Hospital Topics

Comparison between Laparoscopic Sterilization and Tubal Ligation

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Summary

During 1970-3, 1910 laparoscopic sterilizations and 531 tubal ligations were performed in Aberdeen. Common complications occurred with 61 (3.2%) and 99 (18.6%) of the operations respectively, but the pregnancy rate was much higher (2.2%) after laparoscopic sterilization.

Introduction

Since the laparoscope was introduced for sterilization there has been controversy about its safety. Advocates claim fewer thromboembolic and other complications, a shorter operating time, and a shorter stay in hospital. Antagonists emphasize serious complications such as diathermy of bowel and perforation of major vessels.¹ In Aberdeen, only five out of nine consultant gynaecologists use the method, while the other four are emphatically against it, using it only in exceptional circumstances. To help resolve this controversy we have compared 1910 cases of laparoscopic sterilization with 531 cases of tubal ligation performed during 1970-3.

Method

The case notes of all patients having laparoscopic sterilization and tubal ligation during 1970-3 were examined. Twenty case notes could not be traced. All laparoscopic sterilizations and most tubal ligations in the north-east of Scotland are done in Aberdeen. The population is relatively stable, so that most cases could be followed up. Laparoscopic sterilization is carried out by Steptoe's technique² or without division.³ In most cases tubal ligation was performed through the abdomen using either fimbriectomy or a modified Pomeroy⁴ technique. In a few cases tubal ligation was performed via a posterior colpotomy. Consultants working as private practitioners in Aberdeen supplied information about complications and pregnancy rates, and the maternity hospital records were searched.

Results

The total number of sterilizations doubled in the four-year period (table I). Laparoscopic sterilizations increased almost fivefold, but tubal ligations decreased. Post-partum sterilizations also declined in

TABLE I—Numbers of Sterilizations Performed in Aberdeen during 1970-3

	1970	1971	1972	1973	Total
Laparoscopic	180	265	579	886	1910
Tubal ligation	105	156	177	93	531
Hysterotomy and sterilization ..	150	177	111	40	478
Post-partum sterilization ..	382	539	499	408	1828
Total	717	1137	1366	1427	4747

TABLE II—Proportions of All Sterilizations Performed with Any Form of Termination during 1970-3

	1970	1971	1972	1973	Total
No. of sterilizations	717	1137	1366	1427	4747
No. (%) performed with termination	219 (30.5)	287 (25.2)	355 (26.0)	299 (21.0)	1160 (24.4)

the last two years of the study. Though the number of sterilizations done with all forms of abortion was increasing, the proportion was decreasing (table II). The increase was due to more suction terminations being performed, while hysterotomy operations were dramatically reduced.

For the purposes of the following comparisons post-partum sterilizations and sterilization with hysterotomy are excluded.

Common Complications.—The relatively high proportion of common postoperative infections is a feature of open tubal ligation (table III) and remains fairly constant. The incidence of deep venous thrombosis decreased over the four years with the use of dextran 70 during abdominal operations. Unsuccessful laparoscopy followed by

TABLE III—Common Complications of Sterilization Seen during 1970-3

	Laparoscopic (n = 1910)	Open Tubal Ligations (n = 531)
Urinary tract infections	2 (0.1%)	27 (5.1%)
Undiagnosed pyrexia	8 (0.4%)	25 (4.7%)
Wound breakdown	0	20 (3.8%)
Chest infection	2 (0.1%)	20 (3.8%)
Thromboembolic disease	1 (0.05%)	7 (1.3%)
Unsuccessful laparoscopy	41 (2.1%)	
Laparotomy for tubal bleeding ..	7 (0.4%)	
Total	61 (3.2%)	99 (18.6%)

laparotomy usually occurred in patients who were obese or found to have pelvic adhesions. The proportion of such cases decreased from 6.6% in 1970 to 1.5% in 1973, presumably as experience with the technique increased. There was a similar decrease in the number of laparotomies performed because of tubal bleeding after laparoscopic diathermy. In 1973 no such cases were recorded.

Rare Complications.—Two cases of bowel diathermy occurred with laparoscopic sterilization, and both went unnoticed at the time (table IV). The first patient returned after three days, when a perforation of the small bowel was repaired as an emergency. The second patient returned 10 days later with a perforation of the small

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TABLE IV—Rare Complications of Sterilization Seen during 1970-3

	Laparoscopic (n = 1910)	Tubal Ligations (n = 531)
Bowel damage	2	1
Bladder damage	0	1
Cardiac arrest	1	0
Death (cause ?)	1	0
Skin diathermy	2	0
Richter's hernia	1	0
Anaesthetic complications	1	1
Total	8 (0.4%)	3 (0.6%)

bowel. Laparotomy was performed and a segment of gut resected. One case of bowel damage occurred with tubal ligation during a posterior colpotomy operation. Bladder damage occurred during tubal ligation through a small suprapubic incision in an obese woman. It was first noticed after the procedure when urine leaked through the wound. Transient cardiac arrest occurred during insufflation of carbon dioxide before laparoscopy in one case. The patient recovered within two minutes and the procedure was completed. One patient died suddenly 48 hours after discharge following a laparoscopic sterilization and suction termination. Necropsy was not performed but death was assumed to be due to either massive pulmonary embolus or myocardial infarction. Another patient returned to hospital some days after discharge with acute obstruction. Laparotomy showed a Richter's hernia through a defect in the peritoneum left by the laparoscope trocar. The gut was viable.

Pregnancy Rates.—The pregnancy rate after laparoscopic sterilization was much higher than that after tubal ligation (table V). None of the patients were pregnant at the time of sterilization. In the four years only two other patients were found to be pregnant at the time of operation. Most operators perform a curettage at the time of laparoscopic sterilization.

TABLE V—Pregnancy Rates after Sterilization during 1970-3

	1970	1971	1972	1973	Total
Laparoscopic	12 (7%)	4 (1.5%)	6 (1.0%)	20 (2.3%)	42 (2.2%)
Tubal ligation	0	1 (0.6%)	1 (0.6%)	0	2 (0.4%)

Grade of Operator.—Though the overall proportions of laparoscopic sterilizations performed by consultants, senior registrars, and junior registrars were similar, consultants did most of the operations in the early years till juniors were trained in the technique (table VI). With all three grades of operator the pregnancy rates were alarmingly high (table VII).

TABLE VI—Proportions of Laparoscopic Sterilizations Performed by Consultants and Registrars during 1970-3. (1853 Operations)

	1970	1971	1972	1973	Total
Consultants	96 (54.5%)	167 (61.6%)	150 (25.5%)	220 (26.9%)	633 (34.2%)
Senior registrars	32 (18.2%)	62 (22.9%)	227 (38.5%)	271 (33.2%)	592 (31.9%)
Junior registrars	48 (27.3%)	42 (15.5%)	121 (36.0%)	326 (39.9%)	628 (33.9%)

TABLE VII—Pregnancy Rates after Laparoscopic Sterilizations Performed by Consultants and Registrars during 1970-3

	1970	1971	1972	1973	Total
Consultants	7 (7.3%)	3 (1.8%)	4 (2.7%)	7 (3.2%)	21 (3.3%)
Senior registrars	0	0	0	4 (1.5%)	4 (0.7%)
Junior registrars	5 (10.4%)	1 (2.4%)	2 (0.9%)	9 (2.8%)	17 (2.7%)

Waiting Time and Bed Usage.—Because of the demand for sterilization the waiting time for the operation has increased (table VIII). Despite attempts to reduce this, at the time of writing it was 12 to 15 months, which is greater than ever before. The length of stay in hospital for laparoscopic sterilization is much shorter than for other methods (table IX). Laparoscopic sterilizations performed on a day-case basis were begun in Aberdeen in 1974.

TABLE VIII—Average Waiting Time for Sterilization in Days

	1970	1971	1972	1973
Sterilization alone	124	178	215	196
Sterilization plus termination		16	14	7

TABLE IX—Average Stay in Hospital (Days) of Patients Undergoing Sterilization

	1970	1971	1972	1973
Laparoscopic	8	7	4	3
Tubal ligation	8	7	7	8

Age and Social Class.—Though the numbers of sterilizations in all age groups increased, the proportion in each age group remained constant. Most operations are performed on women over 30 (table X). Social class was not recorded for many of the women who were sterilized. Nevertheless, the distribution appeared to be similar to that of all women of childbearing age in Aberdeen (table XI).

TABLE X—Age of Patients Undergoing Sterilization during 1970-3

Age (years)	20-24	25-29	30-34	≥35	Total
No. (%) of patients	189 (7.7)	644 (26.3)	801 (32.7)	807 (33.3)	2441 (100.0)

TABLE XI—Social Class Distribution of Patients Sterilized as Compared with That of Women of Childbearing Age in Aberdeen City during 1970-3. Figures are Percentages

Social Class:	I	II	III	IV	V	Unspecified
Controls	6.6	11.6	48.2	17.1	10.4	6.0
Patients	2.0	8.9	39.1	15.7	9.3	25.0

Discussion

The introduction of the laparoscope coincided with a liberalization of indications for sterilization. Gynaecological clinics are strained by increasing numbers of women requesting the operation. Laparoscopic sterilization offers a quick, convenient, and relatively safe method of sterilization, allowing many more operations to be performed than does open tubal ligation.

The incidence of rare complications was much the same for both types of operation in this study, while total complication rates were much higher in the tubal ligation group. The complication rate for laparoscopy varies from nil to 8%, the mean being 1.3% in 16 997 cases.⁵ The complication rate for 1115 tubal ligations reported by Shepard⁵ ranged from nil to 39.1% with a mean of 5.6%.

The wide range of reported complication rates must reflect merely the lack of common notation. Our most common laparoscopic complication was failure of laparoscopy due to obesity or poor view because of adhesions. This complication is not often included in other series, and when we exclude it our complication rate is 0.9%. Failure of laparoscopy and bleeding from the tube necessitating laparotomy have become noticeably less common as operators have become more familiar with the technique. Bowel diathermy is a rare and serious complication. Our rate of 0.1% compares with a combined rate in the literature of 0.2%.⁶ It is extremely important to make sure that the bowel is well clear of the diathermy field.

One of our patients had an apparent cardiac arrest of short duration. Heart problems have been found in other series^{7, 8} and are thought to be associated with a raised carbon dioxide pressure and the production of cardiac arrhythmia. They are rare. Another of our patients died suddenly after being discharged. She had had both suction termination of pregnancy and laparoscopic sterilization. We do not know the cause of death.

Our pregnancy rates are high. In other series in which they are mentioned the average is 0.3%.⁵ Our follow-up in a limited region with a stable population and one hospital was probably good. The highest failure rates occurred in the early years when the laparoscopic technique was being learnt, and this problem was emphasized by Steptoe.⁶ We have had over 25 operators in the series, some of whom were experienced but many of whom were not.

Among those patients who became pregnant almost half had one tube completely undamaged. Most of the remaining patients had one tube only lightly damaged, and only a few (20% of failures) became pregnant when the operation was correctly performed. With tubal ligation the morbidity is higher and the hospital stay longer. The pregnancy rate is lower. We feel that laparoscopy offers considerable advantages provided that it is done with sufficient skill and after careful training. These points must be emphasized. In the light of this review we hope to make a great improvement on the failure rate after laparoscopic sterilization.

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Outside Medicine

John Leyden, Poet and Linguist

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John Leyden became medically qualified to advance his career, not in medicine but as a linguist. His notability, like that of the other men described in this series of articles, was not attributable to his medical qualification. He was, however, alone in having acquired this qualification as a means of furthering his chosen career.

He was born in Denholm, in Teviotdale, in 1775. His family had long association with the area as his ancestors had farmed land leased from the Douglasses of Caver. For centuries the male population of the Scottish Borders had engaged in raids into England for cattle and other booty. Their exploits were described in ballads full of romantic braggartry tinged with a gentle poetry of great beauty. These ballads must have roused and inspired successive generations of moss troopers, as the raiders were called.

The Treaty of Union between England and Scotland in 1707, however, abruptly changed the character of border life by introducing a common law on either side of the border. The moss troopers, and similarly the gypsies of Kirk Yetholm, were no longer protected and consequently suffered by the loss of the border. The source of inspiration was gone; only a nostalgic memory lingered. So began the decay of the border ballads. Yet the functional death of the ballads coincided with the appearance in the late 18th century of original poets such as Ferguson, Hogg, and Burns and also of the great ballad collectors, of whom Sir Walter Scott gained the greatest fame.

John Leyden was both poet and ballad collector. His interest in border folk lore must have been initiated by his mother's rich

fund of border ballads. His childhood home was dominated by Ruberslaw, a sullen hill redolent with exploits of the Covenanters.

John Leyden

Reputation for Brilliance

He entered Edinburgh University in 1790, aged 15. Initially he had an uncomfortable time, for his broad accent and general uncouthness were not immediately suited to classical studies. The discomfort was not long lived. He rapidly gained a reputation for brilliance, a reputation which must have been

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