

TUBOPERITONEAL CAUSES OF INFERTILITY: SURGICAL TREATMENT

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Operative procedures to restore the functional capacity of the fallopian tubes have been described for more than a century. There has been tremendous changes during the last decade in concepts and procedures for reconstruction of occluded tubes and release of the tubes from significant adhesions. Presently much importance is given for careful classification of surgical procedures on the tubes to enable comparison of results for analysis (Sieglar, 1977). Aimed at restoring patency and free mobility of tubes the various plastic operations undertaken are: (i) implantation, (ii) anastomosis, (iii) salpingoneostomy, (iv) fimbrioplasty, (v) lysis of adhesions, (vi) combinations, and (vii) others such as transplantation, and ovarian implantation.

Tubal implantation, lysis of tubal adhesions and salpingoneostomy are the common surgical procedures attempted by us. Our method of patient selection, procedure of reconstruction and the results of surgical treatment are detailed in this presentation.

Selection of patients

After ruling out the male factors by physical examination of the male, semen

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analysis and post-coital test, the female is further investigated for any definite cause of infertility. Tubal patency is basically evaluated by hysterosalpingography (HSG). Eventhough not absolutely reliable, HSG gives valuable information about the tubes at a minimal risk to the patient. Since bilateral patency by HSG is reliably diagnostic of normally functioning tubes, we exclude tubal dysfunction in women with normal HSG findings. In the absence of any clinical evidence or other factors unilateral tubal patency is considered to be normal. We have taken this view on the basis of many women with unilateral tubal patency by HSG conceiving without any form of treatment. Hysterosalpingographic diagnosis of hydrosalpinx appears to be reasonably accurate, and in none of the patients the laparotomy diagnosis was contrary to the HSG diagnosis of hydrosalpinx. However, HSG finding of bilateral cornual block appears to be quite unpredictable. Bilateral cornual block is diagnosed only after confirmation by laparoscopy, and chromotubation at laparotomy. Similarly, we feel that diagnosis of tubal adhesions is difficult with HSG and hence we resort to laparoscopy and laparotomy. In addition, those women with normal HSG and with no other discernible cause for infertility are also subjected to endoscopic evaluation, if conception does not occur

within a reasonable period. All women subjected to AID undergo a preliminary hysterosalpingographic evaluation; after 6 consecutive unsuccessful attempts at insemination these women are further evaluated by laparoscopy or sometimes by laparotomy.

Infertile women with pelvic masses, clinically diagnosed as endometriosis or fibroids are subjected to surgical correction with or without a prior HSG/laparoscopy evaluation.

After the tubal surgery, in those women who fail to conceive, we use HSG to verify the functional patency of the fallopian tubes.

Study Design

Since December 1977, over a period of one year, 42 laparotomies were performed for surgical correction of infertility. Among them 28 women had tuboperitoneal causes of infertility who underwent reconstructive surgery for occluded tubes or lysis of significant peritubal adhesions. This group also included 5 women who had tubal dysfunction as the cause for repeated unsuccessful attempts at AID. The types of reconstructive surgeries performed were: tubal implantation, salpingoneostomy, lysis of adhesions, and salpingo-oophorectomy. Many of them were combined operations, in the same patient, such as correction of tubal block and lysis of tubal adhesions.

Certain general principles were adhered to: (1) The practice of using intra-tubal devices, splints or stents for maintenance of the patency of the tube was avoided. (2) Injection of corticosteroids through the fimbrial ostia of the tubes were routinely practised. (3) Corticosteroids and promethazine were given in the post-operative period to prevent adhesions. (4) Post-operative hydrotuba-

tion was a routine following salpingoneostomy.

Implantation: Four patients with bilateral cornual block underwent tubal implantation. Technic of uterotubal implantation advocated by Peterson *et al* (1977) was tried in all the 4 patients. After confirming cornual block and making sure that rest of the tube was normal, the tube was opened proximally and was adequately mobilised by incising about 2 cm of mesosalpinx. After passing blunt probe through the entire length of the resected tube, anterior and posterior flaps approximately $\frac{1}{2}$ cm in length were created at the proximal end (Fig. 1) Oxytocin was injected in the upper posterior wall of the uterus and a transverse incision was made into the myometrium at the level between the two ovarian ligaments. The tubes were implanted into the endometrial cavity as shown in fig. 2. The myometrium was closed with interrupted 1-0 chromic catgut sutures (Fig. 3). A peritoneal graft was taken from the anterior parietal peritoneum and placed over the uterine incision (Fig. 4). The uterus was anteverted by plication of round ligament or by Baldy-Webster procedure.

Age of these patients ranged from 26 to 35 years with a mean duration of sterility of 7 years (4 to 18 years). Among them 2 patients had reported for donor artificial insemination for intractable male factor.

Salpingoneostomy: This operation was done in 8 women with distal tubal obstruction with hydrosalpinx in which no identifiable fimbriae were seen. Terminal salpingostomy was done in all cases, and after the tube was freed from adhesions the hydrosalpinx was opened and a cuff was made by everting the edge with 3-0 chromic sutures. After the repair the

uterus was anteverted as mentioned earlier.

Age of these patients ranged from 24 to 38 years, with duration of sterility ranging from 4 to 16 years.

Lysis of Tubal Adhesions: Fourteen patients between 23 to 40 years of age and with a duration of sterility ranging from 3 to 8 years were subjected to salpingolysis and ventrisuspension of the uterus. Among them there were 3 patients who had failed to conceive after repeated attempts at artificial insemination. In this group 10 patients had evidence of endometriosis. The adhesions were separated by sharp dissection and area of endometriosis was resected. After obtaining haemostasis the uterus was ventri-suspended.

Salpingo-oophorectomy: Two patients with normal ovaries on either side and markedly damaged tube on one side and normal tube with adhesions on the other side were treated with salpingo-oophorectomy on the side of the diseased tube and salpingolysis on the contralateral side. Ventrosuspension was done by plication of the round ligament.

An infertile woman 25 years of age with a period of sterility of 4 years was found to have pelvic endometriosis with marked distortion, thickening and adhesions of the right tube. The left tube was normal with peritubal adhesions. On both sides the ovaries were normal and the

right ovary contained a corpus luteum. Right salpingo-oophorectomy was done and the uterus was ventrosuspended by plication of round ligament.

The second patient was 33 years old with 2 years' infertility. Endometrial cysts of the left ovary with a markedly damaged adherent left tube, with a relatively normal ovary and tube with small areas of endometriosis and adhesions were the laparotomy findings. She was treated with left salpingo-oophorectomy and release of adhesions on the right side. Round ligaments were plicated on either side.

Results of Surgical Correction: (Table I)

Uterotubal implantation by the technic described by Peterson and co-workers (1977) performed in 4 patients gave the best results in this series. Among the 4 patients who underwent implantation by this technic, 2 conceived, 1 within 3 months of surgery, and the other patient at the second cycle of artificial insemination. The third patient who had 7 unsuccessful attempts at AID following implantation underwent a review HSG. The HSG revealed a normally functioning tube on the left side with uniform peritoneal spill, and the right tube was not visualised. Since tubal patency was established at least on one side (Fig. 5) insemination is still continued with a better hope of conception. Considering the

TABLE I
Results of Reconstructive Surgery on the Tubes

Operative procedure	No. operated	No. conceived	Percentage
Salpingolysis	14	2	14.28
Salpingoneostomy	8	1	12.80
Implantation	4	2	50.00
Unilateral Salpingo-oophorectomy	2	1	50.00
Total:	28	6	21.42

overall results, 3 of the 4 patients had established tubal patency following the reconstructive surgery and 2 of them had conceived within 3 months.

The next best results were realised for unilateral salpingo-oophorectomy performed in 2 women. One of them conceived within 2 months of surgery and at the time of reporting she was already 24 weeks pregnant.

Outcome of salpingoneostomy for hydrosalpinx and salpingolysis for tubal adhesions were relatively poor. Among the 8 women who were subjected to salpingoneostomy for bilateral hydrosalpinx only 1 (a 34 year old woman with 12 years' sterility) conceived 7 months after surgery (Fig. 6). She delivered a healthy male baby by caesarean section.

Of the 14 subjects who were operated for tubal adhesions, 2 women with endometriosis conceived within 4 months of surgery. One patient who conceived by the fourth cycle of artificial insemination aborted in the first trimester.

Analysis of results for surgical correction of tubal factor of infertility reveals a pregnancy rate of 21.42 per cent with the best results for bilateral tubal implantation by Peterson's technic. Of the 6 women who became pregnant, 1 aborted in the first trimester. There were no tubal pregnancies in this series studied.

Discussion

Two special features in this communication are (i) employment of a newer technic of tubal implantation, and (ii) inclusion of patients who had repeated unsuccessful attempts at donor insemination due to proved tubal factors.

There are certain definite advantages for the tubal implantation method de-

scribed by Peterson *et al* (1977) over the usually practised method of cornual implantation. The technic described differs from the other reported methods in that the uterine incision is made transversely in the posterior fundus at the level of the ovarian ligaments rather than transversally in the cornual area. This enables minimal mobilisation of mesosalpinx and therefore more blood supply to the tube is preserved. Technically also this represents the shortest distance to the endometrial cavity. Moreover, this area allows implantation with the minimum amount of distal tube, and an utilisable distal segment of 3 cm. of normal tube with proper fimbriated opening is adequate for the repair.

Presently it has been well accepted that neither AID nor AIH is undertaken without a prior evaluation of the female (Beck, 1974). It is also suggested, with all parameters standardised, that following AIB if conception does not occur within 6 cycles of exposure the woman should be further evaluated preferably with a laparoscopy for undetected tubal dysfunction. (Dixon and Buttram, 1976). We employ hysterosalpingography as a basic investigative procedure prior to donor artificial insemination. With good quality semen and proper timing of insemination if conception does not occur in a woman with normal HSG findings, we resort to laparoscopy or laparotomy. Among those women who were investigated in this manner we found that 5 women had tubal dysfunction and they were considered for corrective surgery. That 2 of them conceived and 1 had established unilateral patency following reconstructive surgery is significant, because, but for this approach to the problem AID would have been continued without any results.

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See Figs. on Art Paper V-VI