

# Diagnosis and management of ectopic pregnancy

**Ectopic pregnancy remains the leading cause of maternal death in the first trimester. Its diagnosis presents challenges despite modern diagnostic tests and its treatment remains controversial to this day.**



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The incidence of ectopic pregnancy varies from country to country. In general, it accounts for 0.5 to 2% of all pregnancies. Although it is a relatively common clinical entity, the diagnosis and management of ectopic pregnancy still presents challenges, and haemorrhage from a ruptured ectopic pregnancy remains the leading cause of maternal death in the first trimester. Maternal death due to this condition has, however, declined over the years due to more accurate diagnostic methods and early treatment.

## Location

Most ectopic pregnancies (over 98%) occur in the fallopian tubes. Most of these (about 80%) are located at the ampullary segment of the tube. Less often, they occur in the isthmic (12%), fimbrial

(6%) and interstitial (2%) portions of the fallopian tube. It is extremely rare for ectopic pregnancies to be located outside the fallopian tubes, but they can occur abdominally (1.5%), on the ovary or in the cervix (0.1 to 0.2%).<sup>1</sup>

## Causes

The pathogenesis of ectopic pregnancy is linked to tubal damage and resultant abnormal tubal transport of the embryo. Documented tubal pathology as a result of disease processes, such as pelvic inflammatory disease (PID), severe endometriosis, previous tubal surgery or previous tubal ligation, remains the strongest risk factor.<sup>1</sup> A history of previous ectopic pregnancy is also a strong risk factor.<sup>2</sup> However, once a woman has experienced an intrauterine pregnancy after an initial ectopic

## IN SUMMARY

- The diagnosis and management of ectopic pregnancy still present challenges; ectopic pregnancy remains the leading cause of maternal death in the first trimester.
- Bleeding in the first trimester of pregnancy is the most common symptom of ectopic pregnancy; however, it is also a common symptom in the first trimester of a viable ongoing intrauterine pregnancy.
- Generally, an intrauterine sac is visible by seven weeks' gestation. The presence of an empty uterus and a positive beta-human chorionic gonadotrophin (HCG) result are the hallmarks of an ectopic pregnancy.
- Beta-HCG levels rise by 50% every 48 hours in a successful intrauterine pregnancy. The plateau or very slow change of beta-HCG levels is highly suggestive of an ectopic pregnancy.
- If an ectopic pregnancy is not ruptured, the ectopic tissue is not more than 4 cm in size and there is no positive fetal heart beat, laparoscopic salpingostomy is a good treatment choice when risk and benefit profiles are considered.
- In women treated with conservative surgery (salpingostomy) or methotrexate injection it is vital to follow up beta-HCG until levels are less than 2 IU/L.

### Table. Risk factors for ectopic pregnancy<sup>3</sup>

#### Strong risk factors

- Proven tubal pathology resulting from:
  - pelvic inflammatory disease (PID)
  - severe endometriosis
  - previous tubal surgery
  - previous tubal ligation
- History of previous ectopic pregnancy
- History of PID
- Failure of current use of an intrauterine contraceptive device

#### Weak risk factors

- History of infertility, infertility treatment (e.g. ovulation induction with clomiphene citrate or follicle stimulation hormone) and *in vitro* fertilisation treatment
- History of previous Caesarean section

#### Suggested but unproven risk factors

- Use of ovulation induction agents

pregnancy, the risk of a subsequent ectopic pregnancy decreases. Risk factors for ectopic pregnancy are listed in the Table.

### Diagnosis

In 1884, when Lawson Tait first reported the successful treatment of a tubal pregnancy with salpingectomy, the most difficult aspect in the management of ectopic pregnancy was making the diagnosis.<sup>4</sup> This has been made easier with the availability of beta-human chorionic gonadotrophin (HCG) tests and pelvic ultrasound; however, the recognition of an ectopic pregnancy still remains a diagnostic trap due to the variable nature of the presentation and the presence of nonspecific symptoms.

The classic symptoms and signs of an ectopic pregnancy are uterine bleeding, localised pain, rebound on pelvic or abdominal examination and an adnexal mass; these are discussed below. The suggested management steps of a woman with a suspected ectopic pregnancy are outlined in the flowchart on page 16, and key points in diagnosis are listed in the box on page 17.

### Diagnosis and management of ectopic pregnancy

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Ectopic pregnancy accounts for approximately 0.5 to 2% of all pregnancies. Haemorrhage from a ruptured ectopic pregnancy remains the leading cause of maternal death in the first trimester. An early diagnosis is therefore important; however, the recognition of an ectopic pregnancy remains a diagnostic trap due to the variable nature of the presentation and the presence of nonspecific symptoms. Treatment decisions are based on the state and size of the ectopic tissue and the state of the patient.

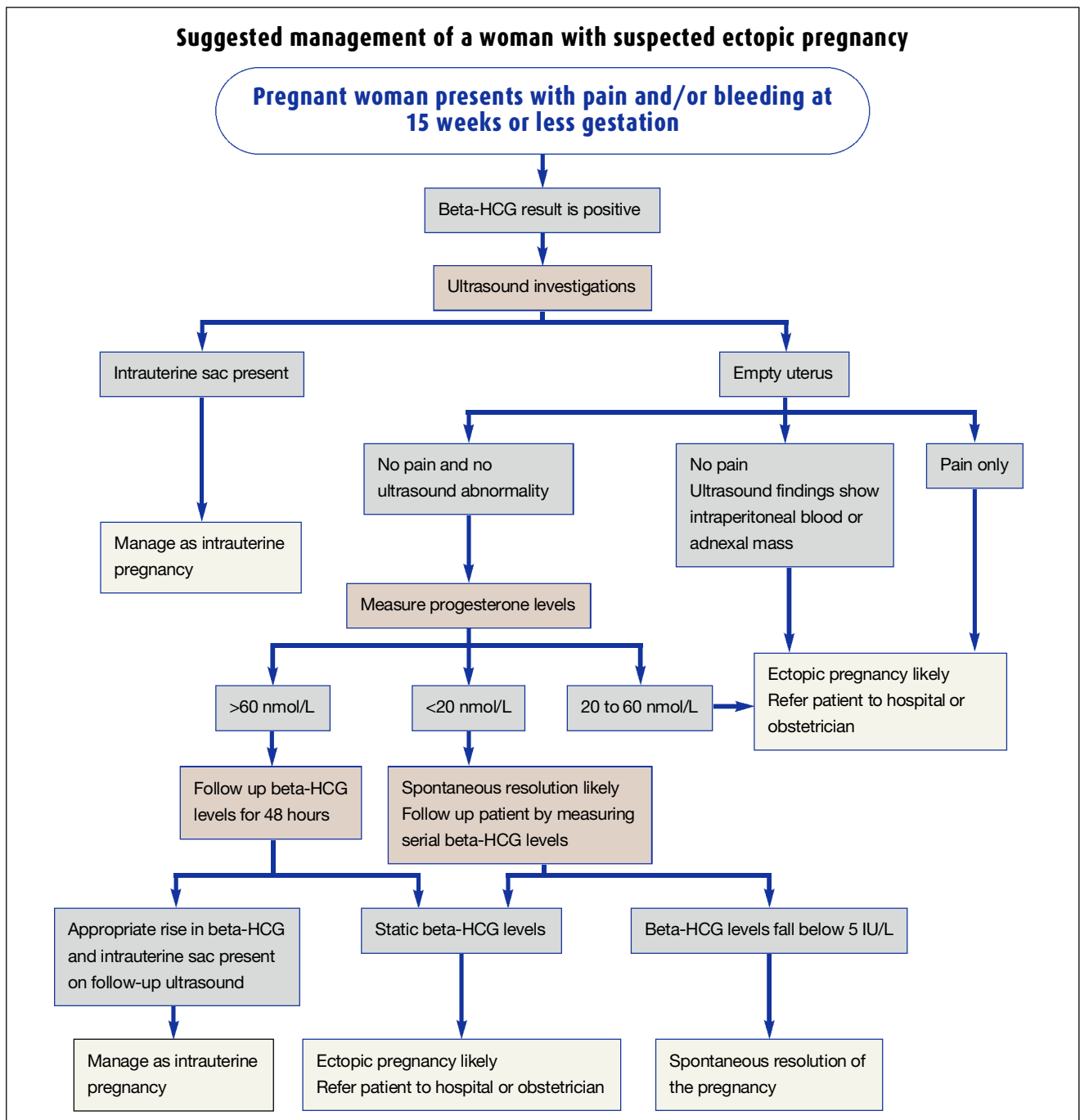
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### Bleeding and the establishment of pregnancy

The most important factor in the accurate diagnosis of an ectopic pregnancy is a high index of clinical suspicion. To diagnose an ectopic pregnancy, the pregnancy state must be diagnosed first. It is therefore important to carry out a pregnancy test in any potentially fertile women presenting with irregular or abnormal bleeding.

A small amount of bleeding is probably the most common symptom of an ectopic pregnancy

continued



and is related to decidual reaction in response to the pregnancy. Unfortunately, bleeding is not an absolute feature of an ectopic pregnancy and is also a common symptom for a viable ongoing intrauterine pregnancy. Even in women with regular cycles, some menstrual shedding may occur at the expected time of menstrua-

tion before symptoms of pain occur (some four to eight weeks later). The amount of flow in a woman with an ectopic pregnancy is most likely to be lighter than that of a normal period. It is therefore important to establish the dates of recent menses and the normality in terms of flow and duration.

**Pain**

Pain is a vague symptom. Most women experience some lower abdominal or pelvic pain in early pregnancy whether it is a normal pregnancy, threatened miscarriage or an ectopic pregnancy. It is often difficult to distinguish the pain from one condition to the other.

Not all patients with an ectopic pregnancy will have clearly localised pain to the right or left side. Most will have generalised pain in the pelvis or lower abdomen. It is important to distinguish the pain from a complete miscarriage to that of an ectopic pregnancy because the two conditions can often be mistaken for each other as both will show a positive pregnancy test and an empty uterus on ultrasound.

With a complete miscarriage there is usually severe cramping that develops over hours and days and is usually associated with bleeding that has culminated in the passage of a significant amount of blood and clots, with or without sac or tissue. Afterwards, the pain will invariably settle and not recur and the amount of bleeding will reduce significantly.

In the case of an ectopic pregnancy, the pain does not settle. The bleeding may be regarded as heavy and the pain severe; the pain usually recurs despite reported passage of tissue. The lack of a significant resolution of pain is a hallmark of an ectopic pregnancy. In these circumstances, an ectopic pregnancy should be considered unless a prior ultrasound confirmed the presence of an intrauterine sac.

### Beta-HCG levels

A positive beta-HCG result of 500 to 2000 IU/L is typically associated with an ectopic pregnancy; however, the actual levels can be extremely variable ranging from tens to tens of thousands. Nevertheless, some common features regarding beta-HCG apply: the beta-HCG level will rise by 50% every 48 hours in a successful intrauterine pregnancy and the plateau or slow change of beta-HCG levels is highly suggestive of an ectopic pregnancy. Serial beta-HCG testing rather than a single test is therefore important for the accurate diagnosis of an ectopic pregnancy in a woman with vague symptoms.

### Pelvic ultrasound

There are two potential pitfalls when

## Key points in the diagnosis of suspected ectopic pregnancy

- Most women with an ectopic pregnancy have some bleeding and pain, with or without ultrasound abnormality of either blood in the pelvis (reported often as free fluid in the pelvis) or an adnexal mass.
- Invariably, women with an ectopic pregnancy have no gestational sac in the uterus.
- In a minority of cases, women with an ectopic pregnancy will have no pain and no abnormality on pelvic ultrasound. In such cases, a single measurement of progesterone may be helpful in distinguishing patients who should be referred and those who can be followed up in 48 hours.
- Tubal rupture can occur unpredictably and with devastating consequences if an ectopic pregnancy is left untreated. If diagnosis is unclear, refer the patient for gynaecological care.
- Some hospitals have available early pregnancy assessment services to help GPs reach an accurate diagnosis for and appropriately manage their patients

diagnosing an ectopic pregnancy using pelvic ultrasound: dating and the possibility of a pseudosac. In a woman with uncertain dates or no idea of a date due to irregular cycles and no fetus is seen on ultrasound, it is difficult to determine if the pregnancy stage is too early for the fetus to be seen or if it is an ectopic pregnancy. In cases of uncertain dates, serial beta-HCG measurements and a pelvic ultrasound should be carried out because of the wide variation of normal ranges for beta-HCG in early pregnancy.

In general, an intrauterine sac is visible after seven weeks' gestation. As a general rule (but not absolute), an intrauterine sac should be visible in a normal pregnancy if beta-HCG levels are 2000 IU/L or above. The appearance of a pseudosac can make the diagnosis difficult. It is extremely difficult for a clinician to guard against this phenomenon except with serial ultrasounds by a reliable ultrasound provider and clinical suspicion.

In practice, the presence of an empty uterus and a positive beta-HCG result is the hallmark for an ectopic pregnancy. The detection of an adnexal mass either by ultrasound or by clinical examination is uncommon except in the hands of the most experienced clinicians and vigilant ultrasound operators.

### Progesterone levels

Progesterone levels have been used recently with some rigour in the diagnosis of potential ectopic pregnancies.<sup>5</sup> Although a single measurement of progesterone may be helpful in cases in which symptoms are not marked and dates are uncertain, it is not discriminatory enough to be diagnostic.

Progesterone levels can often add to confusion in some cases. Low levels of progesterone (less than 20 nmol/l) are usually associated with spontaneous resolution of the pregnancy, but exceptions can occur. High levels of progesterone (above 60 nmol/L) are often, but not always, associated with an ongoing intrauterine pregnancy. An intermediate level (between 20 and 60 nmol/L) could mean anything.

### Treatment

#### Surgical management

In a haemodynamically compromised patient with a ruptured ectopic pregnancy, a timely laparotomy salpingectomy, evacuation of haemoperitoneum and appropriate resuscitation have definite life-saving merit.

With serial beta-HCG measurements and the availability of sensitive pelvic ultrasound, the diagnosis of an ectopic pregnancy can often be made relatively early, sometimes even before symptoms occur. As a result, conservative treatment

### Key points in the treatment of women with an ectopic pregnancy

- Generally, treatment decisions are based on the state and size of the ectopic tissue and the state of the patient.
- If an ectopic pregnancy has not ruptured, the ectopic tissue is not more than 4 cm in size and there is no excessive activity (no positive fetal heart beat), laparoscopic salpingostomy is a good treatment choice when risk and benefit profiles are considered.
- A laparoscopic salpingectomy is more appropriate than salpingostomy in cases likely to result in persistent trophoblastic disease – e.g. when there is a large ectopic tissue (>4 cm in size) or ultrasound evidence of a fetal heart beat.
- A single dose intramuscular injection of methotrexate is likely to be popular with patients and appropriate if an ectopic pregnancy diagnosis can be made in women as outpatients before they have a laparoscopy.
- Single dose methotrexate injection is less likely to be successful if beta-HCG levels are high.
- Many ongoing studies are exploring alternative treatments – e.g. adjunctive treatment of methotrexate with prostaglandins, the role of expectant management in the presence of low beta-HCG levels and comparison of laparoscopic salpingostomy versus salpingectomy.

becomes appropriate in cases where tubal rupture has not yet occurred. In these situations, it is possible to cut open the fallopian tube (salpingostomy), remove the ectopic tissue and conserve the tube.

Salpingectomy and salpingostomy can be performed laparoscopically.<sup>6,7</sup> Most gynaecologists are now so adept at laparoscopies that even in the case of a ruptured ectopic pregnancy, it may be quicker to perform a laparoscopic salpingectomy and stop the haemorrhage than to perform a laparotomy.

### Medical management

Systemic treatment with methotrexate is an alternative to surgery. Methotrexate, a folic acid antagonist, inhibits the synthesis of purine and pyrimidine, thus interfering with DNA synthesis and cell proliferation in trophoblastic tissue. As a result of the inhibition on cellular proliferation, there is possible toxicity to other proliferative tissue causing stomatitis, conjunctivitis or gastroenteritis. The toxicity can be minimised with folic acid administration. The most commonly used methotrexate regimen is a single intramuscular dose at 50 mg/m<sup>2</sup>. In some institutions,

1 mg/kg is given to patients without folic acid; this has been shown to improve compliance and the toxicity profile.<sup>8</sup>

Methotrexate is a useful adjunct if persistent trophoblastic disease is identified after conservative laparoscopic surgery. Additionally, it is suitable if surgery is anticipated to be difficult due to the unusual site such as cervical, cornual or Caesarean section scar pregnancy. It is also the treatment of choice when the pregnancy is of an unknown location (i.e. a laparoscopic approach failed to identify the location, but it is definitely not intrauterine) and obviously nonviable.

In most institutions, patients can only receive methotrexate treatment if they are deemed suitable. Methotrexate treatment can be associated with treatment failure, presenting as persistent trophoblastic disease. Patients should be followed up and possibly a repeat injection administered, although patients must be compliant and clinically stable. The ectopic size, if identified on pelvic ultrasound, should be 3 cm or less. There should not be a fetal heart beat and beta-HCG levels should generally be below 10,000 IU/L for methotrexate treatment to be given.

Patients should have normal haematological, renal and hepatic function to minimise toxicity. They should be advised not to drink alcohol or use aspirin (e.g. NSAIDs), refrain from sexual activity, avoid sun exposure, drink plenty of fluids (more than 1.5 litres daily) and use prophylactic mouthwash. They should also be advised not to conceive for three months after treatment due to potential teratogenicity.<sup>9</sup>

### Treatment comparisons

#### Persistent trophoblastic disease

Despite careful surgery, persistent ectopic pregnancy tissue can occur in about 5 to 8% of patients treated with laparoscopic salpingostomy.<sup>6,10</sup> Persistent trophoblastic tissue is more likely to occur in patients after laparoscopic salpingostomy than in those after open salpingostomy, and even more likely in those who have had single dose methotrexate treatment. The differences in treatment success are statistically significant.<sup>11</sup>

The most important factor predicting persistent trophoblastic disease after treatment seems to be high pretreatment beta-HCG levels (>3000 IU/L);<sup>10</sup> the size of the ectopic tissue appears to be of secondary importance. In women treated with conservative surgery (salpingostomy) or methotrexate injection it is vital to follow up beta-HCG until levels are less than 2 IU/L.

#### Future fertility

The subsequent cumulative intrauterine pregnancy rate at 12 months is about 60 to 70% in women who have had one ectopic pregnancy treated with laparoscopic surgery.<sup>12</sup> There is no significant difference between laparoscopic salpingostomy and open salpingostomy, or between methotrexate and laparoscopic salpingostomy in terms of future fertility.

The subsequent ectopic pregnancy rate is about 10% after one ectopic pregnancy – i.e. at least a 10 times greater risk than that of the general population.<sup>12</sup> Interestingly, there is a nonsignificant tendency towards

## Case presentations: diagnosis and management issues

### Case 1. An incorrect diagnosis

A 32-year-old nulliparous woman at seven weeks and two days' gestation presented to the casualty department after referral by her GP. She had regular menstrual cycles and was certain of her dates. She had experienced a small amount of vaginal bleeding over the past three weeks and had right iliac fossa pain that started one day before presentation.

At six weeks and four days into her pregnancy, the woman's GP had arranged a pelvic ultrasound and measurement of serum beta-HCG. The ultrasound had shown only a bulky uterus and her beta-HCG level had been 419 IU/L. Five days later, the beta-HCG level had increased to 1547 IU/L. The patient was referred to the hospital's early pregnancy assessment service (EPAS) the next day for dilatation and curettage with a presumptive diagnosis of miscarriage. However, the patient's pain had started that day and worsened overnight so she took herself to the casualty department rather than the EPAS.

At casualty, the patient's beta-HCG level was 1622 IU/L and progesterone level, 27.2 nmol/L. A transvaginal ultrasound was performed and showed a right-sided ectopic pregnancy and haemoperitoneum. The patient underwent a laparoscopy and right salpingostomy. At the time of the procedure, there were pelvic adhesions on both fallopian tubes, ovaries and the pouch of Douglas. Perihepatic adhesions (Fitz-Hugh-Curtis syndrome) were noted. Pelvic adhesiolysis was also performed at surgery.

Postoperatively, chlamydia and gonococcal screening were negative, and the beta-HCG result was negative by week four.

### Case 2. An asymptomatic presentation

A 32-year-old woman presented to a gynaecologist with 13 months of primary infertility. Significantly, there was a longstanding history of irregular cycles ranging from 21 to 65 days. A diagnosis of polycystic ovarian syndrome (PCOS) was made on the basis of her history and ultrasound findings of polycystic-looking ovaries.

The woman was treated with clomiphene citrate with cycle monitoring. She returned at day 29 to review the result of her cycle: ovulation was evident at day 15 and she had not yet had a period.

A pregnancy test later carried out was positive. She returned for follow up at seven weeks.

Results from prearranged tests showed that her beta-HCG level was 1670 IU/L and progesterone level, 41 nmol/L. The patient was totally asymptomatic, including absence of early pregnancy symptoms (such as nausea or breast tenderness). She was advised that she may have an ectopic pregnancy and a repeat beta-HCG and pelvic ultrasound were requested in four days time (due to an impending long weekend). She was also informed about symptoms of ectopic pregnancies and advised to go to the emergency department of her nearest hospital if these symptoms occurred.

The patient started having pelvic pain about 24 hours later but waited three days before presenting to the emergency department when the pain deteriorated. A repeat beta-HCG measurement was 1500 IU/L and an ultrasound showed an empty uterus with free fluid in the pelvis. A possible left adnexal mass of 37 mm diameter was also reported. A large left ectopic tissue was identified by laparoscopy and salpingectomy was performed. The right tube was viewed to be normal. She made an uneventful postoperative recovery.

### Case 3. Efficacy of methotrexate treatment

A 28-year-old woman presented to her obstetrician for her first visit at eight weeks' gestation. She had regular 28-day cycles and was certain of her dates. She felt that she had already had a miscarriage three days previously when she had started bleeding, which had worsened on the day of presentation. On further questioning, she had had small amounts of dark blood only. She also had some lower abdominal cramps, located at midline.

Examination showed only small amounts of blood and a closed cervix. The uterus was slightly bulky and no adnexal mass was felt, the patient was tender to examination generally. An urgent pelvic ultrasound was arranged and beta-HCG level was measured. The results showed an empty uterus on ultrasound and a beta-HCG level of 705 IU/L.

The patient was advised that more than likely she had an ectopic pregnancy and that she did not have a viable pregnancy. Treatment options were discussed and she elected to be treated with

a lower repeat ectopic rate when patients are treated with the less invasive treatment, such as medical treatment.<sup>11</sup>

### Health care costs and patient desire

Although laparotomy has the best success profile out of all treatments for ectopic pregnancy, its disadvantages lie in the invasive nature of open surgery and subsequent higher health care costs.

Methotrexate treatment is potentially less expensive as it can be administered, and patients followed up, on an outpatient basis. Its association with persistent trophoblastic disease, however, can result in health care costs greater than those for laparoscopic salpingostomy and subsequent follow up.

Some evidence suggests that single dose methotrexate treatment is more likely to

succeed and cost savings will be superior or equal to laparoscopic salpingostomy when beta-HCG levels are low (less than 3000 IU/L).

Despite the side effect profile of methotrexate, a single dose intramuscular methotrexate injection is generally well tolerated and patients are generally willing to risk the side effects to avoid surgery of any kind (open or laparoscopic).



methotrexate. A referral to a medical oncologist was arranged and she was treated the next day. She had no side effects from the methotrexate. Six days later her beta-HCG level was 41 IU/L and 13 days later it was 6 IU/L.

A hysterosalpingogram three months later confirmed bilateral tubal patency. The patient then suffered secondary infertility (unexplained) and was treated with clomiphene citrate without success. She then conceived spontaneously (after signing up to receive IVF treatment) and delivered a healthy term female infant about three years after the first ectopic pregnancy.

## Case discussion

### Symptoms

Patients with an ectopic pregnancy normally present at seven to eight weeks' gestation, as illustrated by these cases. Bleeding in the first trimester of pregnancy is the most common symptom of an ectopic pregnancy; however, it is also a common symptom during the first trimester for women with a viable ongoing intrauterine gestation.

In Case 1, the presumptive diagnosis of an inevitable miscarriage was incorrect as there was no intrauterine gestational sac. In addition, despite three weeks of bleeding, the actual amount of bleeding was small, and the beta-HCG levels rose from 419 IU/L to 1547 IU/L in five days, a slow rise typical of an ectopic pregnancy.

In Case 2, the patient was asymptomatic initially. Although not an absolute indicator, the absence of pregnancy symptoms signals the lack of a viable pregnancy. The patient's dates were certain due to basal body temperature monitoring. Beta-HCG levels of 1000 to 2000 IU/L at seven weeks' gestation are highly suggestive of an ectopic pregnancy. Allowing this patient to go home could have been fatal as she could have had a dramatic rupture at home. Furthermore, the patient, who had previously had problems of infertility, did not want to face up to the possibility of an ectopic pregnancy so she waited as long as she could with worsening pain. A long weekend without follow up was potentially too long.

### Beta-HCG

The recorded beta-HCG levels in these cases are classic of an

ectopic pregnancy (in the range of 1000 to 2000 IU/L). It was helpful that the dates were all relatively certain, even for the patient with PCOS due to monitored fertility treatment. In city practices, beta-HCG results can be available on the same day so that even in the absence of certain dates, a lack of appropriate rise in 48 hours will raise the alarm regarding an ectopic pregnancy.

### Ultrasound

Cases 1 and 2 may be misleading as they suggest that the ectopic pregnancy can always be located by ultrasound. These ultrasounds were done through the EPAS of the Royal Prince Alfred Hospital. The equipment was sensitive and the operators were tuned to the diagnosis of an ectopic pregnancy. In most situations, think 'ectopic' if an empty uterus is found in the presence of positive beta-HCG results.

### Treatment

The woman in Case 2 had a laparoscopic salpingectomy due to the size of the ectopic tissue. Case 3 illustrates how effective noninvasive methotrexate treatment can be, although it remains controversial whether spontaneous resolution might have occurred in this patient (due to low beta-HCG levels). On the basis of current available information, all women with ectopic pregnancies should be treated. This patient was an ideal candidate for methotrexate treatment as she was compliant, clinically stable and relatively asymptomatic and her beta-HCG levels were low, suggesting methotrexate would be effective.

During operative management for ectopic pregnancies, tubal patency tests with hydrotubation is not recommended if there is some haemoperitoneum present because it can potentially increase the risk of adhesion formation and infection. However, potential contralateral tubal damage was suggested in Case 1 because of the presence of tubal adhesions indicative of past pelvic inflammatory disease, particularly chlamydial infection (Fitz-Hugh-Curtis syndrome). There is some evidence that the future intrauterine pregnancy rate is better if salpingostomy is performed in the presence of contralateral tubal damage. For this reason the patient in Case 1 underwent a laparoscopic salpingostomy.

### Salpingectomy versus salpingostomy

The disadvantages of conservative surgery (laparoscopic salpingostomy) are the risks of persistent trophoblastic disease (5 to 8%) and repeat ectopic pregnancy (10%).

Current evidence suggests that future fertility and the subsequent ectopic rate are similar whether salpingectomy or salpingostomy is performed. In the presence of

contralateral tubal pathology, the subsequent intrauterine pregnancy rate may be higher after conservative surgery.<sup>11</sup> The only proven advantage of salpingectomy over salpingostomy is the prevention of persistent trophoblastic disease.

Salpingostomy versus salpingectomy is the subject of ongoing studies. Most available studies on surgical treatment of ectopic pregnancies explore issues

that relate to salpingostomy rather than salpingectomy.

### Post-treatment follow up

All patients should be followed up after treatment, even if a salpingectomy has been performed, to identify any side effects and demonstrate a rapid fall of beta-HCG levels. After conservative surgery or methotrexate treatment, follow up is vital

### Modifications in the management of ectopic pregnancy for rural practice

#### Role of in-hospital care

In-hospital observation may be invaluable in rural practice where it may be geographically difficult for patients to receive medical care. In this situation, it is safer to admit patients for 48 hours, observing the development of symptoms, than to send them home with the danger of a potential tubal rupture. In addition, pathology services may be limited so that quantitative beta-HCG levels cannot be available on the same day, making it safer to keep patients in hospital until results are available and a diagnosis can be reached.

#### Diagnostic laparoscopy

The availability of a sensitive vaginal ultrasound is critical to the diagnosis of an ectopic pregnancy; for an intrauterine pregnancy, an intrauterine sac should be visualised by seven weeks' gestation and/or beta-HCG levels of 2000 IU/L or above. However, in a remote area where pelvic ultrasound is not available, a clinical diagnosis must be made and diagnostic laparoscopy relied on for confirmation of an ectopic pregnancy.

If the diagnosis is uncertain and invasive surgery is not desired, it would be appropriate to transfer the patient to a regional centre where important diagnostic tests are available.

#### Role of laparotomy

Not all rural hospitals are equipped with laparoscopic or operative laparoscopic equipment. Similarly, not all practitioners working in rural areas are trained to use this technique. Future fertility is no different when open salpingostomy and laparoscopic salpingostomy are compared. An accurate diagnosis and prompt treatment is the most important aspect to good patient care rather than the type of surgery performed. In view of the possible risk of persistent trophoblastic disease, salpingectomy instead of salpingostomy should be performed when follow up is difficult due to a relatively inaccessible pathology service, geographical difficulty to medical care or possible noncompliance.

to exclude persistent trophoblastic disease and side effects.

A repeat measurement of beta-HCG is usually carried out three or four days after treatment to ensure an appropriate fall in levels (defined as halving of the level every two to three days and the minimal fall of one level to the next being at least a 15% reduction). The beta-HCG measurement needs to be repeated until the result is negative (less than 2 IU/L).

Methotrexate toxicity is monitored by the presence of mouth ulcers, skin reactions and nausea and vomiting. Additionally, repeat full blood counts and hepatic and renal function tests are required (usually a week later) to exclude myelosuppression and potential hepatic and renal dysfunction.

After laparoscopic surgery there is

often abdominal bloating and shoulder tip pain, which continues for up to seven days. However, the pain and discomfort improves on a daily basis, and bowel and urinary function should return spontaneously.

The administration of anti-D immunoglobulin should be carried out for any Rh-negative woman.

Key points in the treatment of women with ectopic pregnancies are noted in the box on page 18, and the case presentations given on pages 20 and 21 highlight some of the management issues that need to be considered in these women.

#### Conclusion

In women presenting to GPs with a pregnancy-related condition during their first trimester, it is important to differentiate

between normal pregnancies, nonviable intrauterine pregnancies and ectopic pregnancies. Although there is considerable overlap of symptoms for these conditions, patients with an ectopic pregnancy will usually have uterine bleeding, localised pain, a positive beta-HCG result and an empty uterus on ultrasound. A high index of suspicion is the most critical prerequisite to an accurate diagnosis.

In most patients, treatment usually involves laparoscopic salpingostomy or sometimes salpingectomy. It remains unclear whether salpingostomy is superior to salpingectomy in terms of future fertility and what the optimal selection criteria are for applying salpingostomy or salpingectomy. Not all rural hospitals are equipped with laparoscopic or operative laparoscopic equipment. Modifications to the management of ectopic pregnancy for rural practice are noted in the box on this page.

Medical treatment with methotrexate can be a useful alternative when an ectopic pregnancy is clinically diagnosed in 'well' patients in whom beta-HCG levels are not excessively high. Both medical treatment and surgery seem to carry similar long-term prognoses for future fertility. The optimal use of medical treatment to maximise its noninvasive nature and minimise the need for protracted follow up remains controversial.

Despite modern nuances, ectopic pregnancy remains a fascinating, multifaceted clinical entity that challenges us constantly in our daily practice. MT

*A list of references is available on request to the editorial office.*

DECLARATION OF INTEREST: None.



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