Fallopian tube recanalisation

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Introduction

The diagnosis of infertility (prevalence 8-15%) requires comprehensive testing of both the female and male partners as the cause may be multifactorial.

Tubal disease accounts for approximately 30% of cases of subfertility in women, with proximal fallopian tube blockage accounting for approximately 30% of these cases. Tubal obstruction, often due to impacted mucus or debris in the isthmic portion of the tube, is amenable to treatment by selective tubal recanalisation. Proximal occlusion due to adhesions secondary to salpingitis isthmica nodosa (SIN), often seen after severe pelvic infections, is frequently more difficult to treat. Distal tubal obstruction, commonly seen after previous pelvic infections and endometriosis and often due to fibrosis and peritubal disease, is less amenable to catheter recanalisation techniques.

Fallopian tube recanalisation was first described more than 150 years ago (1849), when London surgeon William Tyler Smith used a whalebone bougie to unblock a fallopian tube using tactile feedback. There was increased interest in this technique and publications in the late 1970s, the 1980s and early 1990s although less so recently with improvements in IVF.

Technique

In our practice, practically all these patients will have had prior hysteroscopic and laparoscopic and dye procedures demonstrating unilateral (75%) or bilateral (25%) tubal occlusion, so these cases are booked for selective hysterosalpingography (hSG) fallopian tube recanalisation (FTR) rather than a straightforward HSG and for days 5-10 of the menstrual cycle.

Patient preparation is critical and all patients receive a patent information leaflet in advance in the post. A relaxed patient is the key to success and understanding secretarial and nursing staff in the day ward are essential in putting the women, who are understandably apprehensive and nervous, at ease. In addition to pre-procedural antibiotics (Doxycycline 100mg) we routinely give sedation (Valium 10mg) we routinely give sedation (Valium 10mg) allowing at least 30 minutes for the effect to wear off.

In the event of pain associated tubal "spasm", the options include:
1. To wait until the discomfort resolves and to repeat with a slower injection;
2. To administer buscopan 20mg IV and to repeat with a slower injection; or
3. To proceed directly with a selective HSG.

Selective HSG (sHSG) and wire recanalisation

While there are dedicated fallopian tube catheterisation kits available (eg Cook – Rösch-Thurmond and FluoroSet) (Figure 1), it is also possible to use standard curved catheters and small wires. Depending on the level of discomfort experienced by the patient during the HSG portion of the procedure it may be worth giving some analgesia at this point. We have found that starting an intravenous infusion of paracetamol 1g, while getting the sHSG kit ready, to be effective, although in general it is usually not required.

A vacuum cup HSG (Cook – Thurmond-Rösch Hysterosath) can be used with the Rösch-Thurmond kit, while the FluoroSet allows for the co-axial insertion of catheters and wires through a HSG balloon catheter (Figure 1). The soft tipped tapered catheter is wedged into the ostium and a shSG performed; the pressure used being determined by patient discomfort (Figure 3). If the tube still fails to opacify, wires of differing sizes come with the kit ranging from 0.015 to 0.035 that can be advanced down the fallopian tube to dislodge any debris (Figure 4). These wires have floppy atraumatic ends, resulting in very low incidence of tubal injury (approximately 2%).

Although we have no scientific evidence of any benefit, we would routinely irrigate the fallopian tubes clear of contrast with normal saline at the end of the procedure, as the contrast is quite viscous and sticky. In the past there have been conflicting reports regarding the benefits or not of oil-based contrast media. It was suggested that these contrast had a beneficial effect on subsequent pregnancy rates because of their bacteriostatic effects, stimulation of tubal ciliary action, inhibition of sperm phagocytosis by peritoneal mast cells and better emulsification of the tubal debris. As reported, there is little effect on the rate of conception and we have never used oil based contrast.

Tube perfusion pressure measurements allow for objective pressure measurements to be made while doing a sHSG, with diseased tubes requiring higher pressures. Tubal perfusion pressures can be predictive of future fertility. While this is best measured objectively with manometry, with experience it can also be assessed subjectively while doing the sHSG.

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Audit
In a recent audit of our practice, we had a technical success rate of 89%. In 15% of patients the tubes were ‘opened’ with ‘normal’ pressure injections. Fifty per cent of tubes were opened using moderate to high pressure HSG techniques, which is comparable to prior reports (47%) (13) and of those who become pregnant, 75% are achieved using these techniques. We would generally not prescribe post-procedure antibiotics in these cases. Before accepting all the credit it should be noted, however, that even a routine HSG has been shown to slightly increase the chance of pregnancy by clearing the tubes of debris.

Using sHSG and wire recanalisation techniques we achieve a further 33% patency rate and of those who become pregnant approximately 12% are achieved using high pressure sHSG and a further 12% using wire recanalisation. For these slightly more invasive procedures, we would generally prescribe post-procedure antibiotics (Doxycycline 100mg BD × 5 days).

We had two cases where, due to adverse anatomy, it proved impossible to adequately cannulate the ostium despite the use of multiple angiographic catheters and wires. Both cases were subsequently successfully performed as combined hysteroscopic and sHSG/PTTR procedures under general anaesthesia with gynaecology (figure 5).

In the vast majority of cases no analgesia or sedation is required. We had only one patient who found the procedure so uncomfortable that we had to stop. In this case, the procedure to open bilateral occlusions was repeated under conscious sedation resulting in bilateral recalculations and a subsequent successful pregnancy.

In a recent patient questionnaire survey, while 60% found the procedure stressful, 75% reported that they would have a repeat procedure. Ninety-six per cent felt that they had received adequate pre-procedural information. Mild pain was experienced by 43% of patients which resolved within 24 hours in 92% of cases. Post-procedure bleeding, typically spotting, occurred in 60% with most settling within three days. There were no post-procedure infections.

Technical success and pregnancy rates
Success rates depend on whether the occlusion is proximal or distal, but overall 80-90% tubal patency rates are generally initially obtained with 40-60% tubal patency rates at 6-12 months.

Pregnancy rates also vary by level of occlusion, with higher success rates reported with proximal compared to distal disease. Even if patency is not restored, the improvement in tubal diagnosis is essential in treatment planning. In highly selected groups (bilateral proximal occlusions) pregnancy rates of 58% are reported. In more heterogeneous groups (including unilateral obstructions and peritubal disease) there are lower pregnancy rates ranging from 20-40% with most occurring within six months. In our heterogeneous group, the pregnancy rate was 24%.

Patients are more likely to benefit if both tubes are occluded. If one tube is open and the ends of the tubes are free of disease at laparoscopy, opening the second tube is less likely to improve the chances of pregnancy.

In conclusion, sHSG and FTR are straightforward techniques that have a high technical success rate and a low complication rate. They are inexpensive, minimally invasive and can be performed as an out-patient procedure. Following consultation and with the agreement of referring gynaecological and fertility colleagues, they can be performed as an extension of HSG. For selected patients with proximal obstructions, especially if bilateral, there is a good pregnancy rate and both techniques are worth trying before embarking on more expensive and invasive alternative treatments.

References


FIGURE 1
Cook FluoroSet allows for the co-axial insertion of a curved catheter (red brackets) through an HSG balloon catheter (yellow bracket) which is lodged in the ostium. Through this a 0.035 wire (blue brackets) can be inserted into the fallopian tube.
FIGURE 2
A 34-year-old female with an 18-month history of primary infertility. A laparoscopic hydrotubation and hysteroscopy demonstrated bilateral tubal occlusion which was confirmed on the initial HSG. A subsequent moderate pressure HSG opacified both tubes with peritoneal spill demonstrated bilaterally. The patient became pregnant but subsequently miscarried.

FIGURE 3
A 39-year-old female with secondary infertility. At laparoscopic hydrotubation and hysteroscopy the right tubal ostium could not be identified. The left tube looked normal but no spill could be demonstrated. Mild endometriosis was demonstrated that was ablated. The right fallopian tube was catheterised and successfully recanalised with a selective HSG injection.

FIGURE 4
A 42-year-old female with secondary infertility (Para 0+1). She had three failed attempts at in-vitro fertilisation. At laparoscopic hydrotubation and hysteroscopy there were small intrauterine fibroids, a right ovarian endometrioma and several deposits of endometriosis. Some proximal left ductal opacification was noted on the initial HSG but a selective HSG was unsuccessful. A 0.018 wire was used to successfully recanalise the left fallopian tube. A subsequent selective HSG confirmed patency of the left fallopian tube.

FIGURE 5
34-year-old female with secondary infertility (Para 0+3, including two ectopic pregnancies). A laparoscopic and dye procedure had demonstrated a blocked left fallopian tube. An initial attempt at a selective HSG was unsuccessful due to difficult anatomy. A combined procedure was performed with general anaesthesia. The left tubal ostium was identified and cannulated under direct vision. A successful recanalisation was performed using a combination of sHSG and wire catheterisation techniques. The patient had a subsequent successful pregnancy.