Managing gynaecological emergencies with laparoscopy

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Abstract

A consecutive series of 49 women (50 procedures), whose conditions were haemodynamically stable, presenting with acute lower abdominal pain, pelvic tenderness, and either a urine concentration of >50 U/l β human chorionic gonadotrophin or a pelvic mass shown by ultrasonography were treated with operative laparoscopy under video monitoring (videopelviscopy) as an alternative to laparotomy. Ectopic pregnancy, ovarian and non-ovarian cysts, pelvic adhesions, endometriosis, and fibroids were found, for which salpingotomy, salpingectomy and salpingo-oophorectomy, cystectomy, adhesiolysis, thermocoagulation, and myomectomy were carried out by laparoscopy. In one patient pelviscopy was repeated because of persistent tubal pregnancy after the fimbria was expressed. Laparotomies were carried out on three patients because treatment was not possible by laparoscopy and on a further patient two days after adhesiolysis had been attempted. These were the only serious complications. For the 46 cases (45 patients) in which operative laparoscopy was successful the mean stay in hospital was 1.9 days after operation, and this group of patients returned to normal activities and to work after an average of 2.3 and 2.6 weeks respectively.

Most gynaecological emergencies that are managed by laparotomy can be treated by laparoscopy and benefit both patients and the health service.

Introduction

Laparotomy is the conventional treatment for acute gynaecological emergencies such as ectopic pregnancy and ovarian cystic accident. In many cases the diagnosis is first confirmed by laparoscopy before more invasive surgery is carried out. Recently, laparoscopic techniques for managing both disorders have been reported. The first excision of a tubal pregnancy through a laparoscope was reported in 1973,¹ and the largest published series comprised 321 patients.² Both conservative and radical operations can be carried out.^{3,4} Laparoscopic drainage, fenestration, and excision of ovarian cysts have also been reported.⁵⁻⁷

Improvements in optics and illumination have made these advances in laparoscopic surgery possible. In particular, the development of ancillary instruments and techniques allows the pelvic organs to be manipulated safely and procedures such as irrigation, haemostasis, and intra-abdominal suturing to be carried out without the need for open surgery.⁸ Video monitoring and lasers have added further dimensions to operative laparoscopy.⁹ Apart from the obvious advantage of avoiding large scars from incisions, patients face less discomfort, less morbidity, a shorter stay in hospital, and an earlier return to normal activities¹⁰; and for the health and social services there are also savings.¹¹

Despite these considerations, the indications for laparoscopy in the United Kingdom and many other

countries have changed little since a survey published by the Royal College of Obstetricians and Gynaecologists in 1978 showed that laparoscopy was used primarily for diagnosis and for sterilisation.¹² We introduced gynaecological operations by laparoscopy with video monitoring (videopelviscopy) at Oxford at the end of 1987, and by the end of 1988 we had performed 105 emergency and elective procedures. We reported our preliminary results in patients with an ectopic pregnancy^{13,14} and now report on the first 50 consecutive gynaecological emergencies managed by these techniques.

Patients and methods

From 2 January to 5 November 1988, 50 emergency videopelviscopies were carried out at Churchill Hospital, Oxford, on 49 women; one woman underwent two procedures. The patients were chosen from 65 consecutive women whose conditions were haemodynamically stable and who underwent laparoscopy for symptoms of acute lower abdominal pain with pelvic tenderness and either a positive urinary pregnancy test (β human chorionic gonadotrophin concentration >50 U/l) or a pelvic mass of <10 cm diameter detected by clinical examination or ultrasonography. The 15 women with no surgically treatable finding at laparoscopy were excluded. The mean (SD) age of the 49 patients was 27.0 (5.85) years; 15 were parous, and nine had undergone laparotomies in the past. Tables I and II give the laparoscopic findings for the 49 patients (50 cases). All patients were counselled before surgery and consented to have a laparotomy if necessary.

TABLE II—Size of ectopic pregnancies, cysts, and fibroids in women treated by operative laparoscopy ($n=49$) and details of the ectopic pregnancies

Mean (SD) diameter (cm):	
Ectopic pregnancies ($n=25$)	3.8 (1.8)
Ovarian or non-ovarian cysts ($n=19$)	5.1 (2.0)
Fibroids ($n=2$)	2.7 (3.0)
Mean (SD) gestation (weeks)	7.2 (2.2)
Site (No):	
Proximal tube	2
Distal tube	20
Ovary	3
State (No):	
Intact	5
Leaking	13
Ruptured	7
Mean (SD) haemoperitoneum (ml)	98 (128)

EQUIPMENT

In addition to the standard laparoscopic instruments we had the following equipment: 10 mm 30° forward-oblique telescope linked to either an Endovision 533 or 536B video camera and monitor, xenon cold light fountain, electronic CO₂ insufflator, endocoagulator with point coagulator, crocodile forceps and myoma enucleator attachments, Aqua-Purator suction and rinsing apparatus, large claw and spoon forceps, 5 mm and 3 mm needle holders and suture forceps, suture

TABLE I—Laparoscopic findings in 49 women (50 procedures) treated by operative laparoscopy instead of laparotomy (nine patients had more than one abnormality)

Ectopic pregnancy	25
Ovarian cyst	17
Pelvic adhesions	7
Endometriosis	3
Non-ovarian cyst	2
Fibroids of the uterus	2
Cystic ovary	1
Thickened tubal isthmus	1
Hydrosalpinx	1

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applicator, tissue morcellator, and 11 mm and 5.5 mm trocars and cannulas (Karl Storz, Tuttlingen, West Germany). A specially designed 11 mm/5.5 mm adaptor allowed us to use the smaller instruments through the larger cannula during the second half of the study. For intra-abdominal suturing we used Ethibinder endoloops and Ethi-endo-naht endosutures (Ethicon, Edinburgh).

SURGICAL TECHNIQUES

Both the surgeon and the assistant stood on the left side of the patient while the video monitor and other instruments were positioned on the right. An indwelling urinary catheter was usually inserted, and the uterus was manipulated with a Spackman's cannula. Hip flexion in the lithotomy position was kept to a minimum to improve access.

During the earlier part of the series we used a four puncture approach in most cases, as described by Semm,⁸ with a subumbilical incision for the laparoscope and three suprapubic incisions for the instruments. After we developed the 11 mm/5.5 mm adaptor only two suprapubic incisions were made—just below and at either end of the pubic hair line. In all cases the larger cannula was introduced on the side opposite the side where the lesion was. The initial routine consisted of aspirating blood from the pelvis to improve visibility, dividing adhesions bluntly or sharply for better access, and controlling bleeding by endocoagulation or suture.

At the end of all procedures the pelvis was rinsed with physiological saline at 37°C. Drains were rarely used. Skin incisions were repaired with prolene sutures. All excised tissues were sent for histological examination.

PROCEDURES

Ectopic pregnancy—Ectopic pregnancies were managed by salpingotomy, salpingectomy, salpingo-oophorectomy, or expression, depending on the site of the gestation, severity of tubal damage, degree of haemorrhage, and desire for future pregnancies. For linear salpingotomy the tube was stabilised medially with atraumatic grasping forceps, and an area of 1.2 cm × 0.5 cm on the antimesenteric border over the gestation was endocoagulated at 100°C and opened with scissors. The products of conception were removed with large spoon forceps, the lumen rinsed with warm physiological saline, and bleeding points endocoagulated. The tubal serosa could be approximated with endosutures if desired. Salpingectomy or salpingo-oophorectomy was carried out using the "triple loop" technique. A series of three endoloops was introduced on the same side as the ectopic pregnancy, the affected tube with or without the ovary being pulled through the sutures, and the slipknots tightened with a pushrod.¹⁵ The tissues were then resected and removed from the pelvis with large claw forceps. Finally, the raw pedicle was endocoagulated in an attempt to prevent adhesions from forming. In cases of complete tubal abortion or ovarian pregnancy the ectopic gestation was removed from the pelvis with large spoon forceps.

Ovarian cystic accident—Ovarian cysts were excised only after careful inspection for signs of malignancy. Laparoscopic treatment was attempted only if the lesion was considered to be functional in origin (typically unilateral, unilocular, semitranslucent, freely mobile with a smooth capsule, absence of papillae, normal vascular pattern, and no ascites), endometriotic, or a benign dermoid. The cyst was first aspirated to deflate it, the ovarian cortex was incised medially, and the cyst wall was extracted by traction with grasping forceps. With larger cysts any redundant ovarian cortex was also excised. When the procedure was completed the base and cut edges of the ovarian

remnant were endocoagulated. Suturing was done only in those cases in which additional haemostasis was necessary.

Other procedures—Non-ovarian cystic lesions were dealt with as described above. Peritoneal endometriosis was treated by endocoagulation. After endocoagulating and incising the overlying serosa subserous fibroids were excised using toothed biopsy forceps or large claw forceps, reduced in size with scissors or morcellation, and removed from the abdominal cavity through the 11 mm cannula; the serosal defect was then endocoagulated for haemostasis. More extensive adhesiolysis was carried out by sharp and blunt dissection, using crocodile forceps to ensure haemostasis with vascular adhesions. In one case a biopsy specimen was taken from the ovary with toothed biopsy forceps, and the isthmus portion of a fallopian tube was explored for a possible ectopic pregnancy.

POSTOPERATIVE CARE

Indwelling catheters were removed usually within 12 hours. Patients were encouraged to get up and move around, and they were discharged home as soon as it was thought safe. They were advised to return to normal activities and work when they felt well enough. Skin sutures were removed after three or four days. Plasma β human chorionic gonadotrophin assays were carried out immediately after surgery and at one and six weeks for patients who had had conservative surgery for an ectopic pregnancy, while those treated for ovarian and other cysts underwent ultrasonography of the pelvis at six weeks. All women were reviewed six weeks after operation.

Results

DETAILS OF OPERATIONS

Forty six (92%) of the cases were managed successfully by videopelviscopy without resort to laparotomy, including 24 of the 25 women with ectopic pregnancies and 14 of the 15 with ovarian cysts. Table III gives the operative procedures. Nine women underwent more than one surgical manoeuvre—for example, the patient with an unruptured right ampullary ectopic pregnancy, left ovarian cyst, and left hydrosalpinx had a right salpingotomy, left ovarian cystectomy, and left salpingostomy by laparoscopy. Over half of the ectopic pregnancies were dealt with by the conservative operation of linear salpingotomy, although in two patients with relatively large pregnancies persistent bleeding from the incision into the fallopian tube necessitated salpingectomy. Intra-abdominal suturing was used in almost half of the procedures that were managed without laparotomy (48.9%), including every salpingectomy and salpingo-oophorectomy.

The mean (SD) overall duration of operation,

TABLE III—Operative procedures and intra-abdominal suturing in 46 cases managed successfully by videopelviscopy

Procedure	No	No requiring intra-abdominal suturing
Ovarian cystectomy	16	9
Salpingotomy	12	2
Salpingectomy	7	7
Adhesiolysis	7	0
Endocoagulation	3	0
Salpingotomy followed by salpingectomy	2	2
Extraction of ectopic pregnancy	2	1
Non-ovarian cystectomy	2	0
Salpingo-oophorectomy	1	1
Myomectomy	1	0
Ovarian biopsy	1	0
Exploration of tubal isthmus	1	0
Salpingostomy	1	0
Other—for example, sterilisation	4	1
Laparotomy:		
Preoperative	3	
Postoperative	1

(a) Duration of operation (interval between intubation and extubation); (b) insufflation volumes of CO₂; (c) estimated amount of blood loss; (d) length of hospital stay after operation for 50 laparoscopic procedures in 49 patients

defined as the interval between intubation and extubation, for all 50 procedures, including that in the three patients who had an immediate laparotomy, was 61 (26.1) minutes (fig (a)). There was little difference between the procedures in duration—for example, salpingectomy for ectopic pregnancy was marginally faster than salpingotomy (57 minutes *v* 64 minutes), but the difference was not significant. The mean (SD) volume of CO₂ insufflated was 30.8 (15.0) litres, the maximum requirement being 60 litres (fig (b)). An average of 1060 ml of saline (range 0–4000 ml) was used for pelvic irrigation. The mean estimated blood loss during operation, including blood found in the pelvis at the start of the procedures, was 162 ml, with a maximum of 1300 ml in a woman with a ruptured tubal pregnancy that was treated by pelviscopic salpingectomy (fig (c)).

COMPLICATIONS

Apart from the two instances when salpingectomy was necessary to control haemorrhage after salpingotomy, the only serious complication of treatment occurred in a woman treated by expression of a partially aborted fimbrial pregnancy who was readmitted three weeks later with pelvic pain; laparoscopy showed persistently bleeding trophoblast, and she underwent pelviscopic salpingectomy. During the early part of the study three women developed post-operative urinary tract infections which in two were related to urinary retention requiring recatheterisation. Later in the study continuous bladder drainage during and for a few hours after surgery prevented this complication. One patient developed a large superficial bruise around one of the suprapubic incisions.

LAPAROTOMIES

Four laparotomies were carried out during the study, three during and one after laparoscopy, giving an overall laparotomy rate of 8%. Of the patients who had a peroperative laparotomy, one had a right ovarian cyst of 6 cm where dense adhesions from a previous appendicectomy prevented safe excision; one had an ovarian pregnancy of 10 cm where large blood clots obscured the view; and one had a fibroid of 8 cm that was too large to excise laparoscopically. The postopera-

tive laparotomy was carried out in a patient admitted with intermittent fever and a pelvic mass on the left side who was found to have bowel adherent to the left adnexum at laparoscopy; adhesiolysis was attempted to delineate the lesion, but this was abandoned. A laparotomy two days later showed a walled off ruptured sigmoid diverticulum.

RECOVERY

The mean postoperative hospital stay for all patients was 2.4 days (range 1–14), but 1.9 days (range 1–4) for the 45 patients (46 procedures) managed solely by videopelviscopy (fig (d)). The latter group returned to normal activities after a mean (SD) of 2.3 (1.4) weeks and to work after a mean (SD) of 2.6 (1.3) weeks. Apart from five women who complained of slight discomfort or tenderness on pelvic examination, all others were asymptomatic at the six week follow up examination. Ultrasound scans in those treated for cysts or fibroids were normal; histological examination of the specimen confirmed the benign nature in all cases. Similarly, quantitative β human chorionic gonadotrophin assays in women treated conservatively for ectopic pregnancy had all returned to baseline values by six weeks irrespective of the type of procedure. At the time of writing three of the 12 women treated by salpingotomy for tubal pregnancy were pregnant, two with intra-uterine gestations and one with an ectopic pregnancy on the same side (managed by pelviscopic salpingectomy).

Discussion

To our knowledge this is the first prospective study of unselected patients presenting with gynaecological emergencies and managed laparoscopically. Until recently reports were restricted to the role of laparoscopic surgery in cases of unruptured ectopic pregnancy,^{2 10 16} but the indications for this approach are much wider and include many if not all of the gynaecological causes of acute lower abdominal pain that are traditionally managed by laparotomy. In the absence of shock or an excessive haemoperitoneum ruptured tubal pregnancies can be treated by radical or conservative procedures by pelviscopy, and our experience

echoes that recently reported.¹⁷⁻²⁰ In the age group our patients were in ovarian cysts are generally benign and are thus suitable for excision by laparoscopy. Whether the simpler procedure of fenestration in cases of functional cysts is equally effective remains to be proved,^{6,21} but aspiration seems to be insufficient because of the risk of recurrence, which is estimated to be up to 40%.²² Most patients who present with acute lower abdominal pain caused by other gynaecological disorders such as endometriosis, pelvic adhesions, and degenerating subserous fibroids, can also be treated successfully without laparotomy.

Despite the restricted access with two or three suprapubic incisions the operative time of videopelviscopy seems to compare well with a sequence of diagnostic laparoscopy followed by operative laparotomy, and this finding is in agreement with the results of studies where direct comparisons were made.^{11,19} Video monitoring facilitates these procedures by increasing the comfort of the operator, magnifying the area to be operated on, and above all improving the coordination among the surgical team. Performing operative laparoscopy without television is akin to performing laparotomy with blindfolded assistants. Although a beam splitter can be placed between the laparoscope and camera, operating directly off the colour monitor can be learnt quickly. It is just as important to have suitable instruments and the facility for suture haemostasis. These additions to a standard laparoscopy tray are relatively cheap but essential to avoid laparotomy.

The postoperative recovery after videopelviscopy in terms of hospital stay and the time taken to return to normal activities is short. These observations have been confirmed formally in two studies comparing laparoscopy with laparotomy, showing that postoperative analgesia is also greatly reduced.^{11,19} Most of our procedures were carried out in the evening, and the patients were observed at least until the following day; several reports from the United States, however, show that patients can be discharged home within hours of emergency operative laparoscopy,^{16,17} and indeed Loffer has described outpatient management of ectopic pregnancies.²³

We had no facilities for laser treatment during the study. While laser laparoscopy seems to be an improved technique for managing endometriosis and pelvic adhesions,^{24,25} there are only two reports, and these are of its use in acute cases of unruptured tubal pregnancies.^{10,16} Apart from the financial implications, the role and advantages of lasers in managing gynaecological emergencies seems limited. The endocoagulator developed by Semm²⁶ is a relatively cheap, safe, and effective alternative to both laser and conventional diathermy for haemostasis, as shown in this and other studies.^{11,18}

In one unit the gynaecological laparotomy rate was cut by half overall and by just over two thirds for tubal and ovarian disease as a result of operative laparoscopy.⁸ The results of an audit in the United States showed that compared with laparotomy pelviscopy was associated with a saving in drugs and other medical supplies of four fifths, a reduction in postoperative stay in hospital of two thirds, and a saving in hospital costs of half.¹¹ Operative laparoscopy deserves to play an important part in emergency gynaecological surgery, particularly as the incidence of ectopic pregnancy, the commonest diagnosis in our study, has risen threefold since the early 1970s.^{27,28} The indications for laparoscopy, however, should not be restricted to managing small intact tubal pregnancies, which ultimately may be better treated non-surgically,²⁹ but should include other abnormalities as shown in this series.

In many specialties there has been a slow but definite trend over the past 20 to 30 years towards less invasive

endoscopic techniques, and there is an evergrowing library of general surgical; vascular; orthopaedic; ear, nose, and throat; neurosurgical; and urological procedures that can be carried out without open surgery.³⁰ Though among the first to use endoscopy to become the laparoscopists par excellence, gynaecologists have until recently and with few exceptions ignored the potential of this approach for surgery. As Wickham, the director of Britain's first department of minimally invasive surgery, said, "Surgeons will need to be trained to be microendoscopists rather than as butchers and carpenters."³⁰ We agree.

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Correction

Clinical medicine in revolution: 2—Fusion in the crucible

Two errors occurred, one in the text and the other in a picture legend, in this article by Dr John Gabbay (15 July, pp 167 and 168). Jean-Nicholas Corvisart popularised percussion and not auscultation, and René-Théophile-Hyacinthe Laënnec showed the value of auscultation and not percussion.