

## LAPAROSCOPIC TUBAL STERILIZATION

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Laparoscopy represents a new approach in female sterilization. It is a combination of 2 procedures—laparoscopy and tubal sterilization, both devised for different purposes, but combined in this century and improved in the last decade.

Kelling (1902), a Dresden surgeon, used a transabdominally placed cystoscope to view the abdominal contents of a living dog. Anderson (1937) proposed laparoscopy as a method of tubal sterilization. Despite scattered clinical reports, laparoscopic sterilization was handicapped by the little demand for sterilization. In the last 3-4 years, the impact of laparoscopy has been profound in the area of tubal sterilization where it has added rapidity, simplicity and in several centres an out-patient approach.

### *Material and Methods*

Patients with good physical and mental health were selected for sterilization from the family planning and the out-patient clinics of the Department of Obstetrics and Gynaecology, Maulana

Azad Medical College and Associated Irwin and G. B. Pant Hospitals.

A total of 2089 sterilizations were performed in 26 months, from 1st of November 1974 to 31st of December 1976. These included (a) 1657 cases of interval sterilization and (b) 432 cases of medical termination of pregnancy with sterilisation.

Patients were selected on the basis of multiparity. Patients with chronic hypertension, diabetes, severe anaemia, epilepsy, cardiac disorders, history of previous abdominal surgery and marked obesity, were carefully excluded from the present study.

Earlier, the patients were admitted a day prior to the day of operation. But later, the patients were admitted in the morning of the day of operation. Every patient underwent a thorough physical examination. Laboratory investigations including Hb. estimation and urinalysis were performed.

Pre-anaesthetic check up was done and the patients were starved. No pre-anaesthetic medication was required. All cases were performed under general anaesthesia.

### *Technique*

The technique of 'one incision, one burn' was followed in all the cases of this

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series. After administration of general anaesthetic and successful intubation, patients are put in modified dorsal lithotomy position utilising the low stirrups with hips abducted and flexed at approximately 60°, the knees flexed and the table tilted at 30° trendelenberg. A negative electrode is placed under the patient. Abdomen and perineum are scrubbed and draped. If medical termination of pregnancy is required, it is performed by suction evacuation before laparoscopy. Cervix is then held with a vulsellum and a specially designed cannula is introduced into the uterine cavity and fixed with the vulsellum.

Skin at the subumbilical margin is held upwards by two towel clips and a 8-10 mm. long transverse incision given. A Veress needle is introduced at this site piercing the peritoneum. The stylet of the needle is removed and carbon dioxide is passed to create pneumoperitoneum, and 1½ to 2 litres of carbon dioxide is introduced. Once the abdominal wall has been distended adequately, the Veress needle is removed, and the laparoscopy trocar inserted through the same incision. Before inserting the laparoscope its intra-abdominal end is warmed in saline to prevent clouding of the lens.

After removing the trocar, the laparoscope is inserted through the same cannula. Fallopian tube of one side is carefully visualised and identified by noting its fimbriated end, before it is grasped with the electrocoagulation forceps. This is accomplished by manipulating the uterus with vulsellum and the cannula inserted into it at the start of the procedure. The electrocoagulation forceps is then advanced towards the tube. The tube is grasped in an area that is relatively free of blood vessels, approximately 2 cms. from the cornu and is lifted away

from any surrounding structures. The tube is fulgurated for a distance of 1 to 1.5 cms. on either side of the grasping forceps. The tube is transected where grasped, by applying the cutting current for a few seconds. Following transection the cut stumps are examined for easier identification. Each stump is secured separately and recoagulated whenever complete fulguration is desired. Same procedure is repeated on the opposite side. After successful tubal transection and securing haemostasis the laparoscope is removed. The cannula is taken out only after evacuating the carbon dioxide from the peritoneal cavity. The incision is closed by a subcuticular catgut stitch.

Patients are observed routinely in the postoperative period. Most patients are discharged within 48 hours after the operation. No postoperative restriction is placed. All the patients are allowed to resume their normal activities.

All cases are asked to come back after 4 weeks for the postoperative check up. History is taken regarding their complaints following the operation and a pelvic examination is performed.

#### *Observations*

The average age was 30.4 years. The youngest patient was 21 years and oldest one was 44 years of age.

#### *Parity*

The parity in this group of patients ranged from 2nd to 10th. The average parity was 4.3.

#### *Duration of operation*

The time taken for the operation including the anaesthetic time and the time taken for suction evacuation in cases for medical termination of pregnancy is shown in Table I.

TABLE I  
Duration of Operation

| Time taken<br>in minutes | With M.T.P.  |            | Without M.T.P. |            |
|--------------------------|--------------|------------|----------------|------------|
|                          | No. of cases | Percentage | No. of cases   | Percentage |
| 10-15                    | -            | -          | 714            | 43.09      |
| 16-25                    | 208          | 48.15      | 789            | 47.62      |
| 26-35                    | 157          | 36.35      | 135            | 8.15       |
| 36-45                    | 40           | 9.25       | 12             | 0.72       |
| Above 45                 | 27           | 6.25       | 7              | 0.42       |
| Total                    | 432          | 100.00     | 1657           | 100.00     |

The average time taken for M.T.P. with laparoscopic sterilization was 27.9 minutes, with a range of 16-80 minutes. Average time taken for laparoscopic sterilization alone was 18.2 minutes with a range of 10-50 minutes.

The cases where more time was required for the operative procedure included the cases needing subsequent laparotomy for various reasons.

#### Operative difficulties

There was inability in establishing pneumoperitoneum in 13 cases (0.62%). In 11 cases (0.53%), after introducing the laparoscope, the tubes could not be visualised because of either haziness in the field or loops of intestines were obstructing the view. In all these 24 cases, laparotomy was finally done for tubal ligation by Pomeroy's technique.

In 15 cases (0.72%), laparotomy was required because of perforation of the uterus. This happened during M.T.P. procedure, but was diagnosed and visualised only through the laparoscope. In all cases, small perforations were seen at the fundus which could be repaired easily followed by tubal ligation. Hysterectomy was not required in any of the cases.

#### Complications

The complications met with in the pre-

sent series of cases are shown in Table II.

TABLE II  
Complications

| Complications                         | No. of cases | Percentage |
|---------------------------------------|--------------|------------|
| Surgical emphysema                    | 8            | 0.33       |
| Haemorrhage from the fallopian tube   | 5            | 0.24       |
| Cauterization of the round ligament   | 2            | 0.10       |
| Cauterization of the ovarian ligament | 2            | 0.10       |
| Bowel injury                          | 3            | 0.15       |
| Trocar injury to uterus               | 2            | 0.10       |
| Total                                 | 22           | 1.02       |

The major complications like massive intraperitoneal or broad ligament haemorrhage were not seen in any of the cases of the present series. No anaesthetic complication was seen in the present series of cases.

#### Hospital stay

Duration of hospital stay varied from 1 to 6 days as shown in Table III.

The average hospital stay in the present series of cases was 2.7 days. No complication was encountered in the immediate postoperative period. Longer stay was required in the following cases:

TABLE III  
Hospital Stay

| Hospital stay in days | No. of cases | Percentage |
|-----------------------|--------------|------------|
| 1                     | 150          | 7.18       |
| 2                     | 860          | 41.17      |
| 3                     | 646          | 30.93      |
| 4                     | 285          | 13.64      |
| 5                     | 87           | 4.16       |
| 6 and more            | 61           | 2.92       |
| Total                 | 2089         | 100.00     |

(a) Patients having excessive uterine bleeding following M.T.P.

(b) Patients who needed laparotomy following laparoscopy.

(c) Few patients were discharged after 48 hours of operation but they did not leave the hospital for one reason or other.

#### Follow up

All the patients were asked to come to hospital after 4 weeks, 8 weeks and 12 weeks following the operation for a post-operative check up. A general and pelvic examination was done in each case who turned for check up. Hysterosalpingograms were performed 12-24 weeks following the operation. The attendance in the follow up clinic was not very satisfactory.

Pelvic examination did not reveal anything significant in 400 cases who reported for post-operative check up after 4-8 weeks of surgery. We could perform hysterosalpingograms only in 20 patients of this series. All of them showed bilateral tubal occlusion. Only 25 patients have been followed up for 6 months or more. Pregnancy was detected in 4 patients after 6 months of operation.

#### Discussion

Continuing experience with laparoscopic sterilization has been favourable. We believe that the procedure is preferable to laparotomy for selected patients because it takes less time and hospitalization is short. No post-operative limitation is needed, discomfort is minimal and there are no cosmetic sequelae.

The duration of operation in our series was necessarily prolonged in some cases because the procedure provided teaching opportunities for students, resident staff and postgraduate training for other physicians. In trained and senior hands the operative procedure was generally concluded in 15 minutes or less.

Cancellation of laparoscopy was necessary in 24 patients because of inability to introduce the trocar or failure of proper visualization of the tubes. Improper patient selection might have been the causative factor. Patients with gross obesity, severe diaphragmatic or intra-abdominal hernias are probably not good subjects for laparoscopic sterilization.

Haemorrhage at the time of operation or in the immediate postoperative period is potentially the most serious complication. Fortunately in only 5 cases there were haemorrhages from the fallopian tubes which were recognized and immediately controlled. There was no other major or significant complication.

The pregnancy rate following laparoscopy cannot be properly evaluated due to relatively short follow up of cases in the present series. But 4 pregnancies reported emphasize the fact that laparoscopy, like all other tubal sterilization procedures, may have an occasional failure. The pregnancies reported here appeared to be the result of technical failure in dividing the tubes adequately. Another potential cause of failure which can not

be ignored is coagulation and cutting of the round ligament. This mistake can always happen unless the surgeon is careful. In fact, on one occasion in our series, this mistake occurred, but was fortunately recognized in time.

Thompson and Wheelless (1973) reported an incidence of 0.3% gastrointestinal complications in their series of laparoscopic sterilizations. Five patients were found at laparoscopy to have an electrocoagulated segment of bowel less than 0.5 cm. in size. One traumatic bowel injury occurred when the laparoscope trocar was inserted. Yuzpe *et al* (1974) performed all tubal coagulations by laparoscopy under general anaesthesia. This was used to prevent respiratory embarrassment due to the presence of intra-abdominal carbon dioxide in a patient in Trendelenburg position. Mean hospital stay after surgery was 3-4 hours and average operating time was 12-15 minutes. Only one patient had a major complication and 7 had minor complications requiring overnight hospitalization. Leong *et al* (1974) performed concurrent suction evacuation and laparoscopic tubal ligation in 65 cases under general anaesthesia. Hospital stay was 2 days and complications occurred in 3.1% of the suction termination-laparoscopic tubal ligation group. Cunanan and Courey (1974) reported a series of 439 cases of combined procedures of laparoscopic tube electrocoagulation-division sterilization and dilatation-suction curettage abortion. The 439 women were in the first 12 weeks of pregnancy and all were multiparas. Total operating time, including anaesthesia induction, suction curettage and laparoscopic tube ligation, ranged from 10 minutes to over 1 hour. Complications occurred in 3 patients (0.69%)—1 had a bleeding point in the omentum controlled by

cautery, 1 had a uterine perforation induced during sounding and 1 had low-grade fever. Patients were usually discharged 3-6 hours after operation and total hospital stay averaged 24 hours. One patient became pregnant 6 months after surgery.

Tubal sterilization under laparoscopic control appears to be an effective, safe, simple and economical way of surgical sterilization. The short hospital stay and immediate return to usual activities have greatly increased the demand to provide this procedure as a form of interval sterilization.

This could be also conveniently performed with medical termination of pregnancy in the first trimester. Electrocoagulation followed by transection of the tubes in our hands appears to be the technique of choice. It is recommended that laparoscopic tubal sterilization should be advocated, offered and utilized by well trained and competent gynaecologists in good general hospitals.

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