DEBATE—continued

Investigation of the infertile couple

A one-stop outpatient endoscopy-based approach

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Transvaginal hydrolaparoscopy (THL) is a new culdoscopic technique for exploration of the pelvic cavity that takes advantage of micro-endoscopic technology and uses aquaflotation for inspection of the tubo-ovarian structures. In infertility patients, THL is systematically combined with mini-hysteroscopy, chromopertubation, fimbrioscopy and, when indicated, salpingoscopy. Mini-hysteroscopy in combination with the chromopertubation test allows accurate assessment of the uterine cavity and tubal patency. The transvaginal access combined with the aquaflotation during THL facilitates detailed inspection of the tubo-ovarian structures and detection of subtle pelvic disease. This combined transvaginal endoscopic approach allows complete evaluation of the reproductive tract. THL is better tolerated than hysterosalpingography, less invasive than standard laparoscopy, and can be used safely as a first line investigation of the female partner in a one-stop infertility clinic.

Key words: infertility investigation/mini-hysteroscopy/outpatient procedure/salpingoscopy/transvaginal hydrolaparoscopy

Introduction

Common gynaecological conditions such as abnormal uterine bleeding can be investigated in a simple one-stop menstrual problem clinic and randomized trials have shown that this approach is efficient, cost-effective, and results in increased patient satisfaction (Kremer et al., 2000). In contrast, infertility exploration is often a drawn-out and repetitive process. Although laparoscopy is still considered to be the gold standard for detection of pelvic disease, it requires general anaesthesia, operating theatre facilities, and accounts for most of the costs associated with the diagnostic work-up. As a consequence, hysterosalpingography (HSG) is widely used as a first line investigation and, in the presence of ‘normal’ findings, laparoscopy is often postponed for 6–12 months, resulting in delayed diagnosis and initiation of treatment. In a recent study the mean delay in the diagnosis of endometriosis in patients with infertility was 3.13 years (Dmowski et al., 1997).

Not surprisingly, some have argued, from a pragmatic point of view, that judicious exploration of the female partner should be abandoned in favour of liberal referral to an IVF–embryo transfer programme. There is, however, no consensus as to how and to which extent the female partner should be investigated.

Recently, the diagnostic potential of ultrasound in infertile women has been highlighted (Kelly et al., 2001) but, despite the remarkable advances in ultrasound technology, this approach yields insufficient information on the presence of tubal disease, pelvic adhesions or endometriosis. We now discuss the advantages of a one-stop endoscopy-based approach that combines transvaginal hydrolaparoscopy (THL) with mini-hysteroscopy, chromopertubation and fimbrioscopy or salpingoscopy.

Transvaginal hydrolaparoscopy

THL, developed by Gordts et al. combines a culdoscopic approach with advanced micro-endoscopic technology including the use of a small scope, high intensity light source and digital camera (Gordts et al., 1998a). In contrast to culdoscopy, the patient is in the dorsal lithotomy position and abdominal distension is obtained by instillation of saline or, preferably, lactated Ringer’s solution. The aquaflotation and the transvaginal access provide physiological exposure and detailed inspection of the tubo-ovarian structures. Manipulation and rotation of pelvic structures can be performed without grasping. Access to the fimbrial end of the Fallopian tube is easier than
at laparoscopy and salpingoscopy can be performed using the same optic (Gordts et al., 1998b; Watrelot et al., 1999). Human ovulation and ovum retrieval by tubal fimbriae was first visualized by THL, attesting to the physiological approach of this technique (Gordts et al., 1998c). For infertility exploration, THL is systematically combined with mini-hysteroscopy, chromoperturbation, fimbrioscopy, and when indicated, salpingoscopy. The prognostic role of salpingoscopy in endoscopic tubal surgery has been recently reviewed (Marana et al., 1999). The combination of these endoscopic techniques has been referred to as ‘fertiloscopy’ (Watrelot, 1999). The procedures are performed in an ambulatory setting under local anaesthesia, conscious sedation or general anaesthesia.

Clinical validation of THL

Clinical implementation of a new diagnostic tool requires rigorous assessment of various features of the technique, including feasibility, diagnostic accuracy, safety, patient’s acceptability and cost-benefit analysis.

Feasibility

We have evaluated the use of THL as a diagnostic outpatient procedure under local anaesthesia in 157 consecutive infertile patients (Gordts et al., 2000a). Access to the pouch of Douglas was achieved in 95% of the patients. In six patients the needle failed to enter the pouch of Douglas and in two cases the procedure was aborted for minor complications. If access was successful, both adnexae were fully visualized in 89% of women. Unilateral or bilateral failure to visualize the adnexae occurred in 9 and 2% of the patients respectively, and was invariably due to the presence of adhesions. Several investigators have reported similar experiences with THL, demonstrating that the technique is reproducible (Watrelot et al., 1999; Bajzak et al., 2000; Darai et al., 2000; Dechaud et al., 2001; Moore and Cohen, 2001).

Diagnostic accuracy

Several studies have demonstrated that THL is an accurate technique, measured against laparoscopy, for the diagnosis of tubo-ovarian pathology (Watrelot et al., 1999; Bajzak et al., 2000; Darai et al., 2000; Dechaud et al., 2001; Moore and Cohen, 2001; Shibahara et al., 2001). A recent prospective comparative study showed a 75% interobserver agreement for the detection of ovarian adhesions with standard laparoscopy versus 90% with THL (Campo et al., 1999a). Furthermore, the absence of compression of peritoneal capillaries and filmy adhesions during the aquaflotation makes THL superior to the original culdoscopic surgery, the risk of infection during THL showed bilateral spill of dye. The prognostic value of the chromoperturbation test has been shown to be better than that of HSG (Mol et al., 1999). Shibahara et al. (2001) compared HSG versus THL in a series of patients with and without a history of Chlamydia trachomatis infection (Shibahara et al., 2001). Both techniques were equally efficient in determining tubal patency but THL was superior for the diagnosis of peritubal adhesions.

Safety

One of the cardinal reasons for abandoning culdoscopy in favour of laparoscopy was that the transvaginal access increased the risk of bowel injury and sepsis. However, bowel injury remains a recognized major complication of laparoscopy. It occurs as frequently at the time of trocar insertion as during an operative procedure even in experienced hands (Jansen et al., 1997; Brosens and Gordon, 2001). In a series of 182 visceral injuries caused by trocar insertion, the diagnosis was delayed in 10% of the cases and the mortality in this group was 33% (Bhoyrul et al., 2001). As THL uses a transvaginal approach, concerns have been raised regarding the risk of bowel injury and sepsis. A recent multinational survey evaluated the incidence and outcome of bowel injury in 3667 THL and fertiloscopy procedures (Gordts et al., 2001). A total of 24 bowel injuries (0.65%) were reported. The risk increases with retrocervical endometriosis and retroverted uterus. After the initial learning experience with 50 procedures, the incidence of visceral trauma decreased significantly to 0.25%. All injuries were recognized during the procedure and all 22 expectantly managed cases were without apparent consequences. A small, non-leaking injury not larger than 5 mm diameter in healthy bowel tissue can apparently be managed expectantly.

Operative procedures

Several authors have reported on a limited number of operative procedures during THL, such as ovarian capsule drilling in clomiphene resistant patients (Fernandez et al., 2001), superficial endometriosis and adhesions (Moore and Cohen, 2001) and ovarian endometrioma (Gordts et al., 2000b). In contrast to the original culdoscopic surgery, the risk of infection during operative THL is greatly reduced as the pelvic organs are not exposed to the vaginal flora.

Patient tolerance

To evaluate the acceptability of this new technique, 60 consecutive patients were asked to score their most intense pain experience during THL on a 10 cm visual analog pain scale immediately after the procedure (Gordts et al., 2000a). The mean pain score was 2.7 (SD ± 1.5) and only five (8%) women marked a score above 5. A total of 96% of the patients agreed to have a repeat procedure if required. Furthermore, a
randomized controlled study found that THL combined with mini-hysteroscopy in an outpatient setting is better tolerated than HSG (Cicinelli et al., 2001). Moore and Cohen (2001) also concluded that outpatient THL does not cause excessive pain.

**Cost-benefit**

If outpatient THL replaces laparoscopy then hospital costs, which in places like the USA can amount up to 70% of the total costs of infertility exploration (Bates and Bates, 1996), would be avoided. However, this benefit is likely to be lost if the rate of conversion to laparoscopy is high. In our series, THL findings were normal in 58.5% of the cases and only 28% of the patients required subsequent explorative or operative laparoscopy (Gordts et al., 2000a). Similarly, Moore and Cohen used office THL in 29 infertility patients and found no need for further surgical intervention in 62% of the cases (Moore and Cohen, 2001). Clearly, a comprehensive one-stop infertility clinic would further reduce the costs associated with delayed treatment and lost patient productivity.

**Patient selection**

A one-stop endoscopy-based approach for infertility exploration is appropriate for patients without obvious pelvic pathology. A detailed history, gynaecological examination, and transvaginal sonography are used to exclude patients with vaginal infection, obliteration of the pouch of Douglas, fixed retroverted uterus, lateral displacement of the cervix or suspected pelvic tumour.

**Mini-hysteroscopy**

Hysteroscopy is the gold standard for evaluating the uterine cavity and can be performed reliably and safely as an outpatient procedure. However, standard hysteroscopy often elicits significant discomfort. Mini-hysteroscopy uses anatraumatic insertion technique, saline or lactated Ringer’s solution for distension of the uterine cavity, and a small diameter hysteroscope of ≤3.5 mm in outer diameter. A recent prospective study of 530 outpatient mini-hysteroscopes, performed without any form of anaesthesia, reported high patient acceptability (Campo et al., 1999b). Mini-hysteroscopy is not more invasive than hystero-contrast sonography (HyCoSy) (Kelly et al., 2001) and, for detection of abnormalities of the uterine cavity, both techniques are equally effective but superior to transvaginal sonography (Dueholm et al., 2001).

**Conclusions**

Although HSG is widely used as a first line investigative procedure for infertility, laparoscopy yields superior prognostic information. However, laparoscopy is an invasive procedure that adds substantially to the cost of infertility exploration and often delays initiation of treatment. Outpatient THL, in combination with mini-hysteroscopy and chromoperturbation, is an alternative to HSG as a first line investigative procedure. It offers the systematic endoscopic evaluation of the reproductive organs and the evidence of tubal patency as a rational basis for proposing expectant management or initiating medical or surgical treatment. A major advantage of the endoscopic approach over imaging techniques is that suspected uterine or ovarian lesions can be biopsied during the investigation. In our experience laparoscopy can be avoided in a majority of patients with infertility and therefore, this one-stop endoscopy-based approach is likely to be efficient, cost-effective, and to improve patient satisfaction. However, further prospective randomized studies are required to prove the superiority of THL as a first line investigation for predicting the fertility outcome in comparison with HSG.

**References**


