Tubal sterilization: methodology, postoperative management and follow-up of 2934 cases

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Summary: Both posterior colpotomy with associated fimbriectomy and laparoscopy offer rapid and effective methods for carrying out interim and post-abortion tubal sterilization. They can effectively be performed on an out-patient basis. Posterior colpotomy has the added advantage that it can be conveniently performed under a combination of intravenous neuroleptanalgesia and local vaginal anesthesia. This series exemplifies the manner in which the burden upon hospital facilities and medical and paramedical personnel can be minimized. In addition, utilization of the "home-care program" has improved patient acceptance and convenience.

Résumé: *Stérilisation par ligature des trompes: méthodologie, traitement postopératoire et post-observations de 2,934 cas*

La stérilisation de la femme est depuis longtemps une méthode de contraception permanente en vogue. La simplification des modes opératoires a diminué la morbidité postopératoire et la durée de l'hospitalisation. Ces deux facteurs ont augmenté encore l'acceptation de cette méthode de contraception.

Le présent rapport décrit les mesures adoptées par le Service d'obstétrique et de gynécologie de l'Hôpital Victoria de Londres pour mettre à la disposition des candidates des méthodes efficaces de stérilisation par ligature des trompes comportant une moindre morbidité postopératoire et permettant à la majorité des opérées de recevoir leur congé le jour même de l'intervention. Ce dernier avantage est particulièrement apprécié par les femmes qui ont laissé à la maison plusieurs enfants en bas âge et, de plus, libère rapidement des lits qui peuvent être utilisés pour d'autres cas gynécologiques.

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Female sterilization has for many years been a popular form of permanent contraception. As surgical procedures have become more simplified, postoperative morbidity and duration of hospitalization have decreased. These two factors have increased greatly patient acceptance of this method of birth control.

This report describes the efforts made by the Department of Obstetrics and Gynaecology at Victoria Hospital, London, to provide women with effective methods of tubal sterilization carrying a low postoperative morbidity and enabling most of them to be discharged on the same day as the surgical procedure. This latter factor is particularly important to women with several small children at home, as well as to the hospitals whose bed and nursing facilities thereby are made more available to handle other gynecological cases.

Methods

Table I shows the methods of tubal sterilization employed during the two-year period January 1, 1970 to December 31, 1971. In all cases where ligation of the tubes has been carried out, absorbable suture material (chromic catgut) has been used. It should be noted that a segment of the tube was not excised after coagulation in the group submitted to laparoscopy. As shown, all procedures can be performed under general anesthesia using a combination of fentanyl citrate and droperidol, (Innovar) 2 ml. and diazepam, 15 to 20 mg. given intravenously. Infiltration of the vaginal mucosa in the posterior fornix with a local anesthetic agent is employed as well.

The number of cases performed by each method is indicated in Table I. The 522 cases in which tubal sterilization was performed at the same time as therapeutic abortion will be excluded from the remainder of this discussion, but are considered in another communication.[1]

In 815 cases in which posterior colpotomy was the approach used and in 49 cases subjected to laparoscopy, patients were discharged within eight hours of their operation.

With the help of the Victorian Order of Nurses (V.O.N.) a home nursing care program was organized to provide a 72-hour postoperative follow-up for those who had undergone out-patient surgery. Of the posterior colpotomy group with or without associated therapeutic abortion, 785 received attention by this means.

The "home-care" plan operates as follows:
(1) A "clinical nurse co-ordinator" contacts all patients to be enrolled in the plan prior to or on the day of her operation in order to explain the surgical procedure and the workings of the plan and to answer any questions.
(2) When the patient is considered fit, she is discharged and given a prescription for a single ampoule of an injectable analgesic and for oral analgesics plus any other medication which her physician believes advisable, e.g. sedative, antibiotic, etc.
(3) A V.O.N. nurse visits the patient between 9 and 11 p.m. on the day of discharge, checking temperature, pulse, blood pressure and vaginal flow. A parenteral analgesic is administered if necessary.
(4) A V.O.N. nurse is on call 24 hours a day. The patient is instructed to check her temperature three times daily and the amount and character of her vaginal flow. The nurse pays at least one visit daily over the next 48 hours, but sees the patient more frequently if indicated. If any problem arises during that period the nurse contacts the surgeon involved.
(5) After 48 hours the patient, if well, is discharged from the plan.

Table I
Number of sterilizations performed according to method

1. Posterior colpotomy: partial salpingectomy (fimbriectomy) or Pomeroy technique	
(a) General anesthesia	1343
(b) Local anesthesia*	50
2. Laparoscopy: coagulation without resection; general anesthesia	50
3. Laparotomy: Pomeroy or Irving technique; general anesthesia	149
4. Laparotomy post partum: Pomeroy or Irving technique or fimbriectomy; general anesthesia	820
5. Any of the above methods at time of abortion	522
Total	2934

*Ten of these cases are included in 5 above.

Table II
Treatment required by 120 unselected home care patients after discharge

1. Demerol (first night)	55 (46)
2. Oral analgesics	85 (70)
3. Laxative	20 (17)
4. Anti-emetic	9 (7)
5. Enema	4 (3)
6. Antibiotics	4 (3)
7. Catheterization	1 (0.7)

Figures in parentheses indicate percentage of total.

Table III
Complications following surgery

1. Laparoscopy	— 0
2. Posterior colpotomy (1890 cases)	
(a) Infection and/or bleeding	
Mild	—36 (1.9%)
Hospitalized	— 6 (0.32%)
Surgery	—10 (0.53%)
(b) Phlebitis at site of intravenous injection	— 1 (0.05%)

Results

Table II illustrates the treatment required by 120 randomly selected women in the "home care plan" within the first 72 hours after discharge from hospital.

The complications of each procedure are listed in Table III. In our experience, no complications of any form were encountered in the laparoscopy group. Hysterosalpingography was performed postoperatively in 10 cases and revealed bilateral cornual tubal occlusion in all instances. Thirty-six patients (1.9%) undergoing posterior colpotomy developed some complications requiring treatment at home with antibiotics. A further six (0.32%) were hospitalized and treated with antibiotics and/or vaginal packing for 24 hours to control bleeding from the vaginal suture line. Ten patients (0.53%) required surgery to control bleeding or drainage of a pelvic abscess following posterior colpotomy.

The pregnancy rates following the various procedures are given in Table IV. The longest follow-up of these patients is now 24 months. To the present no pregnancies have occurred in any patients undergoing laparoscopy or abdominal tubal ligation (including postpartum and non-puerperal patients). Four pregnancies have occurred in the posterior colpotomy group (0.21%). In all instances the patients had a previous history of pelvic inflammatory disease and difficulty was encountered in locating the fimbriated end of the tube. The Pomeroy procedure rather than the standard fimbriectomy was performed in all four cases.

One case performed under local anesthesia early in the series required a general anesthetic before the procedure could be completed. This was considered due to an inadequate dosage of Innovar.

In one case posterior colpotomy was unsuccessful owing to obliteration of the posterior cul-de-sac by adhesions. The procedure was abandoned and laparoscopy was performed.

Discussion

(1) *Laparoscopy*

None of the complications described by Peterson and Behrman,[2] including subsequent pregnancy, perforation of a viscus, hemorrhage or cardiac arrhythmia, have occurred in our group. Bleeding following section of the tube as part of the procedure necessitated laparotomy in six patients reported by Liston *et al*[3] and in five patients in Peterson and Behrman's series. We have therefore elected not to excise a portion of the tube. The major advantage of excision is the availability of a specimen for histological confirmation.

Since Peterson and Behrman, as well as White,[4] have described pregnancies in patients following hysterosalpingography we do not perform this procedure postoperatively.

Although laparoscopies have been performed under local anesthesia plus neuroleptanalgesia,[5] we choose to manage our cases solely under general anesthesia. We

Table IV
Pregnancy following tubal sterilization

Laparoscopy	—0
Laparotomy (post partum and interim)	—0
Posterior colpotomy (with or without therapeutic abortion—1890 cases)	—4 (0.21%)
Overall rate (2924 cases)	—4 (0.14%)

do so to avoid the possibility of respiratory embarrassment from the presence of intra-abdominal carbon dioxide in a patient in the Trendelenburg position.

Liston has reported nine pregnancies in his series of 760 tubal sterilizations performed by laparoscopy. Five of these patients were pregnant at the time of the procedure. Since the operation cannot always be performed during the proliferative phase of the cycle we routinely curette the uterus. Even so, one patient in Liston's group remained pregnant following curettage!

When pregnancy occurs following tubal coagulation the question must be raised as to whether the tube was inadequately coagulated or whether some other structure, generally the round ligament, was coagulated in mistake. To avoid this possibility we visualize the fimbriated end of the tube and then follow it carefully to the cornu. This is easily performed and assures the operator that he is coagulating the proper structure.

The majority of our patients had had no previous abdominal surgery. Five had had previous cesarean sections through midline vertical incisions and one patient had had four such operations. Another patient had three lower abdominal scars. To date we have had no difficulties from adhesions preventing adequate insufflation of the abdomen or insertion of the trochar.

(2) *Posterior colpotomy*

The fallopian tubes are easily accessible through the culde-sac. By employing the combination of Innovar and diazepam with local vaginal infiltration, the necessity for an anesthetist being in attendance is obviated. Our experience to this point with 50 patients has been extremely favourable. Any discomfort experienced during the procedure has primarily been associated with traction upon the fallopian tubes.

Kroener,[6] in a series of 200 fimbriectomies, reported no pregnancies. Our results are similar. The four subsequent pregnancies in the posterior colpotomy group all had two factors in common: (a) a previous history of pelvic inflammatory disease making the fimbriated ends of the tubes inaccessible through the vaginal incision and (b) ligation performed using the Pomeroy technique. A fifth case required a repeat operation to complete the sterilization when the pathology report showed that one of the ligated structures was the round ligament. This case had a previous history of pelvic inflammation.

The overall pregnancy rate for this series, including all methods, is 0.14% which compares very favourably to the 0.71% reported by Garb[7] in 29,496 cases. There are no published series of significant magnitude with which to compare the results for the vaginal fimbriectomy group in this report. The major difference between this study and that of Kroener is that the majority of his fimbriectomy cases (193) were performed abdominally in the postpartum period.

Fort and Alexander[8] reported a series of 100 vaginal Pomeroy procedures with a 2% pregnancy rate. The number of such cases in this series is inadequate for comparison.

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