# SURGICAL MANAGEMENT OF FEMALE INFERTILITY

by

R. RAJAN,* M.D., D.G.O.
LINNIE EAPEN,** M.D., D.G.O.
P. S. RAMANI,*** M.B.,B.S.
K. AMBIKA DEVI,† B.Sc., M.B.,B.S.
T. S. MARY,†† M.B.,B.S.
P. K. MOHANRAJ,††† M.B.,B.S.

and

K. C. JOSEPH,‡ M.D. (A.I.I.M.S.)

Until recently, the outlook for women with organic pelvic pathology such as tubal disease in regard to achieving a normal pregnancy was discouraging. Success rates in terms of live births after pelvic operations were far from satisfactory. Because of this, there was a tendency by many physicians to discourage operations aimed at promoting fertility. This was reflected by the relatively few articles in the literature dealing with this area of operative gynaecology.

Since the turn of the 20th century there have been tremendous changes in our gynaecological practice. With the change in our social life, late marriage and voluntary infertility have become a common phenomenon. Unnecessary births are prevented by the liberalisation of abortion laws, and similarly there is a growing acceptance of contraceptive measures such as intra-uterine devices. All these, in combination with an apparent increase in gonococcal and nongonococcal infections of the genital tract have escalated the occurrence of pelvic diseases compromising fertility. With the wider acceptance of tubal sterilisations we encounter a greater number of women needing tubal recanalisation.

All these factors have kindled renewed interest in the gynaecologist to take up operative procedures for infertile women, especially tubal reconstructive procedures. Fortunately, over the past few years, hysterosalpingographic and laparoscopic technics have improved the diagnostic accuracy and have ably assisted the surgeon. So also, the recent developments in surgical technics including emergence of microsurgical technics, have encouraged further progress in this field.

The purpose of this paper is to analyse the types of pelvic disorders we have encountered in our study of infertile women, and also to doccument our experience

*Associate Professor, Obstetrics and Gynaecology.

**Assistant Professor, Obstetrics and Gynaecology.

***Tutor, Obstet. & Gynaec.

@Senior Research Fellow, Indian Council of Medical Research.

@@Senior Research Fellow, Indian Council of Medical Research.

@@@Research Assistant, Infertility Research Project.

Medical College Hospital, Alleppey, Kerala 688 001.

‡Assistant Professor.

Department of Radiology, Medical College Hospital, Kottayam, Kerala 686 008.

with the different operative procedures undertaken to improve the fertility.

*Materials and Methods*

From May, 1977, through October, 1980, we have operated on 82 infertile women with varied pelvic pathology. The first half of the work was conducted at the Medical College Hospital, Kottayam, and the remaining cases were operated at the Medical College Hospital, Alleppey. The surgical procedures were performed without any form of magnification or the use of electrocoagulation for hemostasis or lysis of adhesions. All patients had a complete infertility work-up prior to the operation, including tubal patency studies, determination of ovulatory status, examination of the husband and a detailed seminal study. In most instances, the diagnosis of tubal or uterine factors were suggested by hysterosalpingography, which we have employed as our basic investigative procedure in all infertile women. However, in the first half of the study, laparoscopy was employed as complementary procedure for diagnosis of tubal disorders.

The patients ranged in age from 23 to 40 years, and their duration of infertility ranged from 2 to 18 years. Operations were performed in 65 women for primary infertility. Eight patients who had a azoospermic husbands and had repeated unsuccessful attempts at Donor Artificial Insemination (A.I.D.) were operated for suspected pelvic pathology. Six women were operated for secondary infertility, of whom except 1 all the others had a history of induced abortion of their first pregnancies. Another 3 women had undergone tubal recanalisation procedure following post-partum tubal sterilisation (Table I).

TABLE I
*Surgical Treatment of Female Infertility*
(from May, 1977 to October, 1980)

| Patient groups | |
|---|---|
| Primary infertility | 65 |
| A.I.D. failures | 8 |
| Secondary infertility | 6 |
| Tubal recanalisation | 3 |
| Total | 82 |

The possible etiologic factors contributing to reproductive failures were assigned to the following categories: Endometriosis, pelvic inflammatory disease (some following induced abortion), uterine fibroids, uterine malformations, and in 12 subjects, no obvious discernible pelvic disease was noted (Table II).

TABLE II
*Aetiological Factors in the 82 Infertile Women*

| | |
|---|---|
| Pelvic Endometriosis | 24 |
| Endometriosis with uterine fibroids | 2 |
| Uterine fibroids | 7 |
| Uterine fibroids with pelvic adhesions | 1 |
| Bilateral hydrosalpinx | 8 |
| Unilateral hydrosalpinx | 5 |
| Bilateral cornual block | 7 |
| Unilateral cornual block | 3 |
| Inflammatory pelvic adhesions | 9 |
| Uterine malformations | 4 |
| Previous sterilisation | 3 |
| Fertility laparotomy | 12 |

*Operative Procedures*

*Utero-tubal Implantation:* Cornual block was confirmed at laparotomy by transuterine instillation of methylene blue solution after the obliteration of the lower uterine segment. Seven patients had bilateral cornual block, and 3 had unilateral block. Saline was instilled retrograde through the fimbrial end of the tube and thus the normal tubal patency of the

distal portion was confirmed. Utero-tubal implantation was done by the technic described by Peterson *et al* (1977), where the tubes were implanted through a transverse uterine incision at the level of the ovarian ligaments (Rajan and Usha, 1980). In the 3 patients with unilateral cornual block, the contralateral tubes had adhesions in 2 patients (salpingoloysis done), and salpingostomy was done for hydrosalpinx in one patient.

*Hydrosalpinx*: Hydrosalpinx was diagnosed with very good precision by hysterosalpingography (Rajan and Usha, 1980). Bilateral salpingostomy (cuff salpingostomy) was done in 6 patients, and another 2 patients with bilateral hydrosalpinx had bilateral tubal adhesions, and hence a combined procedure of salpingostomy and salpingolysis was done. Three patients had unilateral hydrosalpinx with the contralateral tube showing normal patency and of them, 2 had unilateral salpingostomy and the third patient was subjected to unilateral adnexal removal (salpingo-oophorectomy) on the diseased side. Another patient with unilateral hydrosalpinx had cornual block on the opposite side. One patient who was operated for tubal abortion (ectopic gestation), had a patent tube with the ectopic gestation on one side and hydrosalpinx on the opposite side. The products of conception were milked out through the fimbrial end, and salpingostomy was done on the other side. Bilateral tubal patency was confirmed by trans-uterine chromotubation.

The most recent patient treated with bilateral salpingostomy had a modified cuff salpingostomy, a method described by Spadoni (1980). This consisted of opening the fallopian tube with small scissors at its distal end at the area of the dimple, extending the incision proximally in a linear fashion on the antimesenteric border for a distance of approximately 2 to 2.5 cms. After obtaining haemostasis the proximal portion of the incision was everted with 2 or 3 sutures on each side. The distal portion of the incision was not everted (Fig. 1). This modification was to reproduce as closely as possible the normal anatomy of the distal portion of the tube, thereby increasing the potential surface area to a greater extent, to facilitate ovum pick-up.

*Pelvic Adhesions*: Pelvic adhesions of inflammatory origin involving the tubes and ovaries or tubes alone were detected in 9 patients. The lesions were either unilateral or bilateral. Two patients had associated fibroids and were treated with myomectomy and salpingolysis. Lysis of peritubal and periovarian adhesions were done, the raw area was reperitonised and haemostasis was obtained in 4 patients with bilateral adnexal adhesions. However, in 3 patients, since the lesions precluded any form of reparative surgery on one side, unilateral adnexal removal and lysis of adhesions on the contralateral relatively healthy side was performed.

*Endometriosis*: One of the major pathologies involving the pelvic organs in the infertile women was endometriosis, unearthed at laparotomy in 26 subjects. Among them, 7 patients had mild endometriosis (peritoneal involvement or small surface implants), 6 had moderate endometriosis (involvement of ovaries and or tubes with minimal adhesions), and 13 had severe endometriosis (large ovarian endometrioma of more than 2 cms diameter, or those with significant adhesions). The classification of endometriosis followed is that described by Acosta *et al* in 1973.

Endometriosis involving the tubes and ovaries was the common finding in 16 patients, and among them 2 patients had ovarian endometrium with the cyst size

of more than 2 cms. Six patients had pelvic peritoneal implants and adhesions, and 4 patients had uterosacral endometrial nodules, and in all these 10 patients, the tubes and ovaries were unaffected.

The surgical treatment included excision of endometrial implants with careful reperitonisation, and excision of uterosacral ligaments (if uterosacral nodules are present) in mild endometriosis. In moderate cases, lysis of tubal and ovarian adhesions were done and endometrial tissues were exterpated, and the raw areas were reperitonised. In those patients with severe adhesions precluding a proper reparative surgery, pelvic dissection was minimised and limited to release of ovarian and tubal adhesions, or more often unilateral adnexal removal was preferred. This type of less aggressive approach to removal of implants and more aggressive approach to unilateral adnexal removal has been reported by Buttram (1979) to increase the likelihood of conception. Two patients with uterine fibroids underwent myomectomy along with surgery for endometriosis. In one subject the appendix was bound down by the endometrial adhesions, and she underwent appendicectomy and release of ovarian and tubal adhesions.

*Tubal Recanalisation*: Three women were operated for recanalisation blocked tubes following tubal sterilisation. Available length of proximal segment of the tubes and their patency were confirmed by HSG, and the nature of tubectomy performed and the presence of the fimbriated distal segment were confirmed by laparoscopy. Two patients had been sterilised by the Pomeroy's technic, and in both of them end-to-end (ampullary-ampullary) anastomosis could be effected. The third patient who had terminal salpingectomy could not be recanalised effectively.

*Myomectomy*: In 7 patients a myoma was the only abnormality and myomectomy the only treatment. In 2 patients fibroids coexisted with pelvic endometriosis and in one with pelvic adhesions, and all the 3 had release of pelvic adhesions in addition to myomectomy. Of the total 10 patients undergoing myomectomy, the uterine cavity was opened to enucleate multiple fibroids in 8 subjects, whereas in 2 patients the fibroids were small and subperitoneal. Preoperative HSG showed distorted endometrial cavity in 3 patients. Following myomectomy the uterus was ventrisuspended by the Baldy-Webster procedure or by plication of the round ligaments.

*Unilateral Adnexal Removal*: Often, an irrevocably damaged oviduct may be encountered in the course of a variety of infertility operation, making removal of the tube and the ovary on the side of the badly damaged tube a potential therapeutic modality. This procedure of 'paradoxical oophorectomy' had been proposed by Jeffcoate (1955) and has been successfully practised by Scott *et al* (1976) and Bronson and Wallach (1977).

In our series, 'paradoxical oophorectomy' and excision of the tube on the side of badly damaged oviduct was performed in 8 patients. They included 4 with endometriosis, 3 with inflammatory adhesions and one with unilateral hydrosalpinx. In all these cases the contralateral tube which was retained was relatively healthier with some adhesions or endometrial implants which could be surgically corrected. It was made sure that both ovaries were normal before deciding on unilateral adnexal resection.

*Other Surgical Procedures*: Four patients had uterine anomalies, of whom 3

were subjected to metroplasty procedure. 'Fertility Laparotomy' was performed in 12 subjects with no discernible cause for the barren union, and in all of them an ovarian wedge resection was done followed by uterine suspension by the Baldy-Webster procedure.

*Adjuvants in Pelvic Surgery*

Post-operative hydrotubation was done as a routine following salpingostomy and some cases of salpingolysis, and the procedure was carried out in the immediate post-operative period employing saline. Post-operative administration of glucocorticoids and promethazine was a routine in all subjects undergoing surgery for infertility.

For tubal surgery, no prosthetic devices were used. Uterine suspension was done in all patients by Baldy-Webster procedure or by plication of round ligaments. Saline irrigation of the peritonial cavity was commonly employed to wash irritants such as blood and tissue fragments. Glucocorticoids were instilled into the tubes through the fibrial ends after completion of surgery.

*Results and Discussion*

While all the patients are carefully followed-up after the infertility operation, the data analysis presented here related only to the first 42 patients who could be followed for a period of 1 to 2 years. (Table III). In our limited experience we find that myomectomy offers the best chances for conception, as has been reported in the literature (Babaknia *et al* 1978). Next in order comes utero-tubal implantation for cornual block, and in this group the reason is obvious because the entire length of the tube is normal and only the cornual region is diseased, and when the tubes are implanted elsewhere conception results promptly. Only case

TABLE III
*Pregnancy Following Infertility Surgery*
(Total patients analysed: 42)

| Pelvic pathology | Operation performed | No. operated | No. pregnant | % |
|---|---|---|---|---|
| Uterine fibroids | Myomectomy | 3 | 3 | 100.00 |
| Fibroids with endometriosis | Myomectomy and salpingolysis | 2 | 1 | 50.00 |
| Cornual block | Utero-tubal implantation | 4 | 3 | 75.00 |
| Endometriosis | Release of ovarian tubal adhesions/resection of endometrioma/ unilateral adhexal removal | 12 | 3 | 25.00 |
| Hydrosalpinx | Salpingostomy | 9 | 1 | 11.10 |
| Fertility laparotomy | Ovarian biopsy and uterine suspension | 5 | 1 | 20.00 |
| Bilateral pelvic adhesions (inflammatory) | Salpingolysis and release of ovarian adhesions | 2 | nil | — |
| Tubal sterilisation | Ampullary-ampullary anastamosis | 2 | nil | — |
| Uterine malformation | Metroplasty | 3 | nil | — |

of 'paradoxical oophorectomy' resulted in conception within 2 months of surgery. Our results for other types of surgeries were relatively poor as could be seen from Table III.

Among the 42 patients operated, 12 women (28.57%) conceived a pregnancy within 1 month to 2 years period. Of them, 4 had normal delivery, 3 had caesarean section and all had healthy babies. Three patients aborted in the first and midtrimesters, and 2 patients after confirming pregnancy could not be followed further.

We feel that the results for tubal reconstructive surgery could be further improved by employing modified cuff salpingostomy (Spadoni 1980) for hydrosalpinx, adhering to the philosophy of Buttram (1979) for surgical treatment of endometriosis, and judicious application of 'paradoxical oophorectomy' and resection of the tube on the side of grossly damaged tube, leaving behind a relatively healthy tube and ovary for better reproductive function.

*Acknowledgement*

The authors are grateful to the Superintendents of Medical College Hospital, Kottayam and Alleppey, for their kind permission to analyse the Hospital Records.

*References*

1. Acossta, A. A., Buttram, V. C., Besch, P. K., Malinak, L. R., Rranklin, R. R. and Vanderreyeden, J. D.: Obstet. Gynec. **42**: 19, 873, 1973.
2. Babakinia, A., Rock, J. A. and Jones, H. W.: Fertil. Steril. **30**: 644, 1978.
3. Bronson, R. A. and Wallach, E. E.: Fertil. Steril. **28**: 613, 1977.
4. Buttram, V. C.: Fertil. Steril. **32**: 635, 1979.
5. Jeffcoate, T. N. A.: Brit. J. Obstet. Gynaec. **62**: 214, 1955.
6. Peterson, E. P., John, R. M. and Behrman, S. J.: Am. J. Obstet. Gynec. **128**: 662, 1977.
7. Rajan, R. and Usha, K. R.: J. Obstet. Gynec. India, **30**: 342, 1980.
8. Rajan, R. and Joseph, K. C.: J. Obstet. and Gynec. India, **30**: 517, 1980.
9. Scott, J. S., Lynch, E. M. and Anderson, J. A.: Brit. Med. J. **1**: 631, 1976.
10. Spadoni, L. R.: Am. J. Obstet. Gynec. **189**: 137, 1980.

*See Fig. on Art Paper V*