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Laparoscopic confirmation of hydrosalpinx is imperative prior to hysteroscopic occlusion for IVF to avoid permanent iatrogenic sterility

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ABSTRACT

Objective: To study operative findings for infertile patients with preoperative diagnosis of hydrosalpinges and determine if the ease of hysteroscopic female sterilization may lead to iatrogenic sterility. **Methods:** Retrospective data, from January 1998 through January 2008, were collected in a fertility center to determine the diagnostic and therapeutic results of laparoscopic surgery for infertile patients with preoperative diagnosis of hydrosalpinges. **Results:** There were 103 women who would have received hysteroscopic sterilisation based on preoperative imaging, but did not require this and had their fallopian tubes saved through correct laparoscopic assessment (7 patients with patent tubes) or laparoscopic surgical treatment (16 patients, only, requested bilateral salpingectomy). **Conclusions:** Occluding fallopian tubes on the basis of the hysterosalpingography findings only would result in unnecessary sterilizations.

1. Introduction

Assisted reproductive technology (ART) has replaced surgery as first-line treatment for infertility unresponsive to medical management[1]. Among the causes of infertility, hydrosalpinges appear to be detrimental to pregnancy outcome[2]. Even in an office setting a hysteroscopic tubal occlusion is easy to perform and shows promising success rates for tubal occlusion prior to *in-vitro*-fertilisation (IVF)[3].

It has been suggested that hysteroscopic sterilization might be the first-line treatment in patients with suspected hydrosalpinges prior to IVF[4]. However, no radiological exam can provide perfect sensitivity or specificity in

diagnosing tubal pathology[5]. Thus, our hypothesis is that the proportion of women who would receive hysteroscopic tubal occlusion based on the non-laparoscopic diagnosis of hydrosalpinx is larger than the proportion of women with laparoscopically confirmed hydrosalpinx that would require occlusion.

We conducted a retrospective observational study in order to determine the diagnostic and therapeutic results of laparoscopic surgery for infertile patients with preoperative diagnosis of hydrosalpinges. The aim of our study was to interpret their operative findings in the light of the currently evolving practise of pre-IVF hysteroscopic tubal occlusion of hydrosalpinges, highlighting risks and pitfalls.

2. Materials and methods

A 10 years retrospective study was performed (from 1st

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January 1998 To 1st January 2008) at a tertiary referral centre for infertility and endometriosis (Reproductive Speciality Centre, Milwaukee, Wisconsin, USA). Criteria of inclusion were infertility of more than one year with a pre-operative ultrasound scan and/or hysterosalpingographic diagnosis of hydrosalpinges.

Parameters of the reproductive functions in males were assessed and couples were only included if the sperm quality was suitable for intrauterine insemination.

The data collected included patient age, obstetric history, the method used to diagnose hydrosalpinx, laparoscopic findings and surgical procedures.

All hydrosalpinges were opened in order to perform a salpingoscopy^[6,7]. Tubal mucosal damage was assessed by salpingoscopy and graded from I–IV^[8]. Neosalpingostomy was performed for tubal damage of grade I and II and salpingectomy was carried out for tubal damage of grade III and IV^[9].

Tubal surgery was performed according to the principles of laparoscopic microsurgery, using Prolene 7–0 or 8–0^[10].

3. Results

During the ten years of this retrospective study, 99 patients were seen for infertility associated with the diagnosis of hydrosalpinx.

The patient age ranged from 22 to 47 years [Mean (35.21±5.00) years]. Number of pregnancies prior to presentation to our unit ranged from 0 to 7 pregnancies (Mean 0.83±1.24) and number of live births prior to presentation to our unit ranged from 0 to 6 deliveries (Mean 0.26±0.73).

In 86 cases (86.87%) only hysterosalpingography was used to make the diagnosis of hydrosalpinges. Results of hysterosalpingographic preoperative diagnosis and surgical findings are summarized in Table 1.

Bilateral hydrosalpinges were seen preoperatively in 40 cases. The remaining cases were unilateral hydrosalpinges with or without other abnormalities.

In 23 cases the preoperative diagnosis of bilateral hydrosalpinges was confirmed during laparoscopic exploration. The comparison between preoperative diagnoses and surgical findings are summarized in Table 2.

These 99 women would have received hysteroscopic sterilisation based on preoperative imaging but did not require this and 7 (6.79%) had their fallopian tubes saved through correct laparoscopic assessment, only 16 (16.16%) patients required bilateral salpingectomy.

In 56 patients pelvic adhesions secondary to previous surgery, pelvic infection or endometriosis were seen laparoscopically. 7 ovarian cysts were discovered, one of those malignant. Fitz–Hugh–Curtis syndrome was diagnosed in 11 patients.

Surgical findings, number of salpingectomy,

Table 1
Preoperative hysterosalpingographic diagnosis of hydrosalpinx compared with laparoscopic findings.

Preoperative diagnosis (n=86)	Laparoscopic findings					
	No pathology	Isolated unilateral HSX	Unilateral HSX + other pathology	Bilateral HSX	Unilateral other pathology	Bilateral other pathology
Bilateral HSX	2	0	11	18	0	3
Left HSX + other pathology	0	1	1	0	0	0
Right HSX +other pathology	0	2	1	0	0	0
Isolated unilateral HSX	5	35	5	0	2	0
Total	7	38	18	18	2	3

Table 2
Preoperative diagnosis of hydrosalpinx compared with laparoscopic findings and surgical procedures.

Preoperative diagnosis (n=99)	Laparoscopic findings						Surgical procedures							
	No pathology	Isolated unilat	Unilat HSX + other				Resection		Neo–salpingostomy		Fimbrioplasty		Adhesiolysis	
			Bilat HSX	Unila tother	Bilat other	Unilat	Bilat	Unilat	Bilat	Unilat	Bilat	Unilat	Bilat	
Bilat HSX	2	1	11	23	0	3	14	14	8	3	10	3	1	1
HSX+Other	0	0	2	0	0	0	1	0	1	0	2	0	0	0
Unilat HSX	5	21	5	0	25	1	38	1	6	0	6	1	0	2

Unilat: Unilateral; Bilat: Bilateral.

neosalpingostomy and complementary surgical procedures are summarized in Table 2.

4. Discussion

Although the exact mechanism by which hydrosalpinges exert a negative effect on pregnancy rate remains unclear^[11], tubal occlusion improves the odds of live birth for women with hydrosalpinges due to undergo IVF^[12,13].

It is noteworthy that most of the studies that recommend salpingectomy prior to IVF include different grades of hydrosalpinges, although low grade hydrosalpinges present a good fertility prognosis following neosalpingostomy^[14].

In the past, tubal occlusion was performed by laparotomy, culdoscopy or laparoscopy^[15] but recently hysteroscopic tubal occlusion has been shown to be effective and practicable for this indication. Hysteroscopic sterilization systems make it possible to obliterate fallopian tubes as an outpatient procedure with or without local anesthesia^[16]. Efficiency, safety, cost savings, immediate recovery and good levels of patients' satisfaction have led to increased popularity of hysteroscopic tubal occlusion for sterilisation or occlusion of hydrosalpinges prior to IVF^[17].

The question that remains to be answered is if tubal occlusion can be safely performed without laparoscopy prior to IVF, once hydrosalpinges have been diagnosed^[3,12,18].

In concordance with other authors^[5,19–20] hysterosalpingography was the most frequently performed exam to diagnose tubal pathology in our series. In keeping with previous reports^[21] its sensitivity is not perfect, in the present study it was 52.94% in case of bilateral hydrosalpinx and 74.47% in case of isolated unilateral hydrosalpinx. Among the 99 patients with radiological diagnosis of hydrosalpinges, 7 patients had healthy fallopian tubes.

In 53 cases surgical exploration helped to modify the preoperative diagnosis, and most importantly, mucosal assessment enabled us to predict the prognosis of the hydrosalpinges.

Of the 40 patients with a preoperative diagnosis of bilateral hydrosalpinges, 2 had healthy fallopian tubes, 14 required bilateral and 14 unilateral salpingectomy. Twenty-four (60%) patients had, at least, unilateral tubal repair or adhesiolysis. Of the 59 patients with a preoperative diagnosis of unilateral hydrosalpinx, 5 had healthy fallopian tubes, 38 had an unilateral salpingectomy. 14 (23.73%) patients underwent, at least, unilateral tubal repair or adhesiolysis.

The present results of discordance between hysterosalpingography and laparoscopy are consistent with the findings of Mol *et al*^[22]. This group reported

a high specificity for proximal tubal obstruction for hysterosalpingography but a low specificity for distal tubal obstruction and hydrosalpinx^[22]. Over-diagnosing hydrosalpinges can be due to tubal phimosis and fluid pockets from adhesions. Furthermore, hysterosalpingography cannot detect adhesions and ovarian pathology. In fact, one of the study patients was diagnosed laparoscopically with a malignant ovarian cyst and was referred to an oncological unit. This diagnosis would have been missed if she had not undergone laparoscopy.

Thus, laparoscopy can avoid iatrogenic obstruction of fallopian tubes when contra-indicated and allow for a "see and treat" approach in women with low-grade hydrosalpinges, who are likely to benefit from neosalpingostomy^[23]. These women would avoid ART with its well-documented side effects as first line treatment^[24–26].

In addition, the present study demonstrates how laparoscopy helps diagnose and treat additional pelvic pathology that contributes to infertility^[27–29]. However, due to the specialised nature of our referral center the rate of patients with clinically relevant pelvic pathology is much higher than in the general population.

The present study demonstrates that laparoscopy can modify the preoperative diagnosis and help to select the patients who will benefit from tubal reconstructive surgery. Although hysteroscopic sterilization appears to be the easy way forward, one needs to take into account that the preoperative radiological diagnosis of hydrosalpinges is far from perfect. Occluding fallopian tubes on the basis of the hysterosalpingography findings only would result in unnecessary sterilizations. In addition, laparoscopy enables doctors to perform surgical tubal repair and to treat in additional pelvic pathology.

Based on the present findings, hysteroscopic sterilization may be an appropriate treatment of recurrent hydrosalpinges prior to IVF rather than first line.

Thus, hysteroscopic sterilisation should only be offered to those patients, in which laparoscopy and salpingoscopy suggest a bad prognosis of hydrosalpinx surgery and where pelvic pathology would lead to a difficult salpingectomy. For all other indications, the choice must involve the individual couple, an ART specialist and a fertility surgeon.

Even assuming a cumulative IVF pregnancy rate of 50%, there will be 3%–4% of women who were unnecessarily sterilized based on HSG, and while being extremely bad medicine, it also sets up for indefensible litigation.

Conflict of interest statement.

We declare that we have no conflict of interest.

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