SURGICAL MANAGEMENT OF ENDOMETRIOSIS AND INFERTILITY

(Report of an Eight-Year Experience)

By

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SUMMARY

Among the 983 infertile subjects undergoing laparoscopy or laparotomy 250 subjects (25.43%) were diagnosed to have endometriosis. The treatment of choice was primarily surgery, either laparoscopic or by laparotomy. Electrocoagulation was the preferred method of surgical dissection.

Of the 134 subjects followed for atleast one year after surgery 57 subjects had achieved a conception, giving a success rate of 42.54%; 64.91% of the conceptions occurred within 6 months of surgery and 87.72% within 1 year. Including the 5 conceptions following post-operative danazol therapy, the pregnancy outcome was excellent, with 5 abortions (8.77%), 1 neonatal death and no ectopic gestation.

Of the 57 successful subjects 43.86% had undergone unilateral or bilateral ovariolysis and/or ovarian cystectomy; 28.07% had undergone unilateral adnexal removal for severe unilateral adnexal pathology; 24.56% had undergone fulguration of peritoneal implants; and 3.51% had undergone bilateral salpingo-ovariolysis. Ovarian endometriosis unassociated with tubal adhesions and unilateral adnexal removal when tubal adhesions are present appear to contribute for greater success rate.

Introduction

Conservative surgery has been utilized for the treatment of infertility associated with endometriosis for more than 50 years. Definition of conservative surgery has remained the destruction of as much endometriosis as possible with preservation of child-bearing function. The recent technical advances in IVF-ET and GIFT will certainly alter our ideas of surgical removal of endometriosis in woman interested in child-bearing in a dramatic fashion over the next few years. Similarly, the tools for surgical ablation of endometriosis are expanding from the scalpel to electrocoagulation and laser used at both laparoscopy and laparotomy.

Danazol alone or coupled with surgical therapy is a well accepted treatment modality for infertile subjects with endometriosis. Since its introduction in 1971

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by Greenblatt and co-workers and documentation of its therapeutic efficacy by Dmoswski and Cohen (1975) it has invited a lot of criticisms and unresolved controversies. The controversies center around (i) danazol as the primary and the only treatment (ii) avoiding danazol completely (iii) if employed coupled with surgery, whether pre-operative or post-operative (iv) role of danazol in larger endometrial implants and in ovarian endometriosis (v) duration of therapy (vi) dosage regiment (vii) interval between cessation of therapy and initiation of pregnancy (viii) cost-benefit (ix) side effects, contraindications and recurrence and (x) teratogenesity (Barbeiri and Ryan, 1981; Daniel and Christianson, 1981; Cohen, 1980; Wheeler and Malinak, 1981; Biberoglue and Hehrman, 1981; Dmowsk, 1981; Puleo and Hammond, 1983; Seibel *et al*, 1982; Guzick and Roch, 1983; Kistner *et al*, 1984; and Buttram *et al*, 1985).

Initiation of therapy, either medical and/or surgical, is warranted when endometriosis is severe and probably when it is moderate. However, the decision to subject an infertile patient with minimal to mild endometriosis to either surgical resection or danazol therapy is again disputed. Expectant management following diagnostic laparoscopy and correction of other infertility factors, such as ovulatory dysfunctions, has been merited with good results in such subjects (Seibel *et al*, 1982 and Schenken and Malinak, 1982).

Over the past 8 years we have managed infertile subjects with endometriosis on the following surgical protocol: moderate and severe endometriosis were subjected to laparotomy resection of endometrial implants, adhesiolysis, enucleation of cysts, other reconstructive procedures, and wherever indicated paradoxical removal. Excepting the first 2 years the entire surgical resection was attempted by employing electrocoagulation. Danazol therapy, either pre-operative or post-operative was not routinely recommended, and had been employed for a very few selected subjects who could afford the cost of the drug.

Subjects diagnosed to have minimal to mild endometriosis were subjected to laparoscopic electrocoagulation of implants provided they were situated in optimally safe areas. Those in unsafe areas were left untreated and expectant line of management was adopted, taking care to treat other causes of infertility. Only one subject in this group was treated with danazol.

Our purpose is to analyse the incidence of pelvic endometriosis among infertile subjects undergoing diagnostic or operative laparoscopy and laparotomy, to document the incidence of varied pelvic surgeries performed and to evaluate the fertility rate and the pregnancy outcome.

Study Design

An accurate diagnosis of endometriosis was always made at diagnostic laparoscopy or at laparotomy. Our indications for performing diagnostic laparoscopy for infertile women have been described in our earlier communications (Rajan, 1984; and Rajan and Ambika, 1985). The diagnostic endoscopic procedure included cervical dilatation, endometrial curettage wherever indicated, thorough tubal lavage to wash-out the methylene blue solution in the tube, peritoneal lavage and aspiration of the pelvic contents (Rajan and Ambika, 1985, and Rajan, 1986). The endoscopic procedure was extended to an operative laparoscopy when minimal to mild endometriosis was located. The endoscopic surgeries included endocoagulation

of implants, ovarian adhesiolysis, aspiration and fulguration of small endometrial cysts and thorough peritoneal lavage (Rajan, 1984). Endoscopic surgery was not attempted on implants located on the fallopian tubes, bladder surface, intestinal surface or near the ureters. Adhesiolysis of moderate to severe pelvic adhesions was also not attempted through endoscopic surgery.

Surgical treatment of moderate to severe endometriosis included laparotomy with adhesiolysis of tubo-ovarian adhesions, enucleation of endometrial cysts of ovary, extirpation of other endometrial implants by electrocoagulation and careful reperitonisation. When the severe adhesions precluded a proper reparative surgery either of the following procedures was preferred: (i) unilateral adnexal removal of the grossly damaged side and reparative surgery on the side evidencing minimal adhesions; and (ii) when gross pelvic adhesions including obliteration of cul-de-sac were encountered the pelvic dissection was limited to release of ovarian and tubal adhesions and the cul-de-sac adhesions were left undisturbed. A few of such subjects were advised danazol treatment post-operatively. Atleast 3 subjects in whom such gross pelvic adhesions were identified at diagnostic laparoscopy were subjected to pre-operative danazol therapy.

Danazol when employed, either post-operatively or pre-operatively, was administered in 4 daily doses of 100 mgs each. Usually this dosage regimen had resulted in complete suppression of menstruation, and the aim of therapy was to produce amenorrhoea for 3 months. If breakthrough bleeding occurred the dose of the drug was enhanced to 600 mgs. Dosage regimen lesser than 400 mgs or greater than 600 mgs was not employed in this study.

The couples were advised to attempt conception from the next cycle of surgery, and if danazol was given post-operatively the advise was to try pregnancy immediately after cessation of therapy. This is in view of the highest pregnancy rate within the first 6 months of surgery or post-operative danazol therapy. In the event of a missed menstrual period a careful pelvic examination was performed to diagnose pregnancy and particularly to ensure that the conception is intrauterine (Rajan, *et al* 1983). Presently, we prefer a pelvic sonography on the 7th day of missed menstrual date to diagnose and confirm an intra-uterine pregnancy (Rajan and Vasantha, 1985 and 1986). A careful sonographic monitoring of such pregnancies was carried ont at regular intervals, and a decision on mode of delivery was taken considering the age of the subject and the obstetric findings. If abdominal delivery was contemplated a thorough inspection of the pelvic cavity was made for evidence of pelvic adhesions, presence of endometriotic foci and location of endometrial cysts.

Data Analysis

Over a period of 7 years and 10 months ending on 19th October, 1986, 1983 subjects had undergone either a diagnostic or operative laparoscopy or a laparotomy as a part of infertility investigation or treatment. In 250 subjects endometriosis was diagnosed either alone or incombination with other pelvic factors such as fibroids, an incidence of 25.43%. Among them 134 subjects could be followed-up atleast for one year after the conservative surgery and/or danazol therapy, and

57 of them had achieved a conception, an overall pregnancy rate of 42.54% (Table I).

TABLE I
Incidence of Endometriosis in Infertility

Period of study	No. of Laparoscopy/ Laparotomy	Endometriosis diagnosed (No.)	Incidence of endometriosis (%)	No. followed after surgery	No. pregnant	Success rate %
7 yrs. 10 months	983	250	25.43	134	57	42.54

Danazol was administered pre-operatively in 3 subjects and post-operatively in 22 subjects. No pregnancies were reported in the former group and 5 conceptions were recorded in the latter group.

The nature of pelvic disorders caused by endometriosis in the 57 successfully treated subjects is given in Table II. The successful subjects are mainly constituted by candidates undergoing ovarian conservative surgery for endometriosis (43.86%), to be followed by those undergoing unilateral adnexal removal (28.07%) and ablatation of peritoneal implants (24.56%). Bilateral salpingo-ovariolysis has contributed very minimally to the successful group viz. 3.51%.

The interval between surgery and conception in the 57 successful subjects is given in Table III. Conception has occurred as early as the next cycle to as late as 3 years after the conservative surgery. Within 6 months of surgery 37 subjects became pregnant (64.91%), and within 1 year 50 (87.72%).

TABLE II
Nature of Endometriotic Lesions in the 57 Successful Subjects

1. Ovarian endometriosis (adhesions/cysts): requiring fulguration/adhesiolysis/cystectomy	25 (43.88%)
i. coupled with dense culdesac adhesions	7 (12.28%)
ii. no pelvic adhesions in culdesac	18 (31.58%)
2. Severe unilateral tubo-ovarian adhesions: requiring unilateral adnexal removal	16 (28.07%)
i. adhesiolysis of contralateral adnexum	10 (17.54%)
ii. no pathology in the adnexum	6 (10.53%)
3. Implants on peritoneal reflections: requiring fulguration or resection	14 (24.56%)
4. Bilateral tubo-ovarian adhesions: requiring bilateral salpingo-ovariolysis	2 (3.51%)

TABLE III
Surgery-Conception Interval

Total pregnancies	Conceived within 6 months	Conceived within 1 year
57	37 (64.91%)	50 (87.72%)

The pregnancy outcome is documented in Table IV. Among the 57 pregnant subjects 5 lost the pregnancy by first trimester abortion, and one had term neonatal death. There were no ectopic gestations or molar pregnancies. One subject underwent caesarean section for placenta praevia. No pregnancy complications were recorded in the small group of 5 subjects achieving conception following post-operative danazol therapy.

TABLE IV
Pregnancy Outcome

No. pregnant	I trimester abortion	Neonatal death	Placenta previa
57	5 (8.77%)	1	1

Discussion

In view of the higher conception rate within 6 months to 1 year of surgery our advice in favour of attempting pregnancy from the very next cycle of surgery appears to be optimal. For the same reason we would suggest that post-operative danazol therapy is better avoided and if there is a need for the medication let it be given pre-operatively.

Among the 22 subjeects who had post-operative danazol medication attempt at conception was advised from the very next month of cessation of therapy. Among the small number of 5 subjects who reported conception there were no pregnancy complications, and hence it is felt that attempting pregnancy immediately following danazol therapy does not harm the pregnancy.

We have documented the following results in our previous communication (Rajan and Ambika, 1985). Unilateral adnexal removal resulted in a pregnancy rate of 54.17%, and the conception rate was 75% if the contralateral adnexum was devoid of any pathology and needed no surgical intervention. Equally good outcome was recorded for ovarian endometriosis needing bilateral or unilateral ovariolysis and/or ovarian cystectomy, namely, a pregnancy rate of 50%. However, when severe cul-de-sac adhesions were present which were left undisturbed the above surgical procedures resulted in relatively inferior results. No pregnancy could be achieved in 7 subjects who had undergone bilateral salpingo-ovariolysis.

From our observations it is evident that meticulous surgical correction of ovarian endometriosis, unassociated with tubal adhesions, offerred the best chances for conception. The surgical approach may be by endoscopy or laparotomy, and has to be individualised on the merit of each case. Unilateral adnexal removal is by far the best surgical technic for subjects having asymmetrical tubo-ovarain adhesions, while difficult salpingolysis coupled with or without ovariolysis carries an unacceptably poor result and hence should be discouraged.

This study does not offer any scope for comparison of pre-operative and post-operative danazol therapy due to paucity of adequate number of subjects recruited in either group. However, there are excellent comparative data published by Buttram *et al* (1985) advocating the use of danazol pre-operatively for all stages of endometriosis and discouraging post-operative danazol therapy irrespective of

the stage of the disease. They suggest that decreased pelvic vasculature and inflammation in patients with endometriosis treated with danazol may reduce the risk of post-operative adhesion formation, and higher pregnancy rate is achieved (64%) than after its use post-operatively or after conservative surgery alone.

GnRH agonist is our most recent weapon in hormonal therapy of endometriosis. This 'medical oophorectomy', with no androgenic side effects, does suppress growth of endometriosis, but data on its use in infertile subjects are not yet available nor the long-term consequences and recurrences have been determined (Schmidt, 1985).

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