

Research from the South

Laparoscopic diagnosis of ascites in Lesotho

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Abstract

In a prospective study of 98 consecutive patients with undiagnosed ascites examined by laparoscopy a correct immediate diagnosis was made in 76 (78%) and a final diagnosis in 92 (94%) of those who underwent laparoscopy. Visual diagnosis was highly accurate in patients with tuberculous peritonitis but only moderately accurate in those with carcinomatosis and liver disease. When the laparoscopic findings were compared with histological and microbiological results visual diagnosis was found to be the most accurate diagnostic method. Laparoscopy may readily be used in rural hospitals for diagnosing ascites.

Introduction

Ascites is a common medical problem in Africa,¹ and in studies from Nigeria and Egypt tuberculous peritonitis comprised 24% and 49% of all cases of ascites.^{1,2} It can be difficult to distinguish tuberculous from non-tuberculous ascites clinically.^{3,6} This poses a major diagnostic challenge to clinicians, especially those working with the limited diagnostic facilities typically found in many rural African hospitals. The mortality from tuberculous peritonitis, if untreated, is 47-49%,^{4,7} and, although with treatment it can be less than 5%,^{4,8} several recent studies report a mortality of 20-30% mainly because of delayed or missed diagnoses.^{5,9} The figures emphasise the need for rapid and accurate diagnosis of this condition.

Microscopical examination to detect acid fast bacilli in ascitic fluid is positive in less than 5% of cases and culture of the fluid is positive in only 20-69%.^{3,5} Earlier studies recommended laparotomy, but a mortality of up to 12% has been reported.^{4,7} Levine advocated percutaneous biopsy,¹⁰ but the technique has proved disappointing in other studies^{3,11} and deaths have occurred.³ Recently, several studies have found laparoscopy to be rapid, accurate, and safe.^{8,12,13} These studies did not, however, detail the visual findings or compare the visual with the histological or microbiological results.

Each month between six and eight patients with undiagnosed ascites are admitted to the adult medical service of this hospital. Pulmonary tuberculosis is common, yet tuberculous peritonitis was rarely diagnosed in Lesotho before 1982 (R Menzies, unpublished data). We prospectively investigated patients with undiagnosed ascites to determine: (1) the causes of ascites in all cases and the relative importance and clinical characteristics of tuberculosis and (2) the value of laparoscopy in determining the cause of ascites,

particularly that due to tuberculosis, and its potential for use in rural hospitals. We report here our findings on the value of laparoscopy in determining the cause of ascites.

Patients and methods

All patients with undiagnosed ascites admitted to the adult medical wards from 1 November 1982 to 31 January 1984 were considered for entry into the study. Those with obvious cardiac or renal disease were excluded, as were those with such severe liver disease as to cause clinical jaundice. Patients with a coagulopathy not corrected with parenteral vitamin K and those judged to be clinically too ill to undergo laparoscopy were also excluded. Samples of ascitic fluid from patients admitted to the study were sent for protein analysis and culture of acid fast bacilli. Those patients with transudative ascites (protein <30 g/l) were treated with diuretics and those with exudative ascites underwent percutaneous drainage at a rate not exceeding 2 litres a day. When the ascites was mild laparoscopy was performed under local anaesthesia with sedation. From 1.5 to 2 litres of carbon dioxide were insufflated through a Verres needle inserted in the left lower quadrant. A Storz laparoscope was introduced through a right paraumbilical puncture; a separate puncture was made for the biopsy. The peritoneum was classified as being abnormal—typical of tuberculosis (category I), abnormal—not typical of tuberculosis (category II), or normal (category III) based on previous reports of tuberculous peritonitis.^{4,13} The liver was also classified as cirrhotic, abnormal, or normal. A specimen of liver tissue was taken for histological examination in all cases and of the peritoneum if abnormal for histological examination and culture of acid fast bacilli. Patients in category I or II were given antituberculous drugs immediately, pending the results of culture and histological examination.

Results

One hundred and seven patients were admitted to the study. Of these, two refused to undergo laparoscopy, three underwent laparotomy, and four had a diagnosis made on the basis of positive fluid cultures without undergoing any procedure. Ninety eight patients underwent laparoscopy (three twice). In six patients no final diagnosis could be reached because of missing data (usually because of transport and communication problems resulting in lost specimens or reports) and are excluded from further analysis. Of the remaining 92 patients, 37 had tuberculosis, which was confirmed in 35 on the basis of a positive culture for *Mycobacterium hominis*, histological evidence of caseating granulomas, or evidence of non-caseating granulomas with a positive Ziehl-Neelson stain. In the two other patients all specimens were lost or spoiled, but both had such a pronounced response to anti-tuberculous drugs, with resolution of ascites and all other symptoms, that we were confident of the diagnosis. In one patient peritoneal biopsy showed positive results on culture for *Mycobacterium hominis*, but histological examination showed adenocarcinoma. Of the remainder, eight had cancer, 43 liver disease, one cardiac disease, and one nephrotic syndrome and two gave a history of recent ingestion of herbal medicine but no histological evidence of liver disease.

LAPAROSCOPIC FINDINGS

Peritoneum—Of the 36 patients in category I, 34 had tuberculosis and two cancer. Of the 18 patients in category II, three had tuberculosis including one who had coexistent cancer, six cancer, and nine liver disease. Table I shows the laparoscopic findings in those with confirmed tuberculosis and in

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those whose peritoneum was abnormal but tuberculosis was excluded. The nodules in peritoneal tuberculosis were usually of uniform size (about 0.5 cm in diameter) and distributed evenly over the peritoneum, bowel serosa, and omentum but not the liver. In one patient the nodules varied in size up to 2 cm, and in two others they were confined to a small portion of peritoneum. Adhesions were usually thin, filmy, and multiple attaching the peritoneum to the bowel, omentum, and liver. Nevertheless, in three patients they were so numerous and dense that only a small portion of highly inflamed peritoneum could be seen. In five patients with tuberculosis and in three with liver disease adhesions were present only between the liver and the peritoneum. In 29 patients with tuberculosis the peritoneum was highly inflamed and haemorrhagic. This finding should be distinguished from the enlarged and prominent collateral vessels that run vertically in portal hypertension. This inflamed appearance was seen in only one of the eight patients with carcinomatosis.

Liver—The visual appearance was cirrhotic—that is, grossly nodular and discoloured—in 29 patients, abnormal—that is, finely nodular or granular with or without discoloration—in 32, and normal in eight. Table II shows the histological data in relation to the visual appearances.

TABLE I—Laparoscopic appearance of the peritoneum in 36* patients with tuberculosis and in 17 without

Finding (total)	With	Without
Nodules and adhesions	25	1
Nodules only (under 2 cm)	5	8
Adhesions only	5	3
Plaques/exudate	0	3
Haemorrhagic/inflamed	29	6

*The patient with coexistent tuberculosis and carcinomatosis is not included in this analysis.

TABLE II—Relation of visual to histological diagnosis in patients with liver disease. Figures are numbers of patients

Histological diagnosis	Visual appearance		
	Cirrhotic	Abnormal	Normal
Cirrhosis	22	11	1
Hem siderosis with and without fibrosis	6	14	—
Centrilobular congestion with and without necrosis	—	2	1
Hepatitis	—	1	—
Tuberculosis	—	2	1
Normal	1	2	5

TABLE III—Results of different diagnostic methods for detecting tuberculous ascites in 37 patients with confirmed tuberculosis who underwent laparoscopy

Procedure	Positive results	Negative results	Sensitivity (%)*
Culture of acid fast bacilli in:			
Peritoneal fluid	19	10	66
Peritoneal biopsy specimen	20	9	69
Histological examination of peritoneal biopsy specimen	23	6	79
Laparoscopy:			
Category I appearance	34	3	92
Nodules and adhesions	25	12	68

*Sensitivity defined as number of tests positive divided by the total number of tests performed.

DIAGNOSTIC ACCURACY

Of 36 patients considered to have tuberculosis (category I), the diagnosis was confirmed in 34 (94%). Tuberculosis was also confirmed in 25 of 26 (96%) patients with nodules and adhesions (Table III).

MANAGEMENT AND COMPLICATIONS

After laparoscopy antituberculous drugs were given to 50 patients, in 37 of whom tuberculosis was diagnosed, but were not given to 42, none of whom had tuberculosis. The mean delay from admission to the start of anti-tuberculosis treatment in those who underwent laparoscopy was 8.7 (range 2-25) days.

No patient had a bowel perforation or haemorrhage as a result of laparoscopy. Six developed prolonged leakage of ascitic fluid from the puncture site. Leakage tended to occur in those whose ascites recurred

rapidly after laparoscopy. The leakage lead to bacterial peritonitis in three patients, two of whom died. In both these patients, however, there were many factors that contributed to their deaths; one had miliary tuberculosis with severe toxicity before laparoscopy and the other was an elderly patient with a cirrhotic liver who appeared to recover from the peritonitis after antibiotic treatment but whose condition then deteriorated leading to death three weeks after laparoscopy. Because of the seriousness of this problem we altered our management so that if leakage developed immediate paracentesis was performed to drain the ascites completely and antibiotics were given for a week. In the latter part of the study two patients developed leakage, which was stopped within 24 hours with this management and neither developed peritonitis.

Discussion

In this study we found laparoscopy to be useful in diagnosing ascites, especially that due to tuberculosis. In the 98 patients who underwent laparoscopy this procedure provided an immediate correct diagnosis in 76 (78%), and in a further 16 (16%) a diagnosis was made based on the results of biopsy specimens obtained at laparoscopy. In this setting a laparoscopic visual diagnosis was more helpful than either mycobacterial culture or histological examination, and it offers several advantages over other diagnostic methods.

Mycobacterial culture requires a well equipped laboratory with highly trained personnel, particularly for the diagnosis of extra-pulmonary disease. If culture facilities are not available at the same centre specimens must be refrigerated in storage and during transport. Positive results may be obtained after four to eight weeks, whereas the average time for a visual diagnosis in our series was 8.7 days. Histological examination is slightly more practical since specimens can be stored in formalin indefinitely and are easily transported by ship, but the specimens are small and require careful review by an experienced histopathologist.⁵ Karney *et al* found that three out of 30 cases of peritoneal tuberculosis were diagnosed only after new sections of the original tissue were cut.⁵

As Table II shows, laparoscopy was more accurate than either culture or histological examination alone in diagnosing tuberculosis, which can be diagnosed with a high degree of confidence in the presence of certain characteristic findings. Among our patients the finding of nodules and adhesions together was almost conclusive of disease, whereas the combination of an inflamed haemorrhagic appearance together with nodules or adhesions was highly suggestive of tuberculosis. None of us had extensive experience with laparoscopy before 1982 so we consider that clinicians familiar with this procedure could easily attain a similar degree of accuracy.

We found laparoscopy to be useful for diagnosing other causes of ascites. Carcinoma was readily identifiable in four cases because of the presence of large nodules 1.5 cm in diameter, as has been described.¹³ In two patients the findings were abnormal but not typical of cancer, and in two they were mistaken for tuberculosis because nodules of uniform size (0.5 cm) were present and distributed evenly over the peritoneum, a problem experienced by others.^{5,13} Barry *et al* considered that a confident visual diagnosis of liver disease could be made,¹⁴ and, although we found that gross distortion of normal appearance was related to the histological findings, milder abnormalities of appearance were not as suggestive. A liver biopsy performed under direct vision can identify focal disease such as malignancy^{14,15} and is superior to a percutaneous blind biopsy for diagnosing diffuse disease.¹⁵

Because general anaesthesia is not required the risks accompanying laparoscopy are low. Loffer and Pent in a review of published reports totalling 32 719 cases of gynaecological laparoscopy found an overall morbidity of 0.05% and a mortality of 0.01%.¹⁶ Lewis and Archer reported no mortality but a morbidity of 4.9% among 81 surgical patients who underwent diagnostic laparoscopy.¹⁷ Barry *et al* reported a 0.4% mortality and 2.3% morbidity among 238 medical patients after laparoscopy.¹⁴ It might appear that laparoscopy is too risky in medical or surgical patients, but these results should be compared with those of laparotomy in similar patients. Harville reported a mortality of 9.5% and morbidity of 13% after laparotomy in 32 patients with acute viral hepatitis.¹⁸ Similarly, Scott *et al* reported a mortality of 13.8% and a morbidity of 43%

after diagnostic laparotomy in 81 medical patients,¹⁹ while Powell-Jackson *et al* reported a mortality of 31% and a morbidity of 61% after laparotomy in 31 patients with unsuspected liver disease.²⁰ In this latter series all of the 16 patients with ascites developed complications, which included wound dehiscence in two, peritonitis in two, leakage of ascites in six, and hepatic failure in eight.²⁰ Mortality after laparotomy in patients with tuberculous peritonitis ranges from 3% to 12%.^{5,9}

Obviously any invasive procedure carries some risk in this group of patients, and some workers would recommend a trial of treatment. Such a trial also carries an appreciable risk of hepatotoxicity in those with liver disease and increased cost both in terms of drugs and personnel required to supervise treatment for one year. The results of therapeutic trials may often be equivocal because of the insidious nature and variable clinical course of tuberculous ascites^{3,6} and the frequent coexistence of cirrhosis and tuberculosis.^{6,7}

Guidelines for the diagnosis of peritoneal tuberculosis that are based on the experience of those working in large centres with full histological and microbiological facilities may be irrelevant for those working in isolated rural hospitals without such facilities. To obtain histological or microbiological confirmation specimens must be sent, often considerable distances, to a central laboratory which may lead to delayed and often missed diagnosis because of wastage of specimens and lost reports. This factor is not usually commented on in published reports, but it is a compelling argument for developing a reliable diagnostic test that can be safely performed in rural hospitals.

In Lesotho there are no facilities for culture of acid fast bacilli and only one histopathology service at the central hospital. Nevertheless, in addition to this hospital there are seven (out of a total of 17) rural hospitals at which laparoscopy is now performed for gynaecological or family planning reasons. This situation is probably typical of many African countries; where tuberculous peritonitis is

common the usual diagnostic methods are unavailable or inaccessible. Laparoscopy could be readily applied in this setting for the rapid accurate diagnosis of this common and serious condition.

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MATERIA NON MEDICA

Marathon in London

The London marathon—what an experience! All the weeks of training, the early morning runs, the raining runs, and even the snowing runs, all of them were worth while. The last few weeks before the race went slowly. Oh so slowly. By that time I was jogging 70-80 miles a week and worried stiff that a tendon might seize or a muscle knot. Every pot hole in the road, every kerb, and every pebble was a potential hazard and yet the miles had to be put in.

Thank goodness nothing broke, seized, or wore out and 21 April finally came round. The organisation was superb—with a potential field of 22 000 it had to be. In the event there were but 18 000 starters; it seems that influenza and bad weather in the home counties had played havoc with the training of some British entrants. Eighteen thousand starters were quite enough for me, and from the crowded special trains from Charing Cross to the mass start at Blackheath I felt none of the loneliness of the long distance runner on that famous Sunday.

The start was slow; with so many runners this was inevitable. Everyone was resigned and good humoured about it. There was no jostling, pushing, or shoving. Indeed, for the whole 26 miles (and 385 yards) I encountered nothing but cheerful camaraderie. And the crowds, they were fantastic. Fantastic in numbers and fantastic in spirit. Without a doubt they kept many a falterer going. Their humour was friendly, kind, and catching. One could not but respond and try that little bit harder. And the bands: brass bands, jazz bands, military bands, the lot, as well as corps of baton twirlers, precision dancers, and pearly kings and queens. There was even one man playing the Northumberland small pipes, sitting alone on a wall, and very cheering they were too.

The climax was coming down the Mall. The cheering was intense and continuous, the crowds seemed six or eight deep and the kids were hanging from the branches of the trees. There was less than a mile to go to the finish on Westminster Bridge. What a sight, what a feeling. What fun. Now it is an ineradicable memory. Crowds, noise, sweat, and aches, everything. Thank you, London.—KENNETH MACRAE LEIGHTON, Vancouver, Canada.

Opening up the past

If you want a reminder of an old fashioned chemist's shop, or want to show your children what a pharmacy used to look like with its attractive coloured flasks and polished drawers, take them to see the one in the Ironbridge Gorge Museum at Telford in Shropshire. "Museum" is something of a misnomer, as it's really an exhibition of our industrial heritage split among several sites in the Severn Gorge.

First stop, of course, is the Iron Bridge itself, which was the world's first made from iron 200 years ago, and which set the scene for the Industrial Revolution. About one and a half miles away at Coalbrookdale (where you can still see the remains of the original furnace and Museum of Iron) Abraham Darby had the idea of smelting iron ore with coke instead of the traditional charcoal, and from this apparently simple and unimportant change stemmed the first cast iron steam engine, the first iron wheels to run on wooden rails, the first iron rails, iron boat, iron aqueduct, metal framed building, and the first steam locomotive to run on rails.

But what about that chemist's shop? This is in the Blists Hill Open Air Museum, voted by our family the best part of all. Here on a 50 acre woodland site is being recreated a village from the Victorian era, with shops and workshops in working order. There's a genuine pub, rebuilt brick by brick, with a fire in the hearth and Victorian misses behind the bar, but alas with 1980's prices. There's a printer's shop, where they make up posters and leaflets, a sawmill, a butcher's shop and sweetshop where you can sample the wares, a cobbler's, and a candlemaker's too.

In the chemist's you'll find remedies such as Venos Seaweed Tonic—"the family remedy for complaints of the stomach, liver, kidneys, and blood. A desirable tonic laxative for children and adults." All for 3/- (15p) a bottle.

We were told that PPP has given a grant to enable a Victorian doctor's surgery to be recreated, which should be ready around Easter 1986. In the mean time, if you have any photographs of surgery interiors dating from the late nineteenth or early twentieth century, the curator would be delighted to see them, as well as certificates, posters, and notices to add greater authenticity.—MYER GOLDMAN, consultant radiologist, Liverpool.