Microsurgery versus laparoscopy in distal tubal obstruction hysterosalpingographically or laparoscopically investigated

B. Mossa, A. Patella, V. Ebano, E. Pacifici, S. Mossa, R. Marziani

Department of Gynecological Science, Perinatology and Child Health
University of Rome, "La Sapienza", II School of Medicine, Rome (Italy)

Summary

Objective: To compare pregnancy rates after laparotomic microsurgical or laparoscopic distal tuboplasty.

Design: Two hundred and twenty-four women with infertility due to distal tubal occlusion were randomized to be treated with either laparotomy or laparoscopy from 1987 to 2001 at the Institute of Gynaecology and Obstetrics, University of Rome, "La Sapienza".

Results: The results were evaluated taking into account the type of surgical approach, the severity of tubal damage and of adhesions. After a 24-month follow-up period, the overall pregnancy rate obtained with microsurgery was 43.7%, of which 33.3% were term pregnancies, 5.0% abortions, and 5.0% ectopic pregnancies. After laparoscopy, the overall pregnancy rate was 41.6%, of which 29.1% were term pregnancies, 8.3% abortions and 3.9% ectopic pregnancies. No significant differences was observed between the two groups in terms of fertility rate (chi-square 0.016, p = 0.9003).

Conclusions: Laparotomy plus microsurgery and laparoscopy were equally effective in restoring fertility in women with comparable tubal damage. The severity of the damage is a critical factor for the results.

Key words: Tubal infertility; Fimbrioplasty; Salpingoneostomy; Laparoscopy; Microsurgery.

Introduction

The investigation for potential tubal disease is an essential step in the work-up of infertility. Tubal disease represents one of the main causes of female infertility (25-35% of cases) [1]. Pelvic inflammatory disease and its sequelae, appendicitis and previous abdominal surgery are the most common causes of tubal disease [2, 3].

Surgery and IVF [4-7] are, at present, the only therapeutic options to im-prove fertility.

The aim of reconstructive surgery is to restore normal anatomic relationships between the fimbriae and ovary [8-10]. Distal tuboplasty is indicated in properly selected cases such as young women with limited tubal damage [2, 11, 12, 27, 28].

Tubal surgery can be most suitable for couples because of minor stress and fewer religious and ethical problems which are frequently associated with IVF.

Material and Methods

During the period 1987-2001, 224 women with tubal infertility confirmed by laparoscopy or hysterosalpingography were treated for distal tubal occlusion with either laparotomy or laparoscopy. Ninety-six women underwent laparotomy plus micro-surgery, while laparoscopy was performed in 128 cases.

The two groups of women were homogeneus in terms of age, type of tubal obstruction, duration of infertility and absence of other factors possibly affecting fertility.

Women's ages ranged from 21 to 37 years (30.7 mean). Sixty-seven women (30.1%) presented with primary infertility (Table 1).

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Table 1. — *Characteristics of patients.*

Age	21-37
Mean age	30.7
Primary infertility	67 (29.9%)
Secondary infertility	157 (70.1%)
Total	224

In 45 patients (20%) we found a previous history of abdominal surgery for different diseases: ectopic pregnancies, peritonitis, appendicitis, cesarean section, tuboplasties, and cystectomies. Only patients with distal tubal occlusion were included in this study; women with associated proximal tubal lesions and other pathologies were excluded.

A standard protocol for the management of infertile couples (clinical history, physical examination, semen analysis, hormonal evaluation, hysterosalpingography, and diagnostic laparoscopy) was used in all cases. In particular, diagnostic evaluation included proper status of the ovaries, fallopian tubes and their permeability to methilene blue, pelvic adhesions or other associated pathologies. Tubal lesions were scored according to endosalpingeal status, extent of ampullary dilatation, thickness and rigidity of the tubal wall, and nature and extent of pelvic and periadnexal adhesions. The severity of disease was staged I-IV. The adhesions were scored according to the type (film, vascular, dense) and extent [13].

Microsurgery and laparoscopy started in many cases with adhesiolysis followed by fimbroplasty or salpingoneostomy (either monolateral or bilateral). Both tuboscopy [14, 15] and chromo-tubal tests were used at the end of the operation.

Surgical procedures

Laparotomies were always performed through transversal Pfannestiel incisions. An operating microscope and atraumatic instruments were utilized.

Adhesions were stretched and lysed with micro-electrodiathermy and atraumatic forceps and continuous irrigation

were employed. Fimbrioplasty or salpingoneostomy were performed according to standard techniques. Careful haemostasis, isotonic irrigation and avoidance of serosal damage were constantly included in the procedure.

To prevent postsurgical adhesions a dextran solution or heparinized fluid and dexamethasone were used. All women received antibiotics and corticosteroids during the postoperative period.

Laparoscopy was performed under general anaesthesia, after creating pneumoperitoneum, with a transumbilical entry. A multiple puncture technique was utilized; three 5-mm trocars were introduced supraumbilically for accessory instruments. Adlhesions were stretched and lysed with forceps or bipolar microelectrode. A continuous NaCI isotonic irrigation was utilized. All women received antobiotics during the postoperative period.

Results

Table 2 shows the overall results according to the surgical procedure carried out. During the 24 month follow-up period, of the laparotomically treated women we observed 42 pregnancies (pregnancy rate 43.7%), 32 of which (33.3%) were term pregnancies, five (5.0%) were abortions and five (5.0%) were ectopic pregnancies. Out of the 96 patients, 47 underwent fimbrioplasty, with a pregnancy rate of 46.8% (38.3% term pregnancies, 6.4% abortions and 2.1% ectopic pregnancies). After 49 salpingoneostomies, there were 20 (40.8%) pregnancies (28.5 term pregnancies, 4.1 abortions and 8.2% ectopic pregnancies).

Table 2. — *Fimbrioplasty and neosalpingostomy: microsurgery versus laparoscopy.*

Microsurgery	No. of patients	Pregnancy rate	TP	Abortion	EP
Fimbrioplasty	47	22 (46.8%)	18 (38.3%)	3 (6.4%)	1 (2.1%)
Neosalpingostomy	49	20 (40.8%)	14 (28.5%)	2 (4.1%)	4 (8.2%)
Total	**96**	**42 (43.7%)**	**32 (33.3%)**	**5 (5.0%)**	**5 (5.0%)**
Laparoscopy	No. of patients	Pregnancy rate	TP	Abortion	EP
Fimbrioplasty	79	35 (44.2%)	25 (31.6%)	7 (8.8%)	3 (3.8%)
Neosalpingostomy	49	18 (36.7%)	13 (26.5%)	3 (6.1%)	2 (4.1%)
Total	**128**	**53 (41.6%)**	**38 (29.1%)**	**10 (8.3%)**	**5 (3.9%)**

TP: term pregnancy; EP: ectopic pregnancy.

The overall pregnancy rate obtained with laparoscopy was 41.6% (n = 53 with 38 (29.1%) term pregnancies, ten abortions (8.3%) and five (3.9%) ectopic pregnancies.

Out of 128 patients, 79 underwent fimbrioplasty; of these patients 35 pregnancies (44.2%) were obtained, (31.6% term pregnancies, 8.3% abortions and 3.8% ectopic pregnancies).

After 49 salpingoneostomies, there were 18 (36.7%) pregnancies (26.5% term pregnancies, 6.1% abortions and 4.1% ectopic pregnancies).

Statistical significance was tested using the chi-square test (chi-square 0.016, p = 0.9003).

Pregnancy rates according to the severity of tubal disease are presented in Table 3.

Table 3. — *Pregnancy rate according to tube stage.*

Stage	Microsurgery Cases	IUP	EP	Laparoscopy Cases	IUP	EP
I	39 (40.6%)	19 (48.7%)	1 (2.6%)	60 (46.9%)	31 (51.7%)	1 (16.7%)
II	49 (51.0%)	17 (34.7%)	4 (8.16%)	51 (39.8%)	16 (31.4%)	3 (5.9%)
III	7 (7.3%)	1 (14.3%)		12 (9.4%)	1 (8.3%)	
IV	1 (1.1%)			5 (3.9%)		
Total	96	37 (38.5%)	5 (5.0%)	128	48 (37.5%)	5 (3.9%)

IUP: intrauterine pregnancy; EP: ectopic.

No pregnancy occurred in patients with Stage IV disease. A very low pregnancy rate was observed in patient with Stage III disease (one out of 7 women treated with microsurgery and one out of 12 women treated with laparoscopy).

In first and second stage patients, a pregnancy rate of 51.3% and 34.7%, respectively, was observed after microsurgery. In women treated with laparoscopy, the pregnancy rate was 51.7% and 31.4%, respectively. Intrauterine pregnancy rates according to adhesion stage are shown in Table 4. The more severe the adhesions, the lower the pregnancy rate. When mild or moderate adhesions were present, pregnancy rate was similar to that of women without adhesions.

Table 4. — *Pregnancy rate according to adhesion stage.*

Stage	Microsurgery Cases	IUP	Laparoscopy Cases	IUP
None	15 (15.6%)	8 (53.3%)	28 (21.9%)	12 (42.9%)
Mild	31 (32.3%)	12 (38.7%)	43 (33.6%)	20 (46.5%)
Moderate	41 (42.7%)	16 (39.0%)	41 (32.0%)	14 (34.1%)
Severe	9 (9.4%)	1 (11.1%)	16 (12.5%)	2 (12.5%)
Total	96	37 (38.5%)	128	48 (37.5%)

IUP: intrauterine pregnancy.

Conclusions

Distal tuboplasty has been considerably advantaged both by microsurgery and laparoscopy. In our study laparotomy plus microsurgery and laparoscopy were equal in restoring fertility, especially when the type of tubal obstruction was taken into account.

On the other hand, Watson *et al.* analyzed four non-randomized studies comparing laparascopic with open, microsurgical salpingostomy [16-19] and found that the overall and intrauterine pregnancy rates were significantly reduced with the laparoscopic approach [20]. Yet, taking into account the economic and recovery time ben-

efits of laparoscopy [21], salpingostomy by this method is recommended in a setting in which IVF-ET is subsequently available if salpingostomy fails [17].

In this regard, a careful tubaI evaluation, including tuboscopy, is essential for a proper classification.

As would be expected with improved tubal ability for oocyte retrieval, fimbrioplasty has resulted in almost double the conception rate (approximately 60%) of cuff salpingostomy for a completely occluded distal tube [22]. Laparoscopic and open microsurgical fimbrioplasty appear to be comparable with regard to intrauterine pregnancy rates; however, with the former, the ectopic rate can be up to 14% [23-25].

Stage III and IV tubes treated with microsurgery or laparoscopy have given very low pregnancy rates and women should be moved to alternative techniques like assisted reproductive technique (ART).

As might be predicted, ectopic pregnancy rates have increased with moderate to severe disease compared with mild disease [26]; but, paradoxically, severe disease is associated with a lower ectopic rate than moderate disease, likely because oocyte retrieval is completely impaired in the setting of severe tubal dysfunction [23].

The laparoscopic approach however, was less invasive and required a shorter stay in hospital (2 vs 5 days) and thus more acceptable to women.

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Address reprint requests to:
R. MARZIANI, M.D.
Via Pescosolido, 192
00158 Roma (Italy)