

Laparotomy during Pregnancy: An Assessment of Diagnostic Accuracy and Fetal Wastage

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Summary

In a series of 48,482 pregnancies laparotomy was undertaken 74 times for conditions not associated with pregnancy (1 in 655 pregnancies). It showed no abnormality in 26 cases; ovarian cysts and acute appendicitis were the commonest pathological findings. The pre-operative diagnosis was proved correct in 53% of cases, and in 66.2% laparotomy proved to be necessary for an alternative diagnosis.

The fetal loss rate after surgery was 23%. Spontaneous abortion was more likely in the presence of peritonitis, with fluid in the peritoneal cavity, or when operative procedures involving the ovary were performed within the first trimester. The risk of precipitating labour following diagnostic laparotomy is negligible, provided no unnecessary surgical manœuvres are undertaken.

Introduction

The obstetrician intending to operate on a pregnant patient is influenced by two factors. Firstly, there are always at least two patients to consider, and, secondly, accurate diagnosis of an acute abdominal emergency or an abdominopelvic swelling can be notoriously perplexing. The purpose of this paper is to assess the accuracy of diagnosis and the degree of fetal wastage in patients undergoing laparotomy in pregnancy.

The survey includes all patients confined at St. Thomas's Hospital and the General Lying-In Hospital from 1959 to 1972, and those confined at the Lambeth Hospital from 1969 to 1972. In a total of 48,482 pregnancies laparotomy was performed 74 times—an incidence of 0.15%.

Operative Findings and Procedure

Laparotomy showed nothing abnormal in 26 of the 74 cases. Ovarian cysts (19 cases) and acute appendicitis (14 cases) were the most common abnormalities (table I). Four of the ovarian cysts were of the corpus luteum type, there were three follicular cysts, two mucinous cystadenomata, and three dermoid cysts. Torsion of the pedicle had occurred in three patients and there were two cases each of cyst rupture and haemorrhage into the

cyst lumen. Of the laparotomies performed for ovarian swelling 15 were in the first trimester. Ovarian cystectomy was performed 18 times and salpingo-oophorectomy once.

Acute appendicitis was confirmed in 14 patients. Two presented in the first 12 weeks and the remaining 12 were equally divided between the second and third trimesters. Peritonitis was present in two cases. Appendicectomy was performed 30 times. Uterine fibroids were found in association with pregnancy in four patients. In two the indication for laparotomy was a pelvic mass; subserous pedunculated fibroids were found and myomectomy was performed. In one patient who presented with abdominal pain and six weeks' amenorrhoea laparotomy was performed for suspected tubal pregnancy; multiple interstitial fibroids were found and no operative procedure was undertaken. The remaining patient was to undergo hysterectomy for fibroids but pregnancy was diagnosed at laparotomy and the uterus was left undisturbed. There were two cases of tubal gestation in association with intrauterine pregnancy.

Gall bladder disease was the indication for laparotomy in three patients. One presented with acute cholecystitis at 12 weeks' gestation, and an elective cholecystectomy was performed eight weeks later; a second who had suffered previous attacks of gall bladder colic presented with acute cholecystitis at 10 weeks' gestation, and cholecystectomy was performed shortly after admission. The third patient, admitted at 29 weeks with suspected appendicitis, proved to have a ruptured choledochus cyst. The gall bladder was drained and elective cholecysto-jejunostomy was performed at a later date. This case is fully documented elsewhere.¹ Nephrectomy was performed for a hydronephrotic kidney in a primigravid patient who presented at 24 weeks' gestation with abdominal pain, vomiting, and a palpable renal mass. An irremovable presacral neurofibroma was diagnosed at laparotomy for a pelvic mass detected in early pregnancy. The only malignancy was in a 29-year-old patient who complained of left iliac fossa pain and was found to have a pelvic mass which at laparotomy proved to be a carcinoma of the sigmoid colon with metastatic deposits in the liver. Left hemicolectomy was performed and the pregnancy terminated.

Six of the patients undergoing laparotomy were not known to be pregnant before operation.

Accuracy of Diagnosis

The preoperative diagnosis was proved correct in 40 cases (52.7%). No abnormality was found in 26 patients (35%), and

TABLE I—Findings at Laparotomy in the 74 Pregnant Patients

	No. of Patients
No abnormality	26
Ovarian cysts	19
Acute appendicitis	14
Fibroids	4
Tubal gestation	2
Acute cholecystitis	2
Ruptured choledochus cyst	2
Bowel obstruction due to adhesions	1
Hydronephrosis	1
Splenomegaly (idiopathic)	1
Presacral neurofibroma	1
Carcinoma of sigmoid colon	1

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TABLE II—Accuracy of Diagnosis

Pre-operative Diagnosis	No. of Patients	Correct	Incorrect
Appendicitis	23	14	9
Ovarian swelling	25	19	6
Fibroids	4	1	3
Tubal gestation	11	2	9
Cholecystitis	2	2	0
Polycystic ovaries	2	0	2
Hydronephrosis	1	1	0
Splenomegaly	1	1	0
Adhesions	2	0	2
Ruptured choledochus cyst	1	0	1
Presacral neurofibroma	1	0	1
Carcinoma of colon	1	0	1
Total	74	40	34

in the remaining 8 (11%) laparotomy showed unsuspected pathological findings. Of the nine patients operated on for suspected appendicitis in whom the diagnosis was not substantiated at laparotomy, only one (the patient with the ruptured choledochal cyst) proved to have any abnormality.

The indication for operation was correct in 12 of the 19 cases found to have ovarian swellings at laparotomy. In seven patients with unsuspected ovarian cysts the preoperative diagnosis had been ectopic pregnancy in six and fibroids in one. Laparotomy with negative findings was performed for suspected ovarian swellings in six patients. The accuracy of diagnosis of the remaining patients is shown in table II.

Fetal Mortality

In 18 patients pregnancy ended in abortion or neonatal death after premature delivery, an incidence of 24% fetal wastage (table III). There were 16 abortions, 12 in the first trimester, and two neonatal deaths. Fetal loss occurred in six patients after appendectomy. In three cases acute appendicitis was confirmed, and peritonitis was also present in two. Abortion occurred in the three remaining patients after removal of a normal appendix. Eight pregnancies ended in abortion after operations on the ovary. Ovarian cystectomy was performed six times and salpingo-oophorectomy twice. Complications of ovarian cysts prompted laparotomy in four patients and there was evidence of blood or fluid in the peritoneal cavity in three. Operation was undertaken in the first trimester in each case.

TABLE III—*Diagnosis and Surgical Procedures in Unsuccessful Pregnancies (18 Patients)*

Laparotomy Findings (In Addition to Intrauterine Pregnancy)	Gestation (Weeks)	Procedure	Timing of Fetal Loss (Days After Operation)
Acute appendicitis with peritonitis	29	Appendectomy	5
Acute appendicitis with peritonitis	16	"	1
Acute appendicitis	15	"	14
Haemorrhage into follicular cyst of ovary	8	Ovarian cystectomy	4
Rupture of follicular cyst of ovary	9	"	1
Mucinous cystadenoma of ovary	8	"	10
Corpus luteum cyst	8	Salpingo- oophorectomy	7
Corpus luteum cyst	12	Ovarian cystectomy	1
Haemorrhage into corpus luteum cyst	11	"	1
Torsion of corpus luteum cyst	6	"	3
Tubal Gestation	6	Salpingo- oophorectomy	2
Adhesions	10	Division of adhesions	4
Ruptured choledochus cyst	29	Cholecystostomy	2
No pathological findings	14	Appendectomy	2
"	16	"	1
"	16	"	7
"	12	Ventrosuspension	3
"	6	Nil	2

Abortion occurred in four patients undergoing some surgical procedure despite negative laparotomy findings. In three the appendix was removed and the remaining patient aborted after ventrosuspension and bilateral wedge resection of ovaries in a case of oligomenorrhoea with unsuspected pregnancy. The anaesthetic technique in these cases differed in no way from the remainder of patients in the series.

Comment

In four studies³⁻⁵ reporting on 116,990 pregnancies, 271 instances of laparotomy in pregnancy were recorded—an incidence of 0.23%. The low incidence of abdominal operation in the present series (0.15%) confirms the belief that few obstetricians will have wide experience in the management of

such cases. The fact that in 35% of the patients in this series no abnormality was found at laparotomy demonstrates the difficulties of diagnosis (table IV).

TABLE IV—*Preoperative Diagnosis in 26 Patients with No Pathological Findings at Laparotomy*

	No. of Patients
Tubal pregnancy	9
Adnexal swelling	6
Acute appendicitis	8
Uterine fibroids	1
Polycystic ovary syndrome	2

Symptoms of heartburn, epigastric and lower abdominal pain, vomiting, and constipation often accompany normal pregnancy. The classical signs of an acute abdomen may be obscured by an enlarged uterus which is itself displaced out of its normal location. The stretched abdominal wall may not respond in its usual fashion to intraperitoneal infection and palpation of masses is difficult. Haematological and biochemical results may be misleading and radiological investigation is usually contraindicated.

Acute appendicitis occurs in pregnant and non-pregnant women of comparable ages with equal frequency.⁶ In our series this diagnosis was confirmed in 14 patients. Only two cases of appendicitis were diagnosed in the first trimester, the remainder being later in pregnancy. In this we do not share the collective experience of other authors (table V). A correct diagnosis of acute appendicitis, 60.9% in this study, compares favourably with other published results—61% by Shnider and Webster,⁷ 68% by Priddle and Hesseltine,⁸ and 58.4% by Bryan.⁹ In one patient only was acute appendicitis an unsuspected finding.

TABLE V—*Reports of Acute Appendicitis during Pregnancy*

Author	No. of Cases	Trimester		
		First	Second	Third
Varner ¹⁴	56	16	21	19
Meiling ¹⁵	26	9	11	6
Hoffman and Suzuki ¹⁶	45	18	15	12
Black ¹⁰	358	130	127	101
Total	485	173 (35.7%)	174 (35.9%)	138 (28.4%)

The development of appendicitis may be more fulminating in pregnancy for various reasons. Increased pelvic vascularity and displacement of the appendix by the uterus may hasten strangulation, and increased local lymphatic drainage together with interference with omental migration may favour systemic spread of the inflammatory process. For all cases of acute appendicitis in pregnant women the maternal mortality is 5%, and the mortality increases with the severity of the disease and the period of gestation.⁶ There were no maternal deaths in the present series.

The overall fetal mortality after removal of the appendix was 20%, and fetal mortality seems to be related to the severity of the disease rather than the period of gestation. Hinshaw⁶ found a fetal loss rate of 30% when the appendix was perforated, but only 3% with simple acute appendicitis. Black,¹⁰ reporting on 358 cases of acute appendicitis in pregnancy, found a fetal mortality of 0.4% when the appendix was the only structure affected and 8-10% when peritonitis was present.

In seven out of 16 patients in the present series the appendix was removed despite negative laparotomy findings, and in three pregnancy ended in abortion. In each case the pregnancy was over 12 weeks' gestation. Nevertheless, the pregnancy was undisturbed in eight of the nine patients in whom no surgical procedure was attempted. Premature labour followed appendectomy on two occasions; in one case the diagnosis was con-

firmed histologically and both infants survived. We believe that there is no justification for removing a normal appendix in pregnancy.

We do not agree with Shnider and Webster¹¹ who found no cases of abortion or premature labour in seven cases of ovarian cystectomy in pregnancy, three of which were performed in the first trimester. In our survey ovarian cystectomy was performed in 18 patients, 12 of whom were in the first trimester. The fetal loss rate was 44%. It is generally recognized that operations on the ovary should be deferred until the 16th week. The indication for laparotomy in five of the seven patients who aborted was suspected tubal pregnancy.

Two patients had co-existing intrauterine and tubal pregnancies; in one a salpingo-oophorectomy was performed and abortion occurred the next day, and in the other patient the intrauterine pregnancy was undisturbed after salpingectomy. Apart from the above two cases laparotomy was performed for suspected ectopic pregnancy with negative findings in eight patients, all of whom were delivered at term of normal infants. Pregnancy was also undisturbed in the two patients undergoing myomectomy for pedunculated fibroids.

Though pregnancy undoubtedly predisposes women to cholelithiasis—owing to bile stasis, an increased concentration of cholesterol in the gall bladder, and changes in the physico-chemical nature of the bile salts—the complications of gall stones are infrequently seen. When reviewing 26,341 pregnancies Hamlin *et al.*¹¹ found only four cases of cholecystitis. Most authors advocate conservative management of cholecystitis in pregnancy, though Sparkman,¹² recorded 11 cholecystectomies in pregnancy without fetal loss. The gall bladder was removed twice in the present series, and pregnancy proceeded to term.

Shnider and Webster⁷ found no specific anaesthetic agent or technique to be superior to others so far as a decreased incidence of perinatal mortality or premature delivery after operation was concerned, and we agree with this.

The administration of progestogens to prevent abortion after laparotomy is of questionable value,¹³ and few controlled studies have been undertaken. Norethisterone was given to only one patient in this series after ovarian cystectomy at 12 weeks;

abortion occurred two days later. In an attempt to forestall premature labour after appendicectomy at 35 weeks, one other patient was given intravenous isoxsuprine postoperatively without success.

The incidence of surgical intervention may well increase as some surgical conditions are being seen more often in the pregnant as well as non-pregnant woman—for example, bowel obstruction due to adhesions from previous surgery and other lesions have become amenable to surgical correction and may require operative treatment in pregnancy. Moreover, therapeutic termination of pregnancy as a part of treatment for some surgical conditions has fallen into disrepute. The approach to any acute surgical problem presenting in pregnancy should be the same as in the non-pregnant state, and once a diagnosis has been established prompt surgical intervention is indicated. Diagnostic laparotomy carries little risk of precipitating labour, but unnecessary manoeuvres, such as removing a normal appendix, should be avoided.

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Any Questions?

We publish below a selection of questions and answers of general interest

Renal Dialysis for a Hypertensive Diabetic Patient

What is the prognosis for a hypertensive man aged 50 with diabetes of 10 years' duration (treated with insulin) who has recently had renal failure requiring dialysis?

Presumably renal failure in this patient was due to diabetic nephropathy so it is unlikely that the need for dialysis was precipitated by reversible factors and death in uraemia is inevitable unless renal function is replaced in some way. The question is then: "what has regular haemodialysis or renal transplantation to offer this 50-year-old, hypertensive diabetic?" Diabetics fare far less well than non-diabetics on regular dialysis.^{1,2} Two major problems are the associated cardiovascular disease and retinopathy which are likely to complicate the diabetes. The progression of diabetic retinopathy does not appear to be retarded by regular dialysis and the tragedy of a blind diabetic established on regular dialysis may result from unwise patient selection. At the age of 50 this diabetic man with hypertension is likely to have considerable vascular disease, while severe retinopathy almost always accompanies advanced diabetic nephropathy.³

Regular dialysis is therefore most unlikely to result in an acceptable prolongation of life for this patient.

It has been suggested that renal transplantation gives better results than regular dialysis in diabetic nephropathy.⁴ Management of the diabetes after transplantation has not proved a major problem, while there is some evidence that progression of retinopathy may be slowed or halted.⁴ However, patient survival after both living-related donor and cadaveric grafts is less good in diabetics than in non-diabetics⁴ and the best results have been reported in patients younger than the subject of this question. It remains highly questionable whether the results so far obtained justify the exposure of a hypertensive diabetic of this age to the further suffering likely to follow renal transplantation.

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