Discuss the post-operative counselling and the implications for future fertility of a woman who had laparoscopic surgery for an ectopic pregnancy.

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Introduction

Scientific advances in the 1960s and 70s, specifically the development of immunological serum tests for human chorionic gonadotrophin (hCG) and ultrasonography, enabled gynaecologists to accurately diagnose ectopic pregnancy. As diagnosis and management has improved, there has been a dramatic increase in survival. The rate of ectopic pregnancy in the UK is 11 per 1,000 pregnancies, with a maternal mortality of 0.2 per 1,000 estimated ectopic pregnancies (6 maternal deaths between 2006-08; rate per 100,000 pregnancies = 0.26) (1). Treatments are potentially fertility-sparing and reproductive outcomes are commonly one of the main concerns of the young women affected by this disease.

The Royal College of Obstetrics and Gynaecology (RCOG) Green-top guideline No. 21 (2) describes conservative, medical and surgical (laparotomy or laparoscopy; salpingotomy or salpingectomy) management options of ectopic pregnancy. The decision of which to use should be based on the clinical condition of the woman and her future fertility requirements.

Open versus Laparoscopic Surgery?

National Institute of Clinical Excellence (NICE) guidelines (3) state that surgical management should be offered to women who are unable to return for follow-up after medical (methotrexate) treatment or who have any of the following:

- Significant pain
- An adnexal mass of ≥35mm
- A fetal heartbeat visible on an ultrasound scan
- A serum hCG level of ≥5000 IU/litre

Surgery should be performed laparoscopically wherever possible (2, 3). Laparotomy is indicated in the case of a haemodynamically unstable patient or in the presence of severe pelvic adhesions.

Salpingectomy versus Salpingotomy?

Whether to perform a laparoscopic salpingotomy or salpingectomy in the management of a tubal ectopic pregnancy should be decided based on the health of the contralateral uterine tube. In the case of a healthy contralateral tube, salpingectomy (i.e. excision of the affected tube) is the preferred method of management (2, 3). However, with a diseased contralateral tube, salpingotomy

(i.e. removal of the pregnancy while preserving the affected tube) is indicated (2, 3). Women are also screened for other risk factors of tubal damage, such as a history of pelvic inflammatory disease, chlamydia infection, termination of pregnancy and previous use of an intrauterine device and these are taken into account (3).

Post-Operative Counselling

Following surgical management of an ectopic pregnancy, women should be made aware of the potential future complications; these include problems as a direct result of the surgery, failure of the pregnancy to resolve and difficulties in future pregnancies.

As with any abdominal or pelvic surgery, laparoscopic management of a tubal pregnancy carries the risk of damage to bowel, bladder, uterus or major blood vessels that would require immediate repair. However, such injuries may not be diagnosed during the procedure and therefore women should be made aware of symptoms that could indicate such damage and advised to return to the hospital immediately should these occur.

In 4-15% of cases treated by laparoscopic salpingotomy, incomplete removal of the ectopic pregnancy (i.e. persistent trophoblast) occurs (4). Women must be made aware of this risk and the importance of them attending follow-up appointments to monitor β-hCG levels at day-7 post-surgery and weekly until a negative result is obtained (3). The risk of persistent ectopic pregnancy is almost completely eradicated by initial treatment with a salpingectomy and therefore this is one of the major drawbacks of carrying out conservative surgery (i.e. salpingotomy). Women treated with a salpingotomy must be informed that in up to 1 in 5 cases, further treatment such as methotrexate and/or a salpingectomy (3) will be required.

Fertility Outcomes of Laparoscopic Management of Ectopic Pregnancy

Recurrent Ectopic Pregnancy

The greatest risk factor for ectopic pregnancy is a previous ectopic, with a reported odds ratio (OR) of 8.3 (95% confidence interval (CI) 6.0-11.5) (4). A case-control study by Bouyer *et al.* (5) found that the rate of recurrence becomes even greater with multiple previous ectopic pregnancies; 10-15% after the first and 30% after the second. The recently published ESEP study (6) is the first randomised controlled trial (RCT) comparing the reproductive outcome of salpingectomy and salpingotomy. The study included 446 women with a confirmed tubal pregnancy and a healthy contralateral tube. There was no significant difference between the total number of repeat ectopic pregnancies, or number of ectopic pregnancies occurring in the ipsilateral or contralateral tube specifically, between the two groups. However, the numbers of events are small; 7 repeat ectopic pregnancies (3%) occurred in the ipsilateral tube of women following a salpingotomy, compared

with 3 (1%) in women following salpingectomy. Although there is no statistical difference, there is a trend towards increased repeat ectopic pregnancies following salpingotomy and so it is difficult to draw conclusions. Similarly other studies have found no increased risk in recurrent ectopic pregnancy with salpingotomy compared to salpingectomy. Bangsgaard *et al.* (7) studied 276 women undergoing surgical management for their first ectopic pregnancy and who were actively attempting to conceive again. The two year cumulative repeat ectopic pregnancy rate was 16% after salpingotomy and 17% after salpingectomy. Factors that did have a significant effect on the risk of recurrent ectopic pregnancy were contralateral tube damage and a previous fertility operation with a hazard ratio of 2.25 (95% CI 1.12-4.53) and 2.51 (95% CI 1.00-6.31) respectively. These studies suggest that follow-up care for all women, regardless of which surgical management is used to treat them, should include information on what to do in subsequent pregnancies. NICE guidelines state that ideal follow-up in future pregnancies should include a referral to an early pregnancy assessment service, to rule out a recurrence (3).

Infertility

The most important factor predicting future intrauterine pregnancy is the disease state of the contralateral tube and as previous described, RCOG guidelines state (2) that in a haemodynamically stable patient, assessment of the contralateral tube at the time of surgery will determine which procedure (salpingectomy or salpingotomy) will be carried out. Silva *et al.* (8) studied reproductive outcomes in 143 women following laparoscopic procedures for ectopic pregnancy and found (without taking into account the laparoscopic procedure carried out) there to be a significant decline in subsequent intrauterine pregnancy rates in women with a history of prior tubal damage compared to those without (79% and 42% respectively). This is supported by Job-Spira *et al.* (9) who recruited 155 women undergoing treatment for an ectopic pregnancy and who were planning on attempting to conceive again. Intrauterine pregnancy rates were 75% in women with a healthy contralateral tube and 55% in a diseased contralateral tube. With clear evidence that disease in the contralateral tube may impact on fertility, it makes sense to preserve as much reproductive capacity as possible by leaving in intact both tubes and opting for salpingotomy for management.

The ESEP study (6) looked at cumulative ongoing pregnancy rates up to 36 months after surgical treatment for an ectopic pregnancy and found no difference between salpingotomy and salpingectomy in women with a healthy contralateral tube (60.7% and 56.2% respectively; fecundity rate ratio 1.06, 95% CI 0.81-1.38). Some may still prefer to preserve both tubes where possible, based on the assumption that two tubes provide a better chance of future pregnancy than one; however this study provides evidence to the contrary. The ESEP study (6) provides evidence to

support the RCOG guidelines in advising the use of salpingotomy rather than salpingectomy in the absence of other infertility risk factors.

It may be necessary for women to use assisted conception in the future as a result of the ectopic pregnancy and its impact on their fertility. Bernoux *et al.* (10) investigated 328 women who were seeking to become pregnancy after treatment for an ectopic pregnancy. 53% had a baby after a viable pregnancy, however, one third of these pregnancies were achieved by in vitro fertilisation (IVF).

Conclusions

It is presumed that salpingotomy achieves more favourable reproductive outcomes by preserving both uterine tubes and therefore increasing the reproductive capacity, however, the technique also has the potential drawbacks of repeat ectopic pregnancy in the same tube or persistent trophoblast resulting in the need for addition interventions (often a salpingectomy). This dilemma is balanced in clinical practice by taking into account other risk factors for infertility in the patient's history and examination, most importantly health of the contralateral uterine tube and this assessment is used to guide the surgical technique used for treatment. However, following either surgical technique, women must be informed of the risk of recurrence in future pregnancies and have a low threshold for seeking medical help should symptoms suggestive of an ectopic pregnancy arise. Likewise, all women treated surgically must be made aware that their fertility may be impacted by the treatment; early discussions about this in follow-up consultations are likely to reduce levels of distress in the long-term. There is currently no evidence exploring the psychological impact of the different treatments of ectopic pregnancy (3). Clinicians should be mindful of the distress the disease can cause for women and be prepared to discuss the potential long-term complications at an early stage.

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