Comparison of tubal patency assessment during microlaparoscopy and laparoscopy, and its compatibility with previous histerosalpingography results

Piotr Marianowski [1], Pawel Kaminski [1], Miroslaw Wielgos [1], Iwona Szymusik [1] & Grzegorz Ludwikowski [2]

1. 1st Department of Obstetrics and Gynecology, Medical University of Warsaw, POLAND
2. Department of Clinical Andrology, Nicolaus Copernicus University, Collegium Medicum, Bydgoszcz, Poland

Correspondence to: Assoc. Prof. Miroslaw Wielgos MD., PhD.
1st Department of Obstetrics and Gynecology, Medical University of Warsaw
Plac Starynkiewicza 1/3, 02-015 Warsaw, POLAND
PHONE: +48 22 5021421
FAX: +48 22 5022157
EMAIL: mwielgos@amwaw.edu.pl

Submitted: 2007-01-12 *Accepted: 2007-02-27*

Key words: **laparoscopy; microlaparoscopy; tubal patency; histerosalpingography; chromopertubation**

Neuroendocrinol Lett 2007; **28**(2):149–152 **PMID:** 17435672 NEL280207A07

Abstract

OBJECTIVES: The aim of the study was to compare tubal patency assessment during microlaparoscopy and laparoscopy and its compatibility with previously performed histerosalpingography (HSG).

MATERIAL & METHODS: Endoscopic evaluation of tubal patency was performed on 135 women, aged 30–39 (microlaparoscopy in 65 cases, laparoscopy in 70). In the group of 42 patients qualified for endoscopy, histerosalpingography was carried out in the past. The duration of tubal patency assessment was counted from the moment of the salpingograph placement, with trocars already introduced into the peritoneal cavity.

RESULTS: The mean duration of tubal patency evaluation during laparoscopy was 5'45"±39 and during microlaparoscopy – 7'30"±49". The results of the examination were afterwards compared with the results of previously performed HSG. Their sensitivity, specificity, compatibility and positive and negative predictive values were calculated. The sensitivity and specificity of microlaparoscopy in tubal patency assessment were 81% and 100%, respectively; its positive predictive value –100% and negative –96%. As to laparoscopy, the values were established at 90%, 100%, 100% and 98.4%, respectively.

CONCLUSIONS: Tubal patency assessment during microlaparoscopy and laparoscopy is characterized by similar sensitivity and specificity. Although the mean duration of microlaparoscopy is significantly longer, the difference in time is of no practical implication.

ORIGINAL ARTICLE

INTRODUCTION

Tubal factor of infertility is mainly due to a patient's history of pelvic inflammatory disease. During laparoscopy, the anatomical characteristics of the patient's Fallopian tubes are assessed. One of the main conditions of successfully completing the transportation of cumulus complex from the ovarian follicle to the fimbriae of the oviduct is an undisturbed movement of the ovary and Fallopian tube. Additionally, it is the patency of the oviduct that is the most important for its proper function. Recently, the routinely used histerosalpingography (HSG) – the method of assessing tubal patency in patients – is being replaced with the endoscopic methods [12]. Moreover, endoscopic procedures have long been considered important among clinical diagnostic tools for infertile patients [10].

The aim of the study was to compare tubal patency assessment during microlaparoscopy and laparoscopy and its compatibility with previously performed HSG results.

MATERIAL AND METHODS

Endoscopic evaluation of tubal patency was performed at the 1st Clinic of Obstetrics and Gynecology in Warsaw on 135 women, aged 30–39 (mean age 33±3.4). Laparoscopy was performed in 65 cases; microlaparoscopy in 70 (both procedures were performed in general anesthesia). Microlaparoscopy was performed with 2.2 mm trocars (Pajunk), 2.2 mm graspers and monopolar needle (Pajunk) and 2.0 mm optics by Stryker. The technique of the procedure was almost the same as during conventional laparoscopy with 5–10 mm graspers and trocars, only with lower pressure in the peritoneal cavity (12 mm Hg). The incisions after microlaparoscopy do not require sutures, stripes are usually placed for a few days to close the margins of the skin.

In order to perform chromolaparoscopy, a salpingograph was placed in the uterine cervix. Afterwards, the uterine cavity was filled with methylblue, while the assigned personel was observing its passage through the tubes and the outflow into the peritoneal cavity. The same operating team performed all laparoscopic procedures.

Out of 135 women qualified for chromolaparoscopy and ovarian electrocautery, 42 who had previously experienced HSG to assess the patency as a routine diagnostic of infertility, were chosen for the study group (HSG was performed 1 to 6 years earlier). In those patients, the tubal patency was assessed again during microlaparocsopy (n=19) or laparoscopy (n=23) – patients were chosen randomly for both types of procedures. Mean age of the patients, time of infertility treatment and time between HSG and endoscopy did not differ significantly in microlaparoscopic and laparoscopic groups.

The duration of the procedure and compatibility of the results were compared for endoscopy and previously performed HSG. HSG results, used as a standard by which to evaluate tubal patency, were compared with microlaparoscopic and laparoscopic results. Sensitivity, specificity, and their positive and negative predictive values were calculated in reference to HSG.

Statistical analysis was performed using Chi^2 and t-Student tests, where values of $p<0.05$ were considered significant.

RESULTS

The duration of tubal patency assessment was calculated from the moment that the salpingograph was placed in the uterine cervix, with trocars already introduced into the peritoneal cavity. The mean times of tubal patency evaluations during microlaparoscopy and laparoscopy are shown in Figure 1.

The mean duration of tubal patency assessment was 5'45"±39" and 7'30"±49" for laparoscopy and microlaparoscopy, respectively. T-Student test for paired samples revealed $p<0.0001$, confirming the significant difference between the duration times of microlaparoscopy and laparoscopy.

Afterwards, the endoscopic results of tubal patency were compared with the HSG results previously performed in 42 patients. During microlaparoscopy (n=19), both tubes were assessed as patent in 65% of patients, one tube was patent in 21%, and bilateral tubal occlusion in 14% of cases. The results of previously performed HSG were: 68%, 21% and 11%, respectively.

During laparoscopy (n=23), both tubes were assessed as patent in 72% of patients, one tube was patent in 17%, and bilateral tubal occlusion in 10% of cases. The results of previously performed HSG were: 66%, 17% and 17%, respectively (Table 1).

The sensitivity, specificity, compatibility, and positive and negative predictive values were calculated in reference to HSG. Results are shown in Table 2.

The sensitivity and specificity of microlaparoscopy in tubal patency evaluations were 81% and 100%, respectively; their positive predictive value was 100% and negative was 96%. As to laparoscopy, the values were established at 90%, 100%, 100% and 98.4%, respectively.

Therefore, in those cases where the chromolaparoscopy performed during both endoscopic methods was negative, bilateral tubal occlusion was proven. On the other hand, if both tubes were patent in HSG, microlaparoscopy confirmed it in 96% and laparoscopy in 98.4% (Photo 1 and 2).

DISCUSSION

The assessment of tubal patency is one of the most important procedures during the diagnostic protocols in infertile couples. Their impatency is a qualification to the in vitro fertilization program. In many centers, tubal patency assessment is one of the routine examinations being performed at the beginning of the infertility treatment. At the 1st Clinic, in cases where patients had no history

Table 1. Results of tubal patency assessment during laparoscopy and microlaparoscopy in patients with previously performed HSG

	Microlaparoscopy	HSG	Laparoscopy	HSG
Number of oviducts	38		46	
Bilateral patency	25 (65%)	26 (68%)	32 (69%)	30 (66%)
Unilateral patency	8 (21%)	8 (21%)	8 (17%)	8 (17%)
Bilateral occlusion	5 (14%)	4 (11%)	6 (13%)	8 (17%)

Table 2. Sensitivity, specificity, positive and negative predictive values of tubal patency assessment during microlaparoscopy and laparoscopy in comparison to previously performed HSG.

	Microlaparoscopy (number of oviducts – 38)	**Laparoscopy** (number of oviducts – 46)
Sensitivity	81%	90%
Specificity	100%	100%
Positive predictive value	100%	100%
Negative predictive value	96%	98.4%

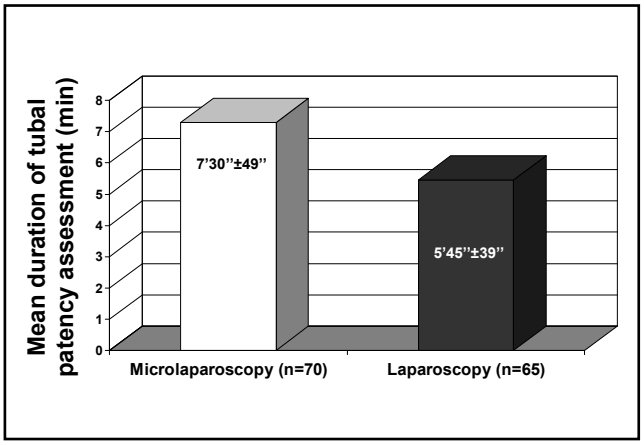

Figure 1. Mean duration of tubal patency assessment in microlaparoscopy and laparoscopy (in minutes).

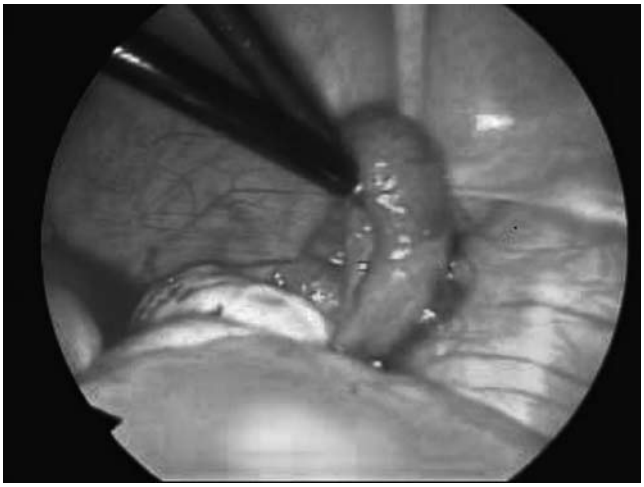

Photo 1. Tubal patency assessment with methylblue during laparoscopy (Chromopertubation in laparoscopy).

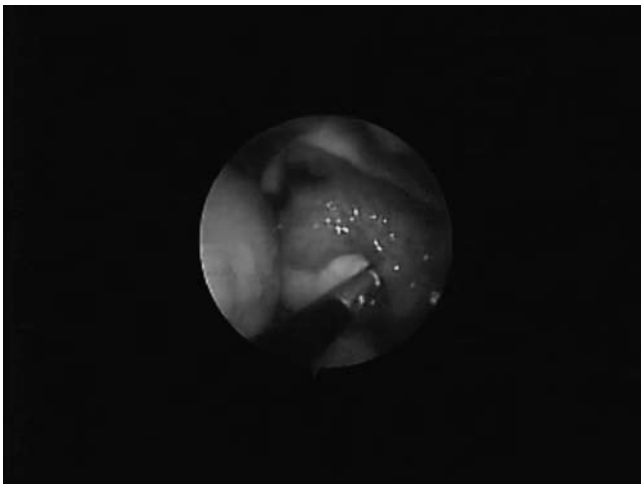

Photo 2. Tubal patency assessment with methylblue during microlaparoscopy (Chromopertubation in microlaparoscopy).

of problematic tubal function (e.g., pelvic inflammatory disease, abdominal surgeries, endometriosis, etc.), we were able to omit the assessment of tubal patency based on two factors. First, the conclusion that with the patient's history, patency was not an issue and second, after explaining our conclusions to the patient, she was in agreement to not have assessments performed. The reason for eliminating the evaluation is that presently, we lack noninvasive, reliable method of tubal patency assessment. HSG, although fast and easy, has its disadvantages, which are: x-ray radiation exposure (especially to ovaries), the possibility of allergic reaction to iodine and pain that may result in false negative results due to the contraction of the Fallopian tubes [5,8].

Sonographical tubal patency examination with the use of Echovist, is not widely used as a diagnostic tool because of its low accuracy [11].

Laparoscopy is the most accurate and reliable method for the diagnosis of tubal factor at present. However, performing this procedure in every patient at the early stages of diagnosing infertility is questionable. Recently, many authors claim the need for one-day infertility clinic where couples can go to have preliminary interviews and examinations conducted within a day [7]. The above examinations would include basic evaluations such as ultrasound, the analysis of hormone levels and seminal

parameters and general evaluations such as endoscopic procedures (hysteroscopy, microlaparoscopy) in local anesthesia [2].

In our results, there where no differences in the efficacy of laparoscopy and microlaparoscopy as a diagnostic tool for the assessment of tubal patency. These endoscopic methods seem to have advantages comparing to histerosalpingography [4,9,11]. However, the comparison of microlaparoscopic efficacy to laparoscopic efficacy in one patient is impossible. Statisitical assessments indicate a high compatibility of those two methods. The difference between the results achieved during HSG and laparoscopy (or microlaparoscopy) in one patient was the result of a change in tubal function over time or the contraction of the Fallopian tubes as a result of pain related to histerosalpingography. The length of time to conduct microlaparoscopy as compared to laparoscopy, although statistically significant, is of no practical importance.

In the US, microlaparoscopy in local anesthesia is widely used in sterilization practices. This quick, safe and reliable method of contraception has generated a high level of interest among patients and gynecologists [6].

It seems that the introduction of laparoscopy with the use of smaller trocars as a routine examination may be revolutionary for the protocol in diagnosing infertility [1,3]. Microlaparoscopy, although technically more difficult and therefore more time-consuming, may be successfully used in one-day infertility clinics. The ability to perform it in local anesthesia is its main advantage, making it less expensive because of the overall cost of drugs and shorter recovery period.

CONCLUSIONS

1. The microlaparoscopic and laparoscopic assessment of tubal patency has similar sensitivity and specificity.
2. Although the microlaparoscopic evaluation of tubal patency is statistically longer, the difference in time is negligible.

REFERENCES

1 Adelusi B, al-Nuaim L, Makanjuola D, Khashoggi T, Chowdhury N, Kangave D. Comparison of microlaparoscopy and conventional laparoscopy for tubal sterilization under local anesthesia with mild sedation. J Am Assoc Gynecol Laparosc 2001; **8**: 385–8.

2 Almeida OD Jr, Val-Gallas JM, Browning JL. A protocol for conscious sedation in microlaparoscopy. J Am Assoc Gynecol Laparosc 1997; **4**: 591–4.

3 Campo R, Gordts S, Brosens I. Minimally invasive exploration of the female reproductive tract in infertility. J Am Assoc Gynecol Laparosc 1996; **3**(Suppl 4): 22–3.

4 Faber BM, Coddington CC. Microlaparoscopy: a comparative study of diagnostic accuracy. Fertil Steril 1997; **67**: 952–54.

5 Fayez JA, Mutie G, Schneider PJ. The diagnostic value of hysterosalpingography and laparoscopy in infertility investigation. Int J Fertil 1988; **33**: 98–101.

6 Fuller P. Microendoscopic surgery: a comparison of four microendoscopes and a review of the literature. Am J Obstet Gynecol 1996; **174**: 1757–62.

7 Gallinat A, Nugent W, Lueken RP, Moller CP, Busche D. Gynecologic laparoscopy and hysteroscopy in a day clinic: trends and perspectives. J Am Assoc Gynecol Laparosc 1994; **1**: 103–10.

8 Henig I, Prough SG, Cheatwood M, DeLong E. Hysterosalpingography, laparoscopy and hysteroscopy in infertility. A comparative study. J Reprod Med 1991; **36**: 573–5.

9 Ismajovich B, Wexler S, Golan A, Langer L, David MP. The accuracy of hysterosalpingography versus laparoscopy in evaluation of infertile women. Int J Gynaecol Obstet 1986; **24**: 9–12.

10 Kaminski P, Gajewska M, Wielgos M, Szymusik I, Ziolkowska K, Bartkowiak R. The usefulness of laparoscopy and hysteroscopy in the diagnostics and treatment of infertility. Neuro Endocrinol Lett 2006; **27**: 813–7.

11 Krynicki E, Kaminski P, Szymanski R, Gasior W, Marianowski L. Comparison of hysterosalpingography with laparoscopy and chromopertubation. Ginekol Pol 2000; **71**: 979–83.

12 Watrelot A, Hamilton J, Grudzinskas JG. Advances in the assessment of the uterus and fallopian tube function. Best Pract Res Clin Obstet Gynaecol 2003; **17**: 187–209.