wide communication between the sac and the uterine cavity.</p>	--	Symmetrical global uterine enlargement.
Interstitial pregnancy	<p>An empty uterus. The ipsilateral interstitial tube adjoining the uterine cavity and the gestational sac. Gestational sac cannot be separated from the uterus and at least 1 cm from the lateral edge of the uterine cavity.</p> <p>Thin myometrial layer (<math>\leq 5</math> mm) surrounding the supero-lateral portion of the gestational sac. The interstitial line sign is present.</p> <p>Narrow communication between the sac and the uterine cavity can be seen.</p>	<p>A junctional zone is present between the gestational sac and the uterine cavity in early gestation.</p> <p>The gestational sac is located eccentrically in the uterine fundus and is contiguous with the uterine myometrium owing to the implantation within the intramural portion of the fallopian tube. Is surrounded by asymmetric thin myometrium.</p> <p>Clear visualization of the decidua adjacent to the gestational sac in second trimester. Identification of myometrial discontinuity and hemoperitoneum in ruptured advanced cases.</p>	The gestational sac (the uterine bulge) located lateral to the round ligament.
Angular pregnancy	<p>Gestational sac in the lateral angle of the uterine cavity. The ipsilateral interstitial tube adjoining the uterine cavity and the gestational sac.</p> <p>The myometrium is thicker and has 5 mm or more of myometrium surrounds all sides of the sac.</p> <p>Absent interstitial line sign. Wide communication between the sac and the uterine cavity can be seen.</p>	<p>No intact junctional zone between the uterine cavity and the gestational sac in early pregnancy.</p> <p>The gestational sac will be completely surrounded by uterine myometrium, although focal thinning is sometimes seen. No clear visualization of the decidua adjacent to the gestational sac in second trimester. High signal intensity in the uterine wall can represent intramural haemorrhage and identification of myometrial discontinuity and hemoperitoneum in ruptured cases.</p>	The gestational sac (uterine bulge) located medial to the round ligament and displaces it laterally. Asymmetrical uterine enlargement.
Rudimentary horn	Pseudopattern of an asymmetrical bicornuate	The gestational sac is clearly located in a rudimentary horn with	The gestational sac in a separate uterine horn with a

Continued.

Location of gestational sac	Helpful scan findings	Helpful MRI findings	Laparoscopy
pregnancy	uterus with variation in thickness of the myometrium surrounding the 2 horns and marked distance between the 2 horns.  A gestational sac mobile and separate from the empty uterus.  Absence of visual communication between tissues surrounding the gestational sac and the cervical endometrium.	a band of tissue connecting the rudimentary horn uterus.  The gestational sac is surrounded by a wall that should match the signal intensity of normal myometrium with all pulse sequences.  No communication between the pregnant horn and endometrial cavity or endocervical canal. The contralateral unicornuate uterus will be laterally displaced and described as a “banana-shaped uterus”.  Identification of myometrial Discontinuity and hemoperitoneum in ruptured advanced cases.	fallopian tube.  The horn is attached to the empty unicornuate uterus by a (narrow or wide) band.  The round ligament of the rudimentary horn is attached lateral to the gestational sac.
Pregnancy in one horn of bicornuate uterus	No variation in thickness of the myometrium around the 2 horns.  Visual continuity between the endometrium lining the gestational sac and that of the other uterine cornua. Wide communication between gestational sac and the rest of the endometrial cavity.	Two separate uterine horns with continuity between the endometrium lining the gestational sac and the other uterine horn	Gestational sac in one of the two uterine horns which is bigger and continuous with the other horn. The round ligament of the pregnancy horn is attached lateral to the gestation sac.

The procedure was performed in OPD under USG guidance under LA by transabdominal route with 26 G spinal needle with due asepsis. Injection MTX 50 mg was instilled intracardiac with 15 meq of KCl under visual guidance. Post procedure FCA was absent on Doppler and M mode with no free fluid in POD (Figure 2-4). Patient was kept under observation for 24 hours and was pain free after 2 hours, ambulant and accepting orally after 6 hours. She made a quick recovery and was discharged after 48 hours after TVS with advice for regular follow up with sβ-hCG in OPD (Figure 5). On 30 September 2020 (D9) her sβ-hCG fell to 1/5<sup>th</sup> of D1 and her TVS revealed no fetal parts and she had withdrawal bleeding (Figure 6). She was advised regarding warning signs; however she remained asymptomatic and showed dramatic improvement. This was a fertility sparing surgery with no scar on the uterus, however left tubal and cornual status is expected to be suboptimal. She also remains high risk for future ectopic pregnancy. Patient was counseled and has been advised not to conceive for 6 months post procedure and her high risk for ectopic gestation.

Interstitial, angular and cornual pregnancies respond poorly to systemic MTX therapy and are notorious for catastrophic uterine rupture because of ability of myometrium to carry on pregnancy to second trimester. Careful TVS in first trimester remains gold standard for early detection of Ectopic pregnancies and prevention of maternal morbidity. The interstitial line sign’ that extends from the upper region of the uterine horn to border the intramural portion of the fallopian tube was also used for diagnosis of this rare type of ectopic pregnancy. MRI with diagnostic laparoscopy is confirmatory. Due to COVID-19 restrictions MRI appointment was not available before four weeks and window period for medical management would have been lost. Patient refused transfer to a higher centre.

## DISCUSSION

Historically, management of IPs included wedge resection by laparoscopic/open surgery or hysterectomy.<sup>4</sup> Less invasive and/or aggressive techniques may reduce the risk of intra-operative complications, whilst improving long-term fertility and obstetric outcomes.



**Figure 1: Left interstitial pregnancy on D1 with echogenic line connecting sac and endometrial canal. endometrium is trilaminar.**



**Figure 2: Doppler image on TVS of left interstitial pregnancy preprocedure D1.**



**Figure 3: Post procedure on D1 with immediate disappearance of FCA and collapse of G-sac on Doppler. No free fluid in POD.**



**Figure 4: Review scan on D3 post procedure with fetal pole and irregular GSac with absent FCA.**



**Figure 5: Empty irregular G-sac and no fetal pole on D10.**



**Figure 6: On D10 of procedure, patient discharged.**



### **Management options of interstitial ectopic pregnancy**

Historically, management of IPs included wedge resection by laparoscopic/open surgery or hysterectomy. Less invasive and/or aggressive techniques may reduce the risk of intra-operative complications, whilst improving long-term fertility and obstetric outcomes.

Conservative management (expectant and medical management); the establishment of early pregnancy assessment units, use of high resolution TVS and access to rapid quantitative  $\beta$ -hCG testing facilitate early detection of ectopic pregnancies, prior to tubal rupture. Conservative management (encompassing expectant and medical management) should only be offered to patients with a radiologically diagnosed IP who are haemodynamically stable and have no obvious risks of immediate rupture, such as large GS or rapidly increasing  $\beta$ -hCG levels. Fastidious follow-up allows expectant or medical management to be offered as first line management in appropriate patients.<sup>6</sup>

#### **Expectant management**

Spontaneous miscarriage is a common pregnancy outcome, whether the pregnancy is intra-uterine or ectopic.<sup>7</sup> Expectant management is an appropriate first line approach for women with an IP and declining serum  $\beta$ -hCG levels (irrespective of ectopic mass size and initial serum  $\beta$ -hCG levels).<sup>8,9</sup> Expectant management should be abandoned if there is evidence of clinical deterioration.

Medical management of tubal ectopic pregnancy; high dose intravenous/intramuscular methotrexate (MTX) with oral folic acid rescue was first proposed as a safe alternative for the management of IP in 1982.<sup>10</sup> The dose of systemic MTX is calculated according to the Stovall et al. protocol: 50 mg/m<sup>2</sup> body surface area.<sup>11</sup>

Surgically assisted medical management for interstitial ectopic pregnancy; For IP, in addition to intravenous or intramuscular administration, MTX may also be injected locally either into, or close to, the GS (under TVS or laparoscopic guidance). Doses for the local injection of MTX in the studies below ranged from 25 to 50 mg. This needle may be advanced through the anterior fornix, through the anterior uterine wall and into the targeted area where the MTX may be delivered straight into the gestational sac and surrounding area. Local MTX administration is more invasive than systemic administration and requires special facilities and trained personnel; this makes it more operator-dependent ultrasound guided into the gestational sac/chorionic tissue, via transvaginal/transabdominal route using a fine spinal needle. Here we used transabdominal route under Lekshminarayanan Thulasi Devi. Some authors advocate local injection of MTX or potassium chloride into the GS when foetal cardiac activity is present.<sup>6,12</sup> We used KCl also since cardiac activity was present.

### **Surgical management**

Surgical management of IPs remains an important option, as it offers definitive treatment. Historically, wedge resection or hysterectomy by laparotomy was the mainstay of surgical management; however, the morbidity associated with such invasive operations has led to newer, less invasive techniques being preferred. Women with IPs who are haemodynamically unstable and/or have an ultrasound suggestive of pregnancy rupture should undergo immediate surgical management. Patients who present with heterotopic pregnancies (one of which is both viable and wanted) should be offered surgical rather than expectant management as accurate monitoring with  $\beta$ -hCG levels is not possible in this situation. Advances in laparoscopic surgery allow for less invasive and less traumatic surgical options for patients with IPs than those practised historically (i.e. laparoscopic cornual resection, rather than abdominal hysterectomy). While cornual ('wedge') resection preserves patients' future fertility, it may carry the risk of uterine rupture due to the loss of myometrium and extensive uterine scarring which should be explained firmly to the patient.<sup>13</sup> More recent studies favour cornuostomy over corneal resection. Cornuostomy excises the IP, while preserving uterine architecture and maintaining fertility.<sup>14</sup> Cornuostomy is considered to cause less tubal damage than cornual resection and may have better pregnancy outcomes in future (including fewer cases of uterine rupture).<sup>15</sup> Other management options; ultrasound-guided transcervical forceps extraction (UTCE) and transcervical suction under laparoscopic and hysteroscopic guidance is discouraged and abandoned as a procedure. Further studies using prospective data from multiple centres are required to assess various management options on the short term and long term outcomes such as fertility, pregnancy and labour complications.

### **CONCLUSION**

The term cornual pregnancy should not be used to describe interstitial ectopic pregnancy in literatures. Radiologists and Obstetricians should be encouraged to look for sonographic diagnostic criteria and document these in their report to increase clinician's confidence with the diagnosis especially in asymptomatic patients with viable pregnancy and high serum  $\beta$ -hCG levels. TVS should be performed in all early pregnancies. Women suitable for surgically assisted medical management of interstitial ectopic pregnancy should be informed that for early viable interstitial ectopic pregnancy can be successful but post treatment follow up can be prolonged and informed consent for laparotomy should be taken.

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