PERITONEOSCOPY

A REVIEW OF 150 CASES

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Peritoneoscopy is an ancillary method of investigation which will often establish the diagnosis in abdominal and pelvic conditions when all other available methods short of laparotomy have failed. The technique, advantages and contraindications have been previously described.[1,2]

It consists of the introduction of an examining telescope into the peritoneal cavity through a cannula after the establishment of a pneumoperitoneum. A diathermizing biopsy forceps is available so that specimens may be taken from selected spots under direct vision and the resulting raw area cauterized at the same time. There is also a sucker to remove fluid from the coelom.

The examination is conducted in the operating theatre with full aseptic ritual. There has been negligible discomfort and morbidity and slight, if any, mortality directly attributable to peritoneoscopy alone.

In these 150 consecutive cases examined during the past 3 years the Ruddock peritoneoscope has been used, though in a few cases recently the Menghini-Wildhirt instrument was employed.

The procedure has been done almost exclusively with local anaesthetic infiltration of the abdominal wall at the site of insertion of the trochar and cannula and with the patient adequately sedated. This applied even to young children under the age of 5 years. Only when a general anaesthetic was being administered for some other concomitant condition was local anaesthetic not used.

In a large number of cases a laparotomy has been avoided and in many the general condition of the patients subjected to peritoneoscopy was such that it did not seem likely that they would survive a surgical exploration. Indeed, 4 patients, for whom peritoneoscopy had been requested and arranged, died just before it could be done. It must be stated, however, that it is not as adequate nor as complete as a laparotomy and therefore cannot replace it.

INDICATIONS

Peritoneoscopy has been of inestimable help in removing doubt in the acute abdomen resulting from trauma, by enabling the amount of blood (if any) in the peritoneal cavity to be seen. If a large amount of blood is present a laparotomy is obviously indicated. These were all closed abdominal injuries with the exception of one penetrating wound where the patient refused operation but permitted peritoneoscopy, which showed no obvious intra-abdominal injury and this was confirmed by his uneventful recovery. With its use, the nature, or even the presence of a lump in the peritoneal cavity has been established and the cause of obscure jaundice, hepatomegaly or ascites has almost always been elucidated. Most of these patients were referred by physician colleagues in the hope of establishing or confirming a suspected diagnosis which had been impossible to make by clinical, radiological, or the whole series of pathological examinations of blood, ascitic fluid, needle-biopsy specimens of the liver, etc. In 6 patients needle biopsy of the liver performed previously by the physician was reported as normal. Inspection of the liver via the peritoneoscope in these cases showed cirrhosis, which was confirmed by the histological examination of the very adequate specimens obtained. In a number of others needle biopsy had been inadequate or inconclusive and this led to reference for peritoneoscopy. In 3 patients with abdominal carcinomatosis, biopsy of a normal-looking liver showed malignant cells in the sinusoids. In a previously described case[1] a few tubercles of 2 mm. diameter were seen on the liver, and after removal for biopsy showed the characteristic histological appearance and acid- and alcohol-fast bacilli of tuberculosis.

Some peritoneoscopies, where the diagnosis was known or almost certain, e.g. recurrent abdominal masses with or without ascites in patients who had had a previous operation for abdominal cancer, were performed at the request of the radiotherapist in order to ascertain the exact site and extent of the neoplasm so as to decide suitability for and planning of therapy. This was usually a combination of radio- and chemotherapy.

Peritoneoscopy was rarely performed when a laparotomy seemed to be necessary in any case but in some of these, in retrospect, peritoneoscopy would have obviated the surgical procedure, e.g. in the case of an elderly male with a large abdominal tumour laparotomy showed a large reticulum sarcoma which could not be excised or by-passed. The same information and biopsy could almost certainly have been obtained by peritoneoscopy. In a Coloured male of 70 years with a recent history of anorexia, vague dyspepsia and weight loss, clinical examination apart from some abdominal tenderness and doubtful ascites was not helpful. Barium-meal investigations suggested a lesion of the greater curve of the stomach. Peritoneoscopy was performed with the tentative diagnosis of carcinoma of the stomach—probably inoperable—but showed a tuberculous peritonitis.

At times peritoneoscopy indicated the need for laparotomy, e.g. by showing that a mass was not metastatic in the liver but adjacent to it and operable.

TABLE I. MAIN FEATURE IN 150 CASES EXAMINED BY PERITONEOSCOPY

	Presenting symptoms						*Total*
	Mass	*Hepato-megaly*	*Ascites*	*Jaundice*	*Trauma*	*Miscel-laneous*	
No. of cases	29	22	40	20	18	21	150

An analysis of the dominant signs in the 150 patients examined is presented in Table I. In many there were 2 or more equally prominent features, e.g. hepatomegaly, ascites and jaundice, but an effort was made to select the most striking sign under which to classify each case. In some of the cases classified under *mass*, this was found to be hepatic on peritoneoscopy. If it was obvious on clinical examination that this was so, the case was classified under *hepatomegaly* and not under *mass*. Where a mass was shown on peritoneoscopy to be a Reidl's lobe it was

classified under *hepatomegaly*, even though there was in fact no generalized enlargement of the liver and biopsy showed no pathological change.

MISCELLANEOUS

The miscellaneous group included those patients in whom an abdominal or pelvic mass was thought to be present but where this was not confirmed on peritoneoscopy, e.g. a very stout lady with abdominal symptoms was reported to have a pelvic mass after X-ray examination of the gastro-intestinal tract. The gynaecologist was doubtful after performing a pelvic examination. Peritoneoscopy showed an enlarged uterus but no other mass.

Three women who had previously had their tubes tied were shown on peritoneoscopy to have remnants of fallopian tubes which were adequate to allow plastic reconstruction. At least 1 of these, I am informed, subsequently became pregnant. Also included here are cases with abdominal distension, who were thought to have ascites, but were shown on peritoneoscopy to have none, and a few who had had previous surgery for cancer and presented with abdominal symptoms, which might have been due to recurrence, but where none was found.

Two pregnant women in this group were examined with the peritoneoscope. One 37-year-old female with a 12-weeks' pregnancy, presented with pyrexia and severe right upper quadrant pain and guarding. She was thought to be suffering from calculus cholecystitis. Peritoneoscopy was done to avoid exposure to X-rays and to elucidate the diagnosis, and showed a normal, undistended gallbladder. The appendix was also seen to be normal and there was no other evidence of intraperitoneal pathology. In both patients pregnancy eventually continued to normal delivery.

One patient with severe haematemesis and melaena from a peptic ulcer was examined with the peritoneoscope to exclude cirrhosis.

Ascites

The causes of ascites in those patients in whom it was obvious and usually amounted to about 2 - 3 litres or more, are presented in Table II.

TABLE II. AETIOLOGY OF 50 CASES OF ASCITES

	Tuberculosis	*Malignancy*	*Cirrhosis*	*Chylous*	*Unknown*	*Nephrosis*
No. of cases	17	16	14	1	1	1

In the tuberculous group the age varied from 2 to 73 years. In a few of these masses were also found. There were no cases of peritoneal tuberculosis among White patients. It may be impossible to tell on inspection alone if you are dealing with peritoneal carcinomatosis or tuberculosis. Both may show a markedly inflamed peritoneum with small nodules. In only 2 was the cause not found by peritoneoscopy, thus giving 96% accuracy of diagnosis. One was a case of chylous ascites in which peritoneal tuberculosis could be excluded as the cause. In the other, subsequent laparotomy also failed to provide the answer. The case of nephrotic ascites required tapping and was examined with the peritoneoscope to exclude any other pathological condition.

Jaundice

An analysis of 36 patients with marked jaundice is shown in Table III. There were a number of others with minor degrees of jaundice, e.g. among the cases of cirrhosis, which are not included here, since either hepatomegaly or ascites was so much more prominent. Peritoneoscopic viewing of the liver in cases of jaundice is of value in establishing the size, consistency and surface appearances, e.g. nodularity and the presence of metastases. Usually it is possible to see the gallbladder and whether it is distended or not. Adequate liver specimens are easily obtainable. In this group there was a diagnostic accuracy of 92%.

TABLE IIII. CAUSES OF 36 CASES OF JAUNDICE

	Gall-stones?	*Carcinoma of liver*		*Hepatitis*	*Extra-hepatic obstruction*	*Cirrhosis*
		Secondary	*Primary*			
No. of cases	1	7	3	5	9	11

The patient with probable gallstones was a stout 93-year-old African with a history of abdominal pain and deepening obstructive jaundice for 2 weeks. Peritoneoscopy showed a finely granular liver with a few pinhead-sized capsular nodules. Oedematous omentum was adherent to the right lobe in the region of the gallbladder, which was not visible. These findings, taken with the history, suggested an inflammatory process. Histological examination of the nodules showed 'compressed fibrous tissue containing bile', and of the liver 'marked fatty change, focal cellular infiltrations probably related to necrosis. There is bile duct proliferation but not definite cirrhosis'. The jaundice gradually cleared. He was seen in the outpatient department 5 months later because of another attack of severe upper abdominal pain followed by jaundice. There was now marked tenderness in the right upper quadrant. Operation was again declined.

Peritoneoscopy is not usually advised if it is thought that jaundice is due to gallstones.

In the group where obstruction was extra-hepatic, 7 were from carcinoma of the pancreas. One was due to metastatic hilar nodes from a carcinoma of the stomach and another resulted from non-specific inflammatory hilar nodes. These diagnoses were all confirmed, either at operation or autopsy.

Hepatomegaly

In all the cases of hepatomegaly analysed in Table IV, except the hydatid cysts, the diagnosis was confirmed by biopsy of the liver. The diagnoses of primary carcinoma was inferential. The mass or masses were more prominent than is usual with secondary metastases and no other primary growth had been found. In none of these, though extensive and involving both lobes, was any peritoneal spread detected. In one case the diagnosis was confirmed by the presence of bile-forming tumour cells in supraclavicular lymph nodes.

TABLE IV. AETIOLOGY OF 37 CASES OF HEPATOMEGALY

	Hydatid cyst	*Malignancy*		*Cirrhosis*	*Fatty infiltration*	*Liver abscess*	*Reidl's lobe*	*Total*
		Primary	*Secondary*					
No. of cases	2	4	13	10	3	2	3	37

Cirrhosis is usually obvious on inspection and was confirmed by the histological examination. At times it is difficult to differentiate tumour nodules from cirrhosis on inspection alone.

In one case of liver abscess, during peritoneoscopy, pus began to leak from the inferior margin of the liver where omentum was adherent. Under local anaesthesia a drainage tube was inserted. In the other, previous needle aspirations and biopsies had been negative. Peritoneoscopy showed some adhesions between the antero-superior surface of the right lobe and the diaphragm and liver biopsy was again unhelpful. Later, since pyrexia continued, a laparotomy was undertaken. There was no bulge in the liver and careful palpation showed a doubtful area of softening in the upper right lobe. Aspiration here yielded a few ounces of yellow odourless sterile pus. The abscess was unroofed and drained. The patient improved and was discharged, but returned later pyrexial and very ill. A second laparotomy, which included needling of the liver, was reported as negative in spite of the pre-operative aspiration of pus. At autopsy a large abscess of the left lobe of the liver was found. In this group there was 95% accuracy of diagnosis.

Mass

Three of the tuberculous group had intraperitoneal masses. The fourth was a case of a large psoas abscess presenting in the left iliac fossa. There had been considerable discussion as to whether the radiological changes in the spine were tuberculous or neoplastic. Peritoneoscopy showed an oedematous-looking mass in the left iliac fossa, displacing the sigmoid colon, and under visual guidance a needle was introduced and tuberculous pus aspirated.

TABLE V. AETIOLOGY OF 29 CASES WITH MASS

	Tuberculous	*Neoplastic*	*Uterus*	*Abscess in abdominal wall*	*Hydatid cyst*	*Total*
No. of cases	4	21	2	1	1	29

The abscess in the abdominal wall presented with a large tender mass in the left upper abdomen and on examining the patient with the peritoneoscope omentum was found to be adherent to the parietal peritoneum in that area, so that while it appeared likely to be primary in the abdominal wall, it could not be established with absolute certainty.

There were in addition a number of inflammatory masses of the pelvic adnexa which are not included here but in the miscellaneous group.

There was an 88% diagnostic accuracy in this group.

FAILURES AND DEATHS

In only one instance was the examination impossible to perform because of extensive adhesions, though in several a pocket, more or less walled off by adhesions, was entered and the peritoneoscope had to be re-introduced at another point. At times, in very stout patients, a second introduction of the instrument nearer the costal margin had to be made in order to obtain an hepatic biopsy. Occasionally peritoneoscopy failed to achieve its purpose, e.g. to establish the origin and nature of an abdominal mass, and in some such cases even laparotomy was hardly more successful. A Coloured female aged 35 years, with abdominal pain and a mass in the left upper quadrant, was examined with the peritoneoscope and the mass was seen to lie at the greater curve of the stomach. No suitable spot for biopsy was seen without risk of injury to adjacent bowel, so a laparotomy was done. Even then it was impossible to determine the origin of this irresectable mass, but biopsy was possible and reported on as anaplastic carcinoma.

In a similar case, a child of 5 years with a mass in the lower abdomen, peritoneoscopy showed a malignant lymphomatous tumour with loops of small intestine intimately related. Again a specimen for biopsy was not taken for fear of endangering bowel, but this was done at laparotomy and a large cavity containing necrotic tumour tissue and bowel contents was opened.

Another failure was that of a Coloured female with an enlarged liver and a suspected mass arising from it. Scanning of the liver with radioactive rose Bengal dye had shown a deficiency of uptake in the right lobe. At peritoneoscopy a large liver with no tumour masses on its anterior surface was observed but at laparotomy a metastatic mass was found projecting from the inferior surface. There were also masses palpable beneath the anterior surface but since they were covered by a good layer of normal hepatic tissue they were not detected on peritoneoscopic inspection. The inferior surface of the liver is not usually or easily accessible to inspection with the Ruddock peritoneoscope, though my impression is that the Menghini-Wildhirt instrument may be more successful in this respect. Future experience with this instrument may or may not confirm this impression.

Two patients were refused peritoneoscopy. One was an elderly female with an obscure abdominal mass, heart block and gross orthopnoea, who could not lie flat in bed. She would certainly not have tolerated a pneumoperitoneum. The other was a case of mild jaundice and hepatomegaly. When seen by me he had tenderness and marked guarding in the right upper quadrant and in fact ruptured his amoebic liver abscess into the peritoneal cavity a few hours later.

One patient with jaundice and severely deranged liver functions went into hepatic coma after administration of the premedication, which at the time was not thought to be excessive. Peritoneoscopy was not performed and she died 4 days later.

Three patients were given blood after biopsy of neoplastic liver masses. In neither of the first 2 cases, despite the fact that bleeding was considerably more than usual, did it appear to be gross enough to really warrant transfusion. One recovered sufficiently to be discharged from hospital. The other was a very ill, wasted Bantu male with a large epigastric mass, poor liver-function tests and a prothrombin index which could not be brought higher than 69% in spite of prolonged vitamin-K injections. Peritoneoscopy, after some persuasion by the physician (since it is felt inadvisable to perform biopsy when the PI is below 80%), was performed with the Ruddock instrument. A massive primary carcinomatous tumour in the liver, largely obscured by vascular omentum, was seen and a specimen taken for biopsy after aspiration of 4 l. of

bloody ascitic fluid. It was then decided to introduce the Menghini-Wildhirt instrument to try to get a better view by insinuating this between the omental adhesions. The manipulation was followed by a brisk bleed of about half a pint before it gradually tailed off and ceased. It was thought that an adhesion had probably been torn, since another biopsy had not been taken. On his return to the ward the patient was given 2 pints of blood. He gradually lapsed into hepatic coma and died 5 days later. Autopsy confirmed the large primary carcinoma of his liver almost completely replacing both lobes.

The third almost moribund patient with jaundice and grossly deranged hepatic functions from extensive secondary carcinomatosis of his liver suddenly collapsed some 18 hours after the examination. He was transfused but died soon after. There had been no bleeding from the liver biopsy site immediately after it was taken. Unfortunately an autopsy could not be obtained.

The third death occurred in a Coloured male with deep jaundice. Peritoneoscopy showed metastatic tumour deposits in the liver and an undistended gallbladder. Under visual guidance a small trochar and cannula was introduced into the gallbladder and a fine polythene tube threaded into it. Subsequent injections of dye via this tube showed a slightly dilated common bile duct with apparently unobstructed passage into the duodenum, but the hepatic ducts could not be visualized on repeated examinations. He developed an ileus and died a few days later. Autopsy showed heavily bile-stained bloody fluid and a plastic peritonitis. There was a large necrotic and infected carcinoma of the pancreas which extended up to the porta hepatis. It is most likely that the plastic peritonitis was the result of the cholecystostomy, though it may well also have originated from the infected carcinoma.

In one other patient with jaundice and hepatic metastases from a carcinoma of the pancreas, dye was injected into the gallbladder through a needle (introduced under peritoneoscopic guidance), which was then withdrawn. This patient also developed a transient ileus from which he recovered. Here too the gallbladder was not distended, nevertheless it is probable that the ileus resulted from some leakage of bile. Peritoneoscopic cholecystography appears thus to be a procedure not to be lightly undertaken or not unless it can be followed by operation immediately. This experience is confirmed by others.[3]

SUMMARY AND CONCLUSION

The experience of 150 consecutive cases examined with the peritoneoscope during the past 3 years is reviewed.

Peritoneoscopy is of great help in the diagnosis in cases of ascites, hepatomegaly, jaundice, abdominal masses, abdominal trauma and pelvic disease. There is over 90% accuracy of diagnosis. While it cannot replace laparotomy, it may avoid it and will at times indicate its necessity.

Failures and difficulties are analysed.

There were 3 deaths which were associated with and may have been accelerated by peritoneoscopic procedures and one which followed on premedication alone. They all occurred in desperately-ill patients with advanced hepatic carcinomatosis.

The peritoneoscope is an invaluable diagnostic tool, the use of which has been sadly neglected.

REFERENCES

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