effect delivery. Similar results have been reported by others.²⁴⁻²⁶

It may be concluded that the occurrence of a cervicovaginal fistula is a non-specific phenomenon that may follow the use of hypertonic saline or prostaglandin, alone or in combination with oxytocin, and is predisposed to by excessive uterine stimulation in the face of a long, tightly closed cervix.

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Outpatient laparoscopic sterilisation

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Summary

One-hundred consecutive laparoscopic sterilisations were carried out on an outpatient basis without serious operative complications. All patients were discharged home on the day of operation. Two patients subsequently required emergency admission to hospital. Most patients were completely satisfied with the day-case service.

Introduction

The increasing demand for female sterilisation has placed an additional burden on an already overstretched gynaecological service. Laparoscopy offers a safe and acceptable method of female sterilisation which can be adapted to an outpatient setting, as has already been done in North America over the past five years.¹⁻⁵

Outpatient laparoscopic sterilisation was introduced in this hospital in June 1972, and by August 1974 219 outpatient sterilisations had been carried out. A prospective study of 100 consecutive patients was begun in September 1974 and completed in September 1975.

Patients and methods

Patients had to satisfy strict criteria before they were accepted for outpatient sterilisation. They had to be medically fit, thin, have had no previous abdominal surgery, and have suitable home conditions. Most were selected from those presenting at the gynaecological clinic

requesting sterilisation. In 11 cases the patient's request for sterilisation had been made while attending the antenatal clinic, but laparoscopic sterilisation two to three months after delivery was preferred to immediate postpartum sterilisation. In every case the nature of the procedure was explained to the patient and she was given the option of having the operation performed as an inpatient or outpatient. Every patient in this series chose the outpatient procedure. In every case written consent for sterilisation was obtained from the patient and her husband.

The ages of the 100 women studied ranged from 24 to 45, and their parity ranged from 1 to 5. The time on the waiting list varied from one to 11 months, the average time being three months.

Routine on admission—Patients were admitted to the day bed area at 8.30 am on the morning of operation. They were instructed to fast from 9.30 pm the previous evening but were not given a bowel preparation. On admission they were seen by an anaesthetist who examined the cardiovascular and respiratory systems. The patient was also seen by the gynaecological registrar or senior registrar who was to perform the operation. Five operators were concerned in this series.

Anaesthesia and operative technique—The theatre list began at 9.15 am and ended at 10.45 am. The list contained six patients, the first two for laparoscopic sterilisation and the subsequent four for diagnostic curettage or cautery of cervix. Forty-six of the 100 patients were premedicated with either atropine alone, valium alone, or atropine and valium together. The remaining 54 patients were not premedicated. All operations were carried out under general anaesthesia induced with either Althesin or thiopentone and maintained with nitrous oxide, oxygen, and halothane by face mask. Muscle relaxants and endotracheal intubation were not used. Laparoscopy was carried out by Steptoe's method⁶ and sterilisation was effected by electrocoagulation of the tube without division.⁷ The skin incisions were closed with black silk sutures.

Postoperative phase and discharge—After operation the patient was returned to the ward when the anaesthetist considered her condition satisfactory. Pulse and blood pressure were recorded on arrival at the ward and again after half an hour and an hour. If satisfactory no further recordings were taken. The patient was seen by the gynaecological registrar at 2 pm. If her condition was satisfactory she was discharged home between 3 pm and 4 pm. On the evening of operation a district nurse visited the patient at home and made a return visit on the fifth day after operation to remove skin sutures. Each patient was given an appointment to return for review six weeks after operation.

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Results

Sixty-one patients underwent sterilisation alone; the additional operative procedures carried out in the remaining 39 patients are shown in the table. The total operating time varied from 10 minutes to 31 minutes (average 18 minutes). In every patient laparoscopy was successful, and bilateral tubal diathermy was carried out. In four patients the initial attempt to introduce a pneumoperitoneum was unsuccessful, resulting in surgical emphysema of the anterior abdominal wall, but in each case a second attempt was successful. The surgical emphysema did not produce any additional abdominal discomfort.

Operative procedures carried out on 100 patients

	No of patients
Sterilisation only	61
Sterilisation and D and C	12
Sterilisation and cautery of cervix	12
Sterilisation, D and C, and cautery of cervix	4
Sterilisation and removal of IUCD	7
Sterilisation, removal of IUCD, and D and C	2
Sterilisation, removal of IUCD, D and C, and cautery of cervix	1
Sterilisation, removal of IUCD, and cautery of cervix	1

D and C = Dilatation and curettage. IUCD = Intrauterine contraceptive device.

The only other operative complication was a small diathermy burn to the pelvic peritoneum. This was recognised at the time of operation, was thought to be insignificant, and caused no symptoms.

During their stay in the ward after operation 66 patients experienced abdominal pain and 52 shoulder tip pain. Only 34 of these patients required an analgesic, however. Twenty-one patients were nauseated and 10 vomited. Seventy-eight patients were able to eat lunch. All patients were discharged home on the day of operation, but two were subsequently admitted to the gynaecological ward as emergencies. The first was a 32-year-old para 2 + 1 who developed lower right-sided chest pain the day after operation. When admitted to hospital that day she was tender over the right lower chest anteriorly and in the right hypochondrium. Chest x-ray films, fibrin degradation products, liver function tests, and a cholecystogram showed no abnormality. Her pain settled spontaneously within a few days. The second patient was a 24-year-old para 2 + 4. Five days after laparoscopic sterilisation and removal of an intrauterine contraceptive device (but no dilatation and curettage) she developed severe lower abdominal pain and was admitted to hospital the next day. She had a mild fever. On pelvic examination the appendages were markedly tender, but no pelvic mass was detected. Acute pelvic inflammatory disease was diagnosed and she was treated with a course of cephaloridine and bed rest. The condition resolved within eight days.

Ninety-three patients returned to the follow-up clinic but six of these did not complete a questionnaire as requested. Thus the following findings are based on the 87 returned questionnaires. During convalescence at home most (84) patients experienced abdominal pain and shoulder-tip pain: 51 women experienced both, 14 had abdominal pain alone, and 19 had shoulder tip pain only. Only 43 (49.5%) had to take an analgesic for their pain, usually only once. Four patients required visits from their general practitioner shortly after discharge from hospital. Two of these were found to have urinary tract infections which responded to ampicillin. The remaining two patients had lower abdominal pain. In both cases no diagnosis was made and the pain subsided in a few days without specific treatment. The two patients who were admitted to hospital defaulted from follow-up and are not included in these four cases.

At the time of writing, three to 15 months after operation, no patient in this series has subsequently been found to be pregnant. Of the 87 patients reviewed at the clinic 83 (95%) were completely satisfied with the arrangements for outpatient sterilisation. Four patients were dissatisfied; in two cases the district nurse did not call on the day of operation, and the other two patients felt they had been sent home too soon after operation.

Discussion

In this hospital outpatient sterilisation has proved to be highly acceptable to both patients and staff.

In unselected series of patients⁸⁻¹⁰ the incidence of failed

laparoscopy has varied from 1.5% to 2.5%. Failures were usually due to failure to insert the laparoscope because of obesity or to see the pelvic organs adequately because of adhesions. The careful selection of patients for outpatient sterilisation should eliminate these failures and so avoid laparotomy and subsequent admission to hospital. Since outpatient sterilisation was started in this hospital every selected patient has been successfully sterilised using the laparoscope.

The major operation hazards associated with laparoscopic tubal diathermy are haemorrhage from the mesosalpinx after division of the coagulated tube^{1 2 4 7 8 10} and bowel damage produced either on introduction of the instruments into the peritoneal cavity^{4 8 11} or by inadvertent diathermy of the bowel.^{2 8 9 11} Bleeding from the mesosalpinx can be avoided easily by not dividing the tube after coagulation. Opinion is divided on the necessity for tubal division. Steptoe¹² and most others believe that tubal division is necessary, but Liston,⁷ Jordan *et al*,¹¹ and Black¹³ believe that it is unnecessary. There is no doubt that division of the coagulated tube causes considerable morbidity. While the efficacy of tubal division in preventing further pregnancy is still in doubt, it would seem logical to omit it. Uterine perforation and diathermy burns of the anterior abdominal wall were not encountered in this series. Operative complications encountered in this series were minor and concerned only five of the patients.

Some patients who were completely free of pain after the operation in hospital subsequently developed mild pain at home. All patients who are free of pain on discharge should be warned that they may develop pain later. Of the 95 patients who were seen after discharge from the day bed area only six required visits from their general practitioner. The hospital readmission rate of 2% seems to be reasonable.

In many series women who are found to be pregnant after laparoscopic sterilisation include a significant number of patients who were in the luteal phase of their cycle and in early pregnancy at the time of operation.^{11 13 14} This can hardly be described as a method failure. It has been suggested that to overcome these "failures" sterilisation should be carried out in the first half of the cycle, but this would cause considerable administrative problems. Another suggestion is that curettage should be carried out at the same time as sterilisation, but Black¹³ has shown that curettage will not always displace an early pregnancy. It would be best to prevent such early pregnancy by ensuring that the patient uses adequate contraception² up to the time of sterilisation. In this series 10 of the patients were using no contraception. It is surprising that no pregnancies have been subsequently discovered with a follow-up of three to 15 months.

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