

Sterilization With Laparoscopic Electrocautery

Twelve-Month Follow-Up

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I. INTRODUCTION

Recently developed mechanical methods for tubal occlusion (e.g., tubal rings, spring-loaded clips) via laparoscopy are thought to be potentially safer than electrocautery because they eliminate possible accidental electrical burns. However, substantial evidence indicates that, in the hands of skilled laparoscopists, electrocautery is in practice a safe and effective technique (1, 2, 3). For several years, laparoscopic sterilization using electrocautery has been performed as an outpatient procedure at Seoul National University Hospital, in Seoul, Korea. These procedures have been associated with a low incidence of surgical and post-operative complications, and with a low failure rate (4). This paper presents the results of a study of 300 cases of laparoscopic sterilization using electrocautery performed at Seoul National University Hospital from January 13, 1975 to September 24, 1975. Follow-up physical exa-

minations were conducted at 7 to 21 days, 6 months, and 12 months after sterilization. The study was conducted in conjunction with the International Fertility Research Program (IFRP), Research Triangle Park, North Carolina, USA. Socio-demographic and medical data were recorded on standard IFRP data collection forms and sent to the IFRP for computer processing and analysis.

II. SUBJECTS

Only women requesting sterilization for the purpose of limiting family size were included in the study. Two categories of patients were included: (1) 245 women sterilized in the interval period (last pregnancy terminated at least six weeks before sterilization); and (2) 55 women sterilized after an induced abortion. Within the postabortion group, 52 patients (≤ 12 weeks gestational age) underwent a dilatation and curettage procedure concurrent with sterilization, while 3 patients (≤ 12 weeks gestational age) had undergone an induced abortion less than ten days before sterilization.

Selected socio-demographic characteristics for both interval and post-abortion patients are provided in Table I. All of the women were married urban residents, and were of the Mongoloid race. The mean education level was

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11.4 completed school years for interval patients and 11.9 years for postabortion patients. The husbands' mean education level was almost three years higher than that of their wives in both groups. Only 11 percent of the women in each group were gainfully employed. Buddhist and Orthodox were the most frequently recorded religions; however, 49.0 percent of the interval patients and 56.4 percent of the postabortion patients indicated no religion. Mean age (just over 34 years) and mean parity (3.1) were similar for both groups.

Reproductive events per 1000 pregnancies for both groups are shown in Table II. These rates include the pregnancy termination procedures performed during this study. As would be expected, the rate of induced abortion was somewhat higher for the postabortion group than the interval group (612.2 and 522.1 per 1000 pregnancies, respectively). Outcomes of most recent pregnancies prior to admission to this study reflect this pattern. All most recent pregnancies ended in induced abortion for the postabortion group, compared to 78 percent for the interval group. Rates of spontaneous abortion were similar (24.5 and 16.3 per 1000 for the postabortion group and the interval group, respectively). The ratio of pregnancies ending in abortion to pregnancies ending in live births was quite high, with live births accounting for less than half of all reproductive events in both groups. The rate of stillbirth of postabortion patients (12.2) was double that for interval patients (6.0). No child loss was reported for either group.

Interval patients reported their contraceptive use for the three months before sterilization, while postabortion patients reported their contraceptive practice for the three months before conception. Interval patients (69.0%) were more likely to have been using contraceptives than postabortion patients (58.2%). Oral contraceptives

Table I. Selected Socio-demographic Characteristics of 300 Cases of Female Sterilization, January 1975 to September 1975

Characteristic	Interval (N=245)		Postabortion (N=55)	
	No.	%	No.	%
Education(Years)				
0	2	0.8	1	1.8
1~6	31	12.7	6	10.9
7~12	150	61.2	29	52.7
13+	62	25.3	19	34.5
Mean	11.4		11.9	
Husband's Education (Years)				
1~6	7	2.9	1	1.8
7~12	82	33.5	15	27.2
13+	156	63.7	39	70.9
Mean	14.2		14.3	
Employment Status				
Gainfully employed	27	11.0	6	10.9
Unemployed (housewife)	218	89.0	49	89.1
Religion				
None	120	49.0	31	56.4
Buddhist	79	32.2	10	18.2
Orthodox	32	13.1	9	16.4
Catholic	14	5.7	5	9.1
Age				
25~29	23	9.4	8	14.5
30~34	99	40.4	18	32.7
35+	123	50.2	29	52.7
Mean	34.3		34.4	
Parity				
2	55	22.4	14	25.5
3	128	52.2	25	45.5
4	51	20.8	13	23.6
5	10	4.1	1	1.8
6	1	0.4	2	3.6
Mean	2.1		3.2	

were the most widely used method by interval patients (38.4%), followed by IUDs (17.1%) and condoms (8.2%). postabortion patients relied mainly on IUDs (18.2%), condoms (18.2%), and oral contraceptives (16.4%). Low percent-

Table II. Reproductive Events Per 1000 Pregnancies for 300* Cases of Female Sterilization, January 1975 to September 1975

Event	Interval (N=245)	Postabortion (N=55)
Abortion	538.4	636.7
Induced	522.1	612.2
Spontaneous	16.3	24.5
Stillbirth	6.0	12.2
Live Birth	455.6	351.0
Living children-male**	268.3	202.0
Living children-female***	187.3	149.0
Child loss	0.0	0.0

* Because all rates are given per 1000 pregnancies, the sum of the abortion, stillbirth, and live birth rates is 1000.

** Mean=1.8 for both groups.

*** Mean=ean=1.3 for both groups.

tages of both groups had recently used rhythm/withdrawal and other methods. The most frequently reported reason for choosing sterilization was the lack of reliability and side effects of other methods.

All of the postabortion patients and 89.8 per cent of the interval patients reported previous pelvic surgery, primarily D & C. Previous abdominal surgery, obesity, abnormal pelvic examinations, anemia, and pelvic infection were reported by low percentages of women in both groups.

III. PROCEDURE

Patients were admitted to the clinic at 7:40 A.M. on the morning of surgery. Medical and socio-demographic data were recorded by a nurse and social worker. Most of the procedures in this study were performed using analgesia plus local anesthesia (286 cases, 95.4%). The following technique description was modified accordingly for patients receiving general (13 cases, 4.3%) or spinal anesthesia (1 case, 0.3%).

After intramuscular administration of 0.5mg. of atropine, the patient was placed on the operating table. A bimanual pelvic examination was performed. The anterior lip of the cervix was grasped with a tenaculum, and a cannula was inserted into the endometrial cavity for the purpose of uterine manipulation. The abdomen was prepared with an antiseptic solution, and 10 mg diazepam and 50 mg meperidine were administered intravenously.

After a sterile drape was placed over the patient, 10 to 20cc of 1% lidocaine was infiltrated into the infra-umbilical area. The umbilicus was elevated using two towel clamps, and a 1 cm incision was made in the lower rim of the umbilicus. Pneumoperitoneum was achieved by infusing CO₂ through a Touhy needle at the rate of 1 liter per minute. Intraabdominal pressure rarely exceeded 10 mmHg. The patient was placed in the Trendelenburg position, the Touhy needle was withdrawn, and the laparoscope trocar and sleeve introduced.

The pelvic cavity was examined, and the uterus positioned to expose the Fallopian tubes. After each tube was grasped with a biopsy forceps, it was blanched, twisted and divided in a continuous motion. A second division was performed 5 mm distal from the first. The laparoscope was removed after an examination of the pelvic cavity, and the CO₂ allowed to escape through the sleeve. The incision was closed with a continuous subcuticular suture of chromic catgut. After being observed in the recovery room for two to five hours, the patient was allowed to go home.

For 52 of the postabortion patients, dilatation and curettage procedures were performed concurrently with the sterilization procedures detailed above. The remaining three postabortion patients had recently undergone an induced abortion.

IV. RESULTS

Surgical and Hospitalization Time

Surgical time is defined as the number of minutes from incision to closure. There was no significant difference in operation time between interval and postabortion sterilization. Mean operation time was 8.5 and 8.7 minutes, respectively. All of the cases, both the interval and postabortion group, were completed in less than 20 minutes.

Technical Failures

No technical failures (cases in which the tubes could not be occluded) were reported.

Surgical Difficulties and Complications

Scars from previous surgery for one interval patient were the only reported surgical difficulty. Uterine perforation (Table III), was reported for three interval patients (1.2%).

Postoperative Complications and Complaints

No immediate complications or complaints (i.e. complications or complaints occurring after surgery but before the patient was discharged) were reported.

Early follow-up complications and complaints were those diagnosed or reported from the time of discharge to the time of the 7- to 21-day follow-up (Table III). All but two interval patients were observed at this visit. Fever treated with antibiotics was reported by six of the postabortion patients (10.9%) and one interval patient (0.4%). Other complication and complaints were infrequently reported.

Nearly all patients were discharged on the same day after surgery. Only seven patients (2.3%) were hospitalized one or more nights, with a mean of 4.3 nights. This hospitalization

Table III. Surgical, Immediate Postoperative, and Early Follow-up Complications and Complaints of 300* Cases of Female Sterilization, January 1975 to September 1975

Complication/Complaint	Interval (N=245)*		Postabortion (N=55)	
	No.	%	No.	%
Surgical				
Complications				
Uterine perforation	3	1.2	0	0.0
Complaints	0	0.0	0	0.0
Immediate Postoperative				
Complications	0	0.0	0	0.0
Complaints	0	0.0	0	0.0
Early Follow-up				
Complications				
Fever treated with antibiotics	1	0.4	6	10.9
Wound infection	1	0.4	0	0.0
Suspected pelvic infection, treated with antibiotics	1	0.4	0	0.0
Complaints				
Usual activities not yet resumed	0	0.0	1	1.8
Women with one or more complication or complaint	6	2.4	7	12.7

* Data for two interval cases were not obtained at the early follow-up visit.

was necessitated by perineorrhaphy surgery which was performed concurrently with the sterilization procedure in seven interval patients.

Complications and Incidents at 6- and 12-Month Follow-up

Table IV shows the complications and incidents reported at the 6- and 12-month follow-up examinations. Two hundred and thirty-eight patients (38 post-abortion; 200 interval) were observed at 6 months and 285 (53 postabortion; 232 interval) patients at 12 months poststerilization. Abdominal total hysterectomy with bilateral adnexectomy was performed on one interval

patient (0.5%) at the 6-month examination following diagnosis of carcinoma in situ; one case (0.4%) of an unspecified systemic disease in an interval patient was noted at the 12-month follow-up. At 6 months, pelvic or back pain was reported by 15 interval patients (7.5%) and 1 postabortion patient (2.6%); 1 case of moderate pain and 15 of mild pain were reported. In all cases, the etiology of the pain was recorded as being related to the surgery. Pelvic or back pain was reported at the 12-month follow-up by seven interval patients (3.0%) and one postabortion patient (1.9%); pain was described as mild in all cases. The etiology of pain was related to surgery in six cases and was unknown in two cases.

The mean weight change for interval patients was an increase of 0.12 kg at the 6-month follow-up and 0.2 kg at the 12-month compared with the preoperative examination; corresponding changes of 1.0 kg and 0.8 kg were noted for postabortion patients.

Changes in Menstrual Patterns

Changes in menstrual patterns were analyzed for interval patients who had not used either systemic contraceptives or IUDs during the three months prior to sterilization.

This analysis included 85 women at the 6-month follow-up and 102 women at the 12-month follow-up. At six months, 50.6 percent of the patients reported regular menstrual cycles both at sterilization and at the follow-up, while 24.7 percent were irregular at both times; 17.7 percent had changed from irregular to regular, and only 4.7 percent had changed from regular to irregular. At 12 months, 53.9 percent of the patients reported regular menstrual cycles at both sterilization and the follow-up, while 19.6 percent were irregular at both times; 23.5 percent had shifted from irregular to regular cycles, and only 2.9 percent had changed from

Table W. Complications or Incidents Since Last Follow-up or 238 Cases at 6 Months and 285 Cases at 12 Months Poststerilization

Complication/Incidents	Interval		Postabortion	
	No.	%	No.	%
Six-Month Follow-up	N=200		N=38	
Pelvic surgery	1	0.5	0	0.0
Pelvic/back pain at time of Follow-up				
Severity of pain				
None	185	92.5	37	97.4
Mild	14	7.0	1	2.6
Moderate	1	0.5	0	0.0
Etiology of pain	N=15		N=11	
Related to surgery	15	100.0	1	100.0
Twelve-Month Follow-up	N=232		N=53	
Systemic disease	1	0.4	0	0.0
Pelvic/back pain at time of Follow-up				
Severity of pain				
None	225	97.0	52	98.1
Mild	7	3.0	1	1.9
Etiology of pain	N=7		N=1	
Unknown	2	28.6	0	0.0
Related to surgery	5	71.4	1	100.0

regular to irregular.

Little change occurred in menstrual cycle length for most of the women who reported menstrual cycles both at sterilization and at 6- and 12-month follow-up visit (43 and 55 patients, respectively). At six months, 67.4 percent of the women reported cycle changes of \pm one day, 20.9 percent had decreases of two to four days and 11.6 percent had increases of two to four days. At 12 months, 78.2 percent had changes of \pm one day, 16.3 percent listed decreases of two to four days, and 5.5 percent had increases of two to four days.

Over 80 percent of the women reported no change or changes of \pm one day in the duration of menstrual flow at the 6- and 12-month follow-up visits. At six months, 3.5 percent of patients

reported increases in menstrual flow of three or more days, while 13.0 percent reported decreases in flow of two to four days. At 12 months, 3.9 percent reported increased flows of two days and 1.0 percent of three or more days, while 14.7 percent of the women reported decreases in flow of two to four days.

V. DISCUSSION

The effectiveness and safety of laparoscopic electrocoagulation in both interval and postabortion cases are reflected in the results of the present study. Effectiveness is indicated by the absence of technical failures of the procedure and by the zero pregnancy rate over 12 months poststerilization. The safety of the procedure is indicated by the low incidence of complications and complaints reported. Only 13 patients (4.3%) reported complications or complaints (primarily fever) at early follow-up. Only patients undergoing concurrent surgery were not discharged on the same day that the procedure was performed. Sixteen patients (6.7%) at 6 months follow-up, and 8 patients (2.8%) at 12 months follow-up reported pain which was related to surgery. No subsequent gynecologic abnormalities or surgery which could be attributed to sterilization were reported. Only minor changes in menstrual patterns were reported. Changes from irregular cycles to regular cycles were more often reported than changes from regular to irregular.

A comparison of follow-up data for interval and postabortion cases indicates that complaints at early follow-up occurred more frequently among postabortion patients, while complications

at 6 and 12 months occurred more frequently among interval cases. Conclusions regarding differential complication rates for interval and postabortion cases cannot be readily inferred from the present study, in which the rate and range of reported complications were small.

This study indicates that, despite the potential risk of surgical complications, electrocautery via laparoscopy can be a simple, safe, and effective technique for female sterilization.

REFERENCES

1. Brenner, W, Edelman, D, Black, J & Goldsmith, A: *Laparoscopic sterilization with electrocautery, spring-loaded clips, and silastic bands: technical problems and early complications. Fertil Steril* 27:256, 1976.
2. Kessel, E & McCann, M F: *Laparoscopic tubal occlusion by electrocoagulation, spring-loaded clip, and tubal ring. In Proceedings of the 1st Inter-Congress, Singapore, April 27-30, 1976 (ed. S M M Karim), Vol. 2, p. 265. Asian Federation of Obstetrics and Gynecology, Singapore, 1976.*
3. McCann, M F: *International experience with laparoscopic sterilization: a review of 8500 cases. Paper presented at the IGCC Contributors Conference, Kuala Lumpur, Malaysia, January, 12-13, 1976.*
4. Chang, Y S: *Laparoscopic sterilization as an outpatient procedure: a review of 1500 cases. Korean J Obstet Gynecol* 20:69, 1977.