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Diagnostic Laparoscopy In Ascites In Government Teaching Hospital Setup

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I. Introduction

The word ascites is derived from Greek work askos, which means bag or sack. Ascites is the pathologic accumulation of fluid in the peritoneal cavity.

Cirrhosis, peritoneal inflammation, malignancy poncreatitis, heart failure hepatic venous obstruction, nephritic syndrome &myxoedena are majority of diseases which represent by accumulation of fluid in peritoneal cavity. of which major causes of ascites in our country are tuberculosis, cirrhosis & renal causes. In about 5% cases two or more causes of ascites are present i.e., mixed ascites. Ascites may appear as an isolated finding in absence of any clinically evident underlying disease or may develop as a part of well recognized disease.

218 patients of ascites reported in our institute in year 2003-04 in medical ward of which about 90% patients of ascites responded to medical treatment in the form of abstinence from alcohol, Sodium restricted diet & diuretics.

Approximately 10% of cirrhotic patients have ascites, which was refractory to medical management.

Evaluation of the patient with ascites requires cause of ascites to be established on the basis of history, physical examination and other investigations.

Sometimes ascites remains an obscure diagnostic problem despite clinical, biochemical, laboratory, radiological & imaging procedure.

Laparoscopy is an accurate method for direct inspection of abdomen and peritoneal cavity and biopsy of suspected sites of pathology.

It can be difficult to distinguish tuberculous from nontuberculous ascites clinically. This poses a major diagnostic challenge to clinicians, especially those working with limited diagnostic facilities. Mortality with tuberculous peritonitis, if untreated is about 47-49% and although with treatment it can be less than 5%. (Menzies et al BMJ, Vol 291: 473).

In pre-laparoscopic era laparotomy was performed to make diagnosis but mortality rate was high.

Transudative ascites of unclear etiology occur most often due to cirrhosis and diagnosis by liver function test and hepatic imaging methods to detect nodular changes. Final diagnosis of cause rest on liver biopsy.

In cases of cirrhosis biopsy can be taken by percutaneous method, transjugular venous approach or laparoscopy. Percutaneous biopsy should not be done when either coagulopathy or moderate ascites is present.

Laparoscopy is a endoscopic procedure which provide us a picture window through which direct visualisation of abdominal cavity is possible, precise tissue biopsy from abdominal organ can be taken simultaneously making it possible to have accurate diagnostic in vast majority of cases.

Biopsy specimen of abnormal looking organ and tissue can be taken under direct vision. This may prove to be an alternative to laparotomy for establishing a diagnostic in disease which are otherwise idopathic.

Laparoscopic biopsy reduces the false negative rate for diagnosing cirrhosis as compared with blind biopsy techniques. Diagnosis of peritoneal seedling of tumour is often made by cytocogical analysis of peritoneal fluids but peritoneal biopsy is required when cytology is negative.

Further in patients with abdominal malignancies where surgeon is in dilema of the resectability of the tumour despite of all investigation. A immidiate preoperative laparoscopy can avoid a full laparotomy in non resectable malignancies.

This study was done to evaluate the efficacy of diagnostic laparoscopy as compared to the other investigation in diagnosis the cause of ascites of unknown etiology can still ...

II. Aims And Objectives

The present study "Diagnostic Laparoscopy in cases of Ascites" has been under taken with the following aims and objectives:-

1. To evaluate diagnostic value of laparoscopy in cases of ascites.
2. To evaluate efficacy of Laparoscopy in providing additional information such as nature, extent and morbid changes along with tissue diagnosis of the cause of ascites.
3. For staging and evaluation of operability in cases of intraabdominal malignancies.

III. Review Of Literature

Endoscopy is a procedure which provides us a picture window through which the interior of body structures can be Visualisd. The first Endoscopy were crude insttruments that were limited by their poor optics & the risk of thermal injury from the light. Two important technologic advances in late 19th century that allowed the development of viable endoscope were the invention of incandescent light bulb by Edison in 1880 & improved optical systems in Germany in 1890s In 1889 Boisseaude Rocher separated the ocular part of the cystoscope form the sheath thus allowing the use of multiple Telescope which provided greater lassitude of observation and manual manipulation through sheath possible . At end of 19th century cystoscopy and other open cavity endoscopic procedures such as bronchoscopy, lyrngoscopy and oesophagoscopy were well established and in daily use. In 1901 **George Kelling**was the first to examine the abdominal cavity of a live dog using a Nitze cystoscope. He named the procedure "celioscopy". Scoping the abdominal cavity, during a meeting of Germen natural scientists and physicians in the Hamberg 1901. He first inserted a needle in to the peritoneal cavity of a living dog and distended it with filtered air and then introduced Nitze cystoscope at another site for viewing. This was the first demonstration of closed cavity endoscopy.

In the same **Dimitri Ott** viewed the abdominal cavity by making an incision in either the abdominal wall or vagina & reflecting the light in to abdomen form a head mirror. Ott termed his procedure "Ventroscopy". No endoscopy was used and a technique represents more a laparotomy than laparoscopy.

In 1910 **H.C. Jacobeus** performed the first endoscopic examinations of the abdominal and thorasic cavities in human and is credited with coning the terms "laparoscopy" and "thoracoscopy". Jacobeus carried out 115 laparoscoic examinations over a period of 1 year with only one major complication that required open laparotomy (Maingot's) Apparently Jacobeus was un aware of the work of Ott and Kelling. He did not use any special penumoperitoneum needle as Kelling had, but introduced fitered air through a cystoscope trocar- sheath having a trapdoor and then introduced the cystoscope through the same trocar sheath. His investigations were so successful & rich in information that he was able to publish his experiences of the indications & technique of the method; "Laparoscopy" in a monograph as early as 1912.

In 1911 **Bertram Berhulm**of the John hopkinshosital USA inserted a half an inch bore protoscope through a small abdominal wall incision for "organoscopy"; viewing of the organs in the peritoneal cavity.

Kelling&Jecobeus are known as father of what is known today as laparoscopy, where as**Ott and Bernheins**who used the speculam and proctoscope are known as father of minilaparotomy.

Nordentoeft of copenhagen in 1912 used "trocar endoscope" to describe the examination of the female pelvis in trendelenberg position in cadavers. He first used laparoscopy in Gynaecology. In the following year many laparoscopy series were published through out the world from, **Tredexo**of Austria (1912, **Neirells**of South America (1913), **Renon and Rosenthal** of france (1913), **Schmidt** of Germany (1914) and **Johnson's** of Finland (1916) **Rocavilla Italy** (1910) designed an instrument with the light source out side the body, reflected through a trocar in to the field of view. The amount of light available by this reflection and the viewing angle were not sufficient for prompt acceptance to this method. **Shackel Ford** (1919) found only a few reports in literature between 1914 and 1919 when stolkind's article about its value in the diagnosis of gastric and hepatic lesions appeared.

On droff gave the technique a new name "Peritonescopy" in 1920. His reported cases dealt primary within abdominal conditions. He introduced oxygen for induction of pneumoperitoneum and developed a sharp pyramidal point on the trocar to facilitate punture of the abdominal cavity after pneumo peritoneum has been created. He also developed an automatic hocat sheath value to prevent escape of gas.

Unverricht (1922) build a large endoscope with a wider angle of vision and a stronger light to improve the visual image. First text book on "Laparoscopy" appeared in 1925 by this author.

Otto Steiner from Atlanta reported his first successful "abcominoscopy" in 1924. **Korbsch and kelling** pointed out the practicality of this procedure, particularly in reducing the number of exploratory operations. **Zollikoffer** (1924) of Switzerland stressed the value of laparoscopy in diseases of the liver and was the first to use carbon dioxide as the gas of choice for insuffilation. CO_2 become more popular because of its non explosive characteristics and its more rapid absorption into the peritoneum as compared to air. Leakage of gas around the trocar was reduced by rubber trocar gasket by **Stone** in USA 1924.

In 1927 Korbsch published first atlas of laparoscpy. Kalk an indefatigable worker in this field reported his first observation on peritoneoscopy in 1929 and since has much contributed in its development. He developed and introduced a fore-oblique (130^o) lens viewing system. **Kalk** also was the first to use second puncture for controlled liver biopsies. He published 29 papers between 1929 to 1959.

He was considered many to be the **father of modern laparoscope**. He introduced a series of 200 laparoscopies without death in 1951.

The first one to mention small operative procedure such as division of adhesions under direct vision through the endoscope was **Fervers** in 1933. In 1934 **Stolze** recommended to surgeons the use of laparoscopy in suitable cases in the place of laparotomy.

The most outstanding American laparoscopist was undoubtedly, **Ruddock** in 1937 he published a paper entitled "Peritoneoscopy" in the general surgery, Gynecology & Obstetrics. He details a personal experience of 500 cases over a 4 year period with 95% accuracy. He developed his own single puncture operating peritoneoscope with biopsy instruments and published extensive discussion as the value of peritoneoscopy in 1937. He described a new instrument which now bears his name, by means of which he could see larger visual field, take specimen for biopsies from any visualised area and control bleeding by electrocoagulation.

Hope in 1937 reported the use of abdominal endoscopy in the differential diagnosis of ectopic pregnancy and reported 10 cases. This was the first report in the literature to date to be directed exclusively to the diagnosis of gynaecological disorders. **Horan** (1937) published satisfactory results with laparoscopy in 50 personal cases.

Sterilisation, the most commonly performed laparoscopic operative procedure today was proposed by **Anderson** of United States in 1937. He used special electrode for endothermic coagulation. He described a new type of instrument permitting transilumination of the stomach, sigmoid and bladder, severing of abdominal adhesions and incising ovarian cysts.

Janos veress (1938) introduced a new type of pneumoperitoneum needle; a spring loaded blunt probe surrounded by a sharp outer sleeve. The needle offered additional safety in preventing intra abdominal soft tissue perforation. **Benedict** (1938) emphasised the value of peritoneoscopy in abdominal diseases. In his series, peritoneoscopy was used in 100 cases without a mishap. In one isntance he aspirated a large ovarian cyst.

1939 **Ruddock** analysed his experience with 900 cases performed successfully, including 58 cases of ectopic pregnancy and proved it to be a method with high degree of accuracy at negligible risk. In 1935 there were two or three peritoneoscopes in America and in 1941 there were over 300 in use. The credit for this change goes almost exclusively to Ruddock.

Hamilton (1940) described the use of peritoneoscopy to determine wether wounds of abdomen were pentrating, with the idea of immediate laparotomy if injury to parietal peritoneum was disclosed.

Jones (1940) employed laparoscopy for separating adhesions between the liver and diaphragm so as to permit further elevation of diaphragm for better collapse of tubrculous lung.

Hamilton (1942) described an instrument in the form of a second trocar through which a rod could be passed for retraction of intervening viscera, or an endotherm electrode or severing adhesions. **Lee** (1942) used the peritoneoscope for aspiration of gall bladder contents and injected radio opaque substance for holecystography. **Horan** performed may instrumentations to study the changes in the liver in cases of hepatitis. Peritoneoscpic cholangiography for detection of stones in the gal bladder and common bile duct & features of cholecysitis was further explored by **Royer and Solari** (1947). Royer in 1950 further reported their accumulated experience of 86 successful peritoneoscopic chaolangiogrpahies and describe the cholangiographic features of biliary dyskinesia which was present in 21(25%) of their 84 cases. This procedure soon got confirmation from **Keil and Landis** (1951) who discussed its role in chronic jaundice of unknown aetiology: to differentiate obstructive hyperbilirubinemia from medical causes.

Hopkins and Kanapy in 1952 added fibre optics in the field of endoscopy.

The first Indian to publish his work on peritoneoscopy was **Anita** (1952), a physician from Nair hospital & Tata Memorial Hospital, Bombay. Though he was engaged in abdominal endoscopy since 1940s, his publication earlier to this were related to culdoscopy. He discussed the value of peritoneoscopy in diagnosing tubercular peritonitis and hepatic disorders including hydatid cyst and angioma of the liver in children.

Handley and Nurick (1956) published data on 139 cases, concluding that peritoneoscopy was a safe, cheap and minor procedure. Peritoneoscopy was found helpful in 79.4 percent cases and was not helpful in 20.6 percent of cases. In 6 cases it was misleading. However they advocated use of general anaesthesia and stressed that if patients general condition prohibited use of general anaesthesia, he was unfit for peritoneoscopy even under local-anaesthesia.

Ruddock's peritoneocopy : "A critical clinical review" (1957) is a milestone in all the publications on peritoneoscopy. This is the commonest referred by all peritoneoscopists and will remain so for years to come. His exprience of over 5000 peritoneoscopies which is unparralled upto today shows the esteemed importance of

this under rated procedure. He discussed its indications, contraindications and limitations and described laparoscopic features in various diseases. Peritoneoscopy was found successful in accomplishing purpose in 98.2% of his cases. He was strong propment of using local anaesthesia which dispenses with needs of anaesthesiologist and expensive anaesthetic instruments. He ably deserves the tile of the "Father of modern peritoneoscopy".

Herrera-Lierandi (1961) established correct diagnosis of 286 (73.3%) of their 390 patients and coeliotomy was avoided in 70 patients.

Antia (1963) from Bombay utilised it extensively for establishing suspected diagnosis of cirrhosis of the liver. The diagnostic accuracy as checked by subsequent surgery was 94% in over 200 patients. Mortality rate was 2 percent.

Kurth Semm in 1964 designed the instrumentation for controlled, automatic insufflation. He created an innovative head transfer system, thermocoagulation, angled lens & hook scissors to increase the safety of the procedure. British physicist **Hopkins** in 1966 incorporated rod shaped lenses as light ransmitters with air lenses between the rod shaped glass elements. This design provided markedly improved resolution and contrast.

Frangenheim developed laparoscope utilising fibre optics in conjunction with the Richard wolf company in 1965. The near image relaying system permitted the designed markedly improved instrument. The increased light transmission, brighter image, improved resolution, wide viewing angle and great depth of the field of this miniaturised telescope facilitates prompt endoscopic reorientation and manipulation. A variety of operating and manipulating instruments were developed which can be introduced through a second smaller trocar (5-5.6 nm) to expose areas covered by omentum & other viscera. Special biopsy forceps permitted safe tissue sampling whereever indicated. Franger heim's contribution stimulated the growth of gynaecological laparoscopy in European countries. Acceptance of this diagnostic procedure by the general surgeons has been extremely slow.

Mc Brien in 1971 described the technique of peritoneoscopy using refined fibre optic scopes. **Cortesi** in the same year published its value in diagnosing acute pancreatitis while **Jan and Mazzacca** (1971) published peritoneoscopic feature of intra-abdominal vessels in cirrhosis of the liver. **Jori and Peschle** provided for the first time an objective comparison of the diagnostic yield of blind percutaneus liver biopsy and peritoneoscopically guided biopsy in the diagnosis of hepatic-neoplasms. Blind & controlled biopsies afforted positive results in 39.5% and 69% respectively. Also the figure of peritoneoscopic biopsy compared favourable with those obtained in postmortem investigations.

Ivan and Rodgers in 1964 reported that peritoneocopy was helpful in 59 patients out of 69 (87%) cases of suspected malignant disease. The main value of laparroscopy in this group was that laparotomy was not needed in 36 patients. There were 57 cases of primary liver disease in another group of their study and peritoneoscopy was even more helpful in this group (51 out of 57 cases).

Mosenthal in 1972 reported a series of 50 patients & peritoneoscopy provided positive information in 42(84%) patients. Laparotomy was avoided in 31 patients (62%). In this series laparoscopy was performed in 8 cases having ascites & diagnosis established in 100% cases.

Berci (1973) evaluated the utility of new peritoneoscope as a diagnostic aid to the surgeons and found fit useful in 62(90%) of his 70 patients. In this study one group of patient having ascites of unknown origin. In all cases, cause of ascites was established perioneoscopically. No mortality was encountered in this study.

Cusheri (1975) compared peritoneoscopic liver biopsy with blind liver biopsy on one hand and hepatic scanning on the other. Penitoneoscopy provided tissue diagnosis, in 86% of cases as compared to 68% positive yield of blind biopsy. Cusheri reported flow pressure during insufflation of peritoneal cavity with carbon dioxide in 30 consecutive cases. In the absence of ascites there was only a small amount of rise in intra abdominal pressure after insufflation of 4-5 litteres of CO_2. When ascites was present however rise in intra abdominal pressure was more pronounced so he concluded that insufflation of abdomen in cases of ascites should be monitored carefully.

Nelson P. Trujillo (1976) obviated the need of diagnostic laparotomy in 90% of 145 cases of intra abdominal disease. In group of this series study was done in 48 cases of exudative ascites. In the group 8 patients were found to have tuberculous peritonitis, 11 had metastatic carcinoma of the peritoneum, 14 had cirrhosis of liver, 1 had ovanan-carcinoma and in 1 patient there was chronic adhesive peritonitis. In 5 cases no evidence of pathology in the peritoneum or intra abdominal organ was found. A sub-sequent diagnosis of polyserositis was made in 4 and of constrictive pericarditis in one.

Ira Friendman & Willam Wolf reported (1977) 94% accuracy of peritoneo scopic diagnosis. In study of 140 patients, 8 patents were having unexplained ascites. The cause was demonstrated by laparoscopy in 7 patients. In 8th patient there was extensive adhesion & the procedure was not successful.

Jean W. Saleh (1978) performed peritoneoscopy in 49 patients with ill defined intra abdominal disease. In on e group of 6 patients with ascites, in which-laboratory and clinical findings where inconclusive. Peritoneoscopy disclosed two cases of peritoneal tuberculosis with its characteristic white millet see

dissemination and two carcinoma of peritoneum with unknown primary. In one patient micronodular cirrhosis was found with hepatoma. Massive ascites in one case pecluded good examination.

Hall, Donaldson and Plennan reported (1980) their experience of laparoscopy in 250 patients. They performed laparoscopy in cases of Ascites in 35 patients. In 34 cases they obtained histological confirmation of the cause. Thirty patients had liver metastasis or carcinomatosis peritonei and 4 had primary liver disease. Peritoneal dialysis cannula was inserted into the peritoneal cavity first to drain ascites and then to introduce the gas before laparoscopy. There were no complications reported in this study.

The result of diagnostic laparoscopy was reviewed by **Adam Levis and Archerin 1981**. A tissue diagnosis was obtained in 25 of 42 patients (60%) suspected to have intra abdominal malignancy on the basis of presence of ascites, hepatomegaly & abdominal mass.

Cunnigham J.T. (1982) reported use of laparoscopy in the diagnosis of ascites and recommended its use when clinical and laboratory assessments, including cytology of ascitic fluid failed to clinch diagnosis.

Jeffers and associates (1988) reported the use of laparoscopy in 27 patients with primary hepato cellular carcinoma. The diagnosis was achieved using laparoscopic guided aspiration with a chiba needle.

Reddy (1988) evaluated cases of tubercular peritonitis and ascites with unknown disease in United state and recommended its use in the differential diagnosis of ascites.

Bruce, Runyan, Hopes and Morgan (1988) performed ascitic fluid analysis in 45 patients having malignancy related ascites. They concluded that only 24 patients with peritoneal carcinoma had an abnormal ascitic fluid cytology, in others with liver metastasis or hepatocellular carcinoma had normal ascitic fluid cytology.

Hassan (1989) identified characteristic purple nodule on the liver surface and on the peritoneum in a case of Kaposi's sarcoma associated with HIV infection. Although extrahepatic lesions generally preceed development of hepatic nodules. He focussed the attention of laparoscopists on these findings as there has been an increasing incidence of this disease in recent years.

Van Yelder (1989) in a series of 19 patients reported the use of laparoscopy in the diagnosis of peritoneal mesothelioma presenting with ascites.

Jonathan Sackier, Eerci, Partlow presented a paper (1990) on interventional laparoscopy during the American college of surgeons, 1990 clinical congress. They reported that in cases of portal hypertension with associated ascites, pneumoperitoneum should be created from right or left iliac fossa.

In 1986 the development of computer chip television camera which allowed videolaparoscopy to performed revolutionised the management of biliary tract diseases and general surgery. The growing recognition of the potential of laparoscopy for diagnostic & staging procedures made theraputic laparoscopy for gastrolintestinal diseases a reality by end of 1980's.

Schreiber performed the first laparascopic appendicectomy for acute appendicitis in 1987. In 1988 the first laparascopy cholecystectomy was performed by Dubois in Paris.

A study from South Africa by **Richard l. Menzies et al** (1985) reported diagnostic accuracy of laparascopy in 95.2% in the study of 92 patients having ascites of unknown orgin. In this series visual diagnosis of cancer, T.B. and chronic liver disease was established in 8.6%, 40 & 46% cases respectively and histological diagnosis was established in 100%, 91% and 100% cases respectively. Laparascopy failed to establish diagnosis in 6 patients out of 92 cases.

Warsaw and Co-workers (1990) evaluated 88 patients of carcinoma pancreas and of ampullary region and identified unresectable tumors in patients with small peritoneal and hepatic implants, who would be subjected to chemotherapy.

Childers J.M. et al (1992) performed office laparascopy and biopsy for evaluation of 7 patients with intraperitoneal carcinomatosis using a new optical cathater under local anaesthesis. 4 patients had previous malignancies and intra peritoneal recurrences or new primaries were suspected. In two of these laparascopically directed biopsis confirmed adenocarcinoma similar to their prior malignancy and in one a new primary as diagnosed while the fourth patient had no evidence of intra peritoneal disease. In remaining 3 patients with new intra peritoneal malignancy, biopsy was obtained and confirmed adenocarcinoma of the ovary in two patients and of gastro intestinal tract in line. They advocated it as an ideal minimally invasive method for detecting small intra peritoneal lesions and allowing some patients to be spared of major operative procedures.

Sudan and Azad in 1992 from Jammu performed laparascopy in 50 patients to find out the diagnostic role of laparascopy and achieved a diagnostic rate of 88% with negligible mortality. They found it of immense value in the diagnosis of malignancy related ascites & tuberculsis.

Cuesta et al (1992) described that the diagnostic laparascopy is valuable because percutaniors ultra sound, CT Scan an MRI all fail to detect the presence of some metastatic deposits of the liver or peritoneum that alter the stage of disease.

97% success rate was reported in cases of ascites by Salky B. in 1993. He described that laparascopy is rapidly becoming a procedure used by general surgeons in increasing number.

Chia-ming Chu et al (1994) from Taiwan reported diagnostic accuracy of laparascopy in 86% of cases in study of 129 cases having ascites of unknown origin. In this series, visual diagnosis of malignant ascties, T.B. and chronic liver disease was established in 60.9%, 20.2% and 5.4% cases respectively. Positive histological diagnosis was established in 85% of malignant ascites and 86% of tubercular ascites. He did not take biopsy in cases of chronic liver disease.

Babirean et al (1994) found that in their series of 16 patients thought to have operable liver tumours, laparoscopy showed previously unrecognised features in 8 patients which rendered them inoperable and spared them an unnecessary laparotomy.

Averback and Sugerbaker (1996) devised a more modern treatment strategy, for diffuse, malignant peritoneal mesothelioma. It was based on the laparoscopic evaluation of pariteal and visceral penoteneum and multiple biopsies, sufficient for definitive histological diagnosis, along with modern imaging procedure like C.T. scan of chest, abdomen and pelvis to rule out distant metastasis and additional radiological and contrast studies. He advocated 2 or 3 courses of induction intraperitoneal chemotherapy followed by cytoreductive surgery approximately two months after completion of induction chemotherapy. This treatment strategy may be most feasible one according to existing knowledge of natural history of this disease.

Niranjan et al presented paper in ASICON 98 Banglore and reported 96% success of laparoscopy in diagnosis of ascites of unknown origin. Laparoscopy was done in 27 patients, in this series most frequently encountered laparoscopic diagnosis was tuberculosis in 17 patients, cirrnosis in 5 patients and carcinomatosis in four patients. No cause of ascites was found in one case.

Complications of Laparoscopy in Various Studies

Ruddock in 1938 reported a series of 500 cases. He encountered 8 accidents & 1 death during his procedure. He encountered 4 small bowel punctures, 1 transverse colon puncture, 1 sigmoid colon & 2 stomach punctures, either with pneumoperitoneum needle or by insertion of trocar. In all of these, the perforation was repaired & patient had uneventful recovery. During the procedure he encountered 1 death because of haemorrhage from the biopsy site in the liver. This patient has extensive metastatic carcinoma of liver.

Power et al (1941) in the study of 175 patients over a period of 3 years with peritoneoscopy observed perforation of the liver in one case in which the liver extended below the umblicus. Perforation of the colon which was adherant to the anterior abdominal wall occured in one patient which was repaired immediately.

Granny W.E. (1941) carried out a study on 75 patients. He encountered only one complication in his entire study - the sepsis of abdominal wall.

Olim C.B. reported his personal experience with 150 patients who underwent peritoneoscopy. He had 3 accidents. Two were perforation of the bowel & the last & third had a fatal complication - perforation of a small cholangitic abscess. Operative intervention was not considered because the patient was critically ill had wide spread metastasis. He concluded that peritoneoscopy will not supplement laparotomy but will prevent unnecessary exploration in many cases.

Narancio et al (1945) in his study of 80 patients encountered one fatality due to intra peritoneal haemorrhage.

Handly et al (1956) encountered no mortality & only minor complications in a study of 136 patients.

Zockler et al (1956) encountered major bleeding in 2 patients of in which operation intervention was required in one.

Rodolfo-Herrera-Lierandi (1961) listed their experiences with peritoneoscopy in 390 cases with minimal complication in 11 i.e. 2.8% and 2 deaths which were because of arroneous premedication & perforation of gall bladder.

Hodgson (1970) concluded that because of using carbon di oxide for creating pneumoperitoneum, laparoscopy involves considerable alteration in respiration & cardio vascular homeostasis. It is essential to monitor the intra abdominal pressure through out the procedure which should not exceed 20 mm Hg.

Siegler A.M. 1971 made a study of several series of patients & found an average complication rate of 2%. He found that most of the complications occured during induction of pneumoperitoneum, while the rest was caused by the laparoscope & assessors instrument; After studying nearly 20,892 laparoscopic procedures, he concluded that a fatality rate of 1 per 1000 did exist.

Rivera & Boyce carried out 150 peritoneoscopies. They reported pneumomediastinitis in one case which was due to tear by needle biopsy of liver & other case had scrotal oedema which resulted from dissection of ascitic fluid through the abdominal wall, after tightly suturing the abdominal puncture in a cirrhosis with ascites. This subsided spontaneously in 48 hours. **Scott** (1972) stated that cardio arrythmias occuring during laparoscopy are innocuous & can be eliminated by using nitrous oxide for insufflation.

Berci et al (1973) reported 9 complications in his series of 70 patients. They included cardiac arrythmias in 3, emphysema of mesentry in 2, traumatic paralytic ieus in 1, subcutaneous emphysema of abdominal wall in 1 and tumor implants at puncture site in 2. There were no mortality.

Bishop & Halpin (1973) reported protrusion of omentum through the infraumblical laparoscopy incision. This occured on the third post operative day after about of caughing.

Schiff (1974) reported 2 cases of small intestine incarceration following herniation through fascial site of laparoscopy which required bowel resection on 14th & 21st post operative day.

Georgy et al in 1974 reported 2 cases of urinary bladder perforation. First was due to initial failure & repeated attempts in searching for a route of entry. The second due to non cathaterised full bladder at a high position.

Schapira (1978) from Switzerland reported the occurence of ureteroperitoneal fistula with urinary ascites as a complication of gynaecological surgery.

Udwadia (1978) during peritoneoscopic study of 29 cases of abdominal tuberculosis encountered a solitary case of bowel perforation. The patient had uneventful recovery after closure of perforation.

Richard I. Menzies et al (1985) in their study of 98 cases of undiagnosed ascites had prolonged leakage of ascitic fluid from puncture site. Leakage led to bacterial peritonitis in 3 patients, however there were many other factors that contributed to their deaths. Because of the seriousness of fluid leakage they started doing immediate paracentasis to drain ascitic fluid in cases where fluid leakage was found & antibiotics were given for one week. In latter part of their study they had fluid leakage in two patients but no bacterial peritonitis.

Chia-Ming Chu et al (1994) in their study of role of laparoscopyin the diagnostic evaluation of ascites of unknown origin in 129 cases encountered minor complication in 5(4%) patients, leakage of ascitic fluid in 2(1.6%), subcutaneous emphysema in 2(1.6%), and wound infection in 1(0.8%) case. Major complication of intestinal perforation was encountered in 2 cases (1.6%) of T.B., for which surgical intervention.

PERITONEUM

It is of Greek derivation refers to a bag or sack. Peritoneal cavity is the largest cavity in the body. The area of its lining membrane being nearly equal to that of skin. The peritoneum is a single layer of veil like membrane and is composed of flattended ployledralcells, one layer thick resting upon layer of fibroelastic tissue, the two layers constitute the peritoneum. Beneath the peritoneum, supported by a small amount of areolar tissue, lies a network of lymphatic vessels & rich plexus of capillary blood vessels, from which all absorption & exudation must occur.

Though the surface area of the peritoneum is extensive, averaging 1.8 m^2 in the adult male, and is comparable to the surface area of the skin. It has been estimated that 1mm increase in the thickness of the peritoneum by accumulation can result in 10 litre of fluid, a fact relevant to massive fluid shift associated with exudative ascites. The peritoneum covers all the interior surface of the abdominal wall, diaphragmatic, retroperitoneal & pelvic surfaces, which comprise the peritoneal cavity, in addition to the intra abdominal viscera. In males the peritoneum forms closed sac, while in females, it is continuous with mucous membrane of fallopian tubes. One half of the peritoneum about 1 m^2 functions as passive, semipermiable membrane to the diffusion of water, electrolytes & macromolecules.

The peritoneal cavity is primarily divided into the greater sac & lesser sac which communicate via the foramen of winslow. Within the great Sac a number of areas, due to both anatomic and physiologic factors, are potential sites of fluid accumulation. These include the right subhepatic space, both right & left sub-phrenic spaces, the paracolic gutters and the pelvis.

Under the normal conditions < 50 ml of sterile fluid is present within the peritoneal cavity. The fluid itself closely resembles lymph and has a low specific gravity, protein content and <3000 cells per cubic mm. Secreted from the visceral peritoneal surfaces, the fluid is circulated through the peritoneal cavity. The movement of this fluid has been defined by introducing the contrast media into the peritoneal cavity in the para ceacal area primarily transmigrates towards the right subphrenic area and in to the pelvis. The cephalad movement proceeds along the the paracolic gutter and sub hepatic spaces. It is thought that cephalad movement of fluid is produced by the creation of negative pressure area in the subhepatic space by diaphragmatic motion. Most of the peritoneal fluid is absorbed in to the lymphatics circulation via the parietal peritoneal surfaces, with the remainder absorbed through the dia phargmatic lymphatics.

ASCITES

Ascites refers to accumulation of free fluid in the peritoneal cavity. it describes pathological fluid accumulation within the peritoneal cavity. Cirrhosis is the common cause of ascites, but there are many other causes to be considered even in patients with chronic liver disease.

CAUSE OF ASCITES

a. Common Causes

- Malignant diseases
- Cardiac failure

- Hepatic cirhosis
- Infective disc - Tuberculosis.

b. Other causes

- Hypo protieinaemia
- Malnutrition
- Nephrotic syndrome
- Protein loosing enteropathy.
- Hepatic venous occlusion
- Budd chiari syndrome
- Veno occlusive disease
- Infection
- Spontaneous bacterial peritonitis
- Pancreatitis
- Lymphatic obstruction
- Chylous ascites

c. Rare causes

- Meig's syndrome
- Vascullitis
- Hypothyroidism
- Renal dialysis

PATHOGENESIS OF ASCITIC FLUID FORMATION

a. Liver diseases

Ascites forms in the setting of cirrhosis as a result of the following sequence of events. Portal hypertension develops first followed by peripheral vasodialatation. This peripheral vasodialatation associated with retention of sodium & water causes hyper volumia & spill over in to the peritoneal cavity from hepatic sinusoids. This is "over flow" theory. After ascites begins to develop "Under filling" theory appears to assume more important role. The sequestration of intravascular fluid in the abdomen in large quantities results in decreased "effective intravascular volume" & tiggers, increased non osmotic secretion of ADH, Renin & aldosterone release, further stimulation of sympathatic nervous system activity, and further sodium and water retension.

b. Malignant Ascites

Peritoneal carcinomatosis appears to cause ascites by exudation of proteinaceous fluid from tumour cells lining the peritoneum. Extracellular fluid enters the peritoneal cavity to re-establish oncotic pressure. In patients with massive liver metastsis fluid presumbly accumulates owing to portal hypertension caused by stenosis or occlusion of portal veins by tumour nodules or tumour. In patients with hepato cellular carcinoma, ascites forms as a result of under lying cirrhosis related portal hyper tension and/or tumour induced portal vein thrombosis. Chylous ascites due to lymphoma appears to be caused by lymphnode obstruction by tumour & rupture of chyle containing lymphatics.

c. Cardiac ascites

In heart failure there is decreased effective arterial blood volume. This activates vasopressin, Renin, aldosterone & sympathetic nervous system. This leads to renal vaso constriction and odium & water retention. Fluid then weeps from the congested hepatic sinusoids as lymph, as in cirrhotic ascites.

d. Tuberculosis

Ascites results from exudation of proteinaceous fluid from the tubercles studded over peritoneum.

e. Pancreatic & billary ascites

Here fluid froms by leakage of pancreatic juice or bile in to the peritoneal cavity and/or by a 'chemical burn' of the peritoneum.

f. Postoperative

After abdominal surgery especially extensive retroperitoneal dissection, lymphatics may be transected and lymph leaks for variable period of time.

g. Nephrotic syndrome
Loss of protein in urine leads to decreased effective arterial blood volume with activation of vasopressin, Ranin-aldosterone, and sympathetic nervous system with resulting renal sodium & water retention.

ASCITIC FLUID ANALYSIS

1. Gross appearance

Clear	-	Normal
Pale Yellow	-	Parechymal liver disease
Cloudy	-	Bacterial peritonitis, pancreatitis
Bloody	-	Trauma, Tumour
Green	-	Billary tract disease, Ruptured bowel
Milk/Turbid	-	Tumour, Tuberculosis

2. Cell Count
Upper limit of total WBC count in an uncomplicated cirrhosis is 500 cell/mm^2. In spontaneous bacterial peritonitis there is elevated W.B.C. count. Poly morphonuclear leucocytes comprise more than 75% of TLC. In peritoneal tuberculosis and carcinomatosis there is frequently elevated total W.B.C. count but with predominance of lymphocytes.

3. Serum-ascites albumin gradient (SAAG)
Calculating the SAAG involves the measuring the albumin concentration of serum and ascitic fluid specimens and simply substracting the ascitic fluid value from serum value. If SAAG is greater than 1.1 gm d/l the patient has portal hypertension, with approximately 97% accuracy.

4. Glucose
Glucose level drops in cases of malignant ascites & tuberculosis. It can also fall significantly in cirrhotic ascites with spontaneous bacterial peritonitis.

5. Amylase
Ascitic amylase activity more than 100 U/I identifies pancreatic ascites. It can also be raised when there is gut perforation.

6. lactate dehydrogenase
Raise in spontaneous bacterial peritonitis because of neutrophil release of LDH. It also rises in secondary bacterial peritonitis.

7. Gram Stain
Demonstrates bacteria only when there are more than 10,000 bacteria per ml. It is most helpful in gut perforations in ascites.

8. Smear & culture
For tuberculosis are unreliable. AFB Smears are diagnostic only in 3% of patients. Cultures are positive in 10-20% of patients and a long time is needed to obtain results.

9. Cytology
It is sensitive in detecting peritoneal carcinomatosis, but does not detect all ascites due to carcinoma because about one third of malignancy related ascites is due to conditions other than peritoneal carcinomatosis. Hepatoma rarely metastasizes to the peritoneum, hence the cytology is usually negative.

DISCRIPTION OF INSTRUMENTS

A. Optical instruments
- Fibre optic end on (180^o) telescope
- Forward oblique (130^o) telescope
- Flexible fibre opticable
- Genitourinary light source

B. Non Optical Instruments
- Veress needle
- Trocar & Cannula
- Suction cum palpation probe

- Palmer drill biopsy forcep
- Insufflation equipment
- Ancillary instruments

A. **OPTICAL INSTRUMENTS** - used in this study was fragenheim's laparoscope manufactured by M/s Genitourinary manufacturing Co. London.

This consist of:-

1. Fibre optic end on (180^o) telescope -

It is a indirect view type of diagnostic rigid telescope which consist of straight tube with the occular in the axis of telescope and an optical system. Optical system. Optical system is the 'lumina' with a series of lenses and air spaces to ensure maximum resolution and minimal distortion, providing the surgeon with wide angle view under magnification. The telescope consists of central image transforming system and outer illuminating system.

The end on scope forms an upright image of the object infront. True size reflection is obtained when telescope is at 3 cm from organ. it has a detachable light cable at proximal end for transmission of light from light source to it.

2. Forward - oblique (130^o) telescope

It has a visual angle of 130^o which facilitates the viewing of certain recesses, anterior surface of liver, parietal peritoneum and when adhesions are present. In such situation the end on viewing telescope may not be much informative.

3. Flexible fibre optic cable

This is cable of 3.5 mm diameter which conveys light from light source to the telescope. It tarnsmits 6-12 volts (100-150 watts) cold light.

4. Genitourinary light source

This endoscopic light source has 3 channels to fit more then one type of cable and produces light by a 150 watt bulb.

B. NON OPTICAL INSTRUMENTS

1. Veress needle

The veress needle continues to be the standard instrument used for the creation of pneumoperitoneum. It consists of sharp outer shealth and a blunt spring loaded inner cannula. The blunt stylet protrudes beyond the sharp outer point. When the needle point is driven against the linea alba or peritoneum, the inner blunt tip is pushed inside the lumen allowing the outer sharp point to pierce these layer. Once the peritoneum has been pierced, resistance falls and the blunt tip springs out, there by minimising the risk of damage to underlying intenstine.

The veress needle is connected to the tubing from the insufflator to establish pneumoperitoneum.

2. Trocar and Cannula

This instrument is used after establishment of successful pneumoperitoneum. Cannula along with the trocar is inserted in the peritoneal cavity which houses the telescope after removal of trocar. Diameter of cannula is about 1 mm larger than trocar or telescope. Trocar is pyramidal in shape as it allows the greater ease of penetrating through the tough layers of anterior abdominal wall. Cannula is made up of a metal which has a valve to prevent lekage of air when trocar is exchanged for the laparscope. The most popular valve being trumpet type but few laparoscopic sleeves have flap valve also, this is 7 mm in diameter.

Another trocar and cannula used for inserting accessory instruments is 5 mm in diameter.

3. Air Insufflator

Insufflation can be performed by high flow insufflator or by sphygmomanometer bulb. The high flow insufflator should permit accurate control of the intra abdominal pressure. Most common gas used for insufflation is carbon dioxide.

4. Palpation Probe

A blunt tipped hollow suction cum metal probe for palpation can be used for placement of viscera and inserted through the accessory cannula.

5. Ancillary Instruments

They are used during procedure and includes Scalpel with blade, syringe with needles, scissors, tooth forceps, needle holder, curved cutting needle, 1-0 silk, haemostatic and allies tissue forceps.

6. Cidex solution

It consist of 2% Gluteraldehyde. It is used for sterlisation of laparoscopic instruments by keeping them soaked in this solution for 20 minutes.

INDICATIONS FOR DIAGNOSTIC LAPAROSCOPY

A. Acute

1. In patients with localised peritonitis & with right iliac fosssa pain, diagnostic laparoscopy can reduce the incidence of negative surgical exploration for acute appendicitis & other causes of right iliac fossa pain may be found.
2. In the management of patients with blunt abdominal trauma with minimal or moderate hemoperitoneum. Laparoscopy can reduce the number of unnecessary laparotomies.

B. Elective

1. Evaluation of liver diseases - Both liver lobes can be seen, the extent assessed & important features discovered. laparoscopic biopsy is safer single bleeding can be controlled by diathermy & more accurate because the site of biopsy can be selected.
2. In suspected liver tumours & metastasis, laparoscopy helps assessing the extent of diseases & obtain biopsy for histopathological confirmation.
3. Origin of ascites - Laparoscopy with target biopsy is invaluable in the diagnosis of abdominal tuberculosis, cirrhotic ascites & primary or secondary peritoneal tumours.
4. Tumour staging - In patients with known primary tumours laparoscopy prioto laparotomy can yield information which may alter the surgical approach & in some cases obviate the necessity for laparotomy.
5. Second look laparoscopy - It is an alternative to laparotomy in the detection of recurrent diseases & in assessing the effect of adjuvent radio or chemotherapy for intra abdominal malignancy.
6. Abdominal diagnostic dialemmas - Laparoscopy may be helpful in the evaluation of abdominal mass, right iliac fossa pathologies, in diagnosis of jaundice etc.
7. Chronic pain of unknown origin.

Gynaecological Indications

1. Primary & secondary infertility
2. Investigation of obscure pelvic pain
3. Suspicious ectopic pregnancy
4. Pelvic masses
5. Endometriosis
6. Acute pelvic inflammatory pathology
7. Ammenorrhoea
8. Investigation of endocrine disturbances
9. Malignancy
10. Tuberculosis

CONTRAINDICATIONS OF LAPAROSCOPY

1. Abdominal wall sepsis
2. Haemorrhagic shock
3. Intestinal obstruction & paralytic ilieus
4. Uncorrectable coaguopathies.
5. General peritonitis
6. Severe cardiac dysfunction
7. Severe chronic obstructive pulmonary disease.
8. Hiatus hernia - Results pneumo mediastinum
9. Irreducible inguinal hernia
10. Extensive adhesions due to previous laparotomy

ANAESTHESIA FOR LAPAROSCOPIC PROCEDURE

1. Local anaesthesia

This anaesthesia is used in diagnostic laparoscopy but not in theraputic laparoscopy. 2% lignocaine is used. In apprehensive patients sedative analgesic i.e. inj. for win &/or diazepam can be given. Infiltration should include skin, subcutaneous tissue through rectas shealth, muscle & peritoneum. This local anaesthesia helps in that the patient remains councious & is able to lense the abdominal wall muscles which provide a rigid platform for insertion of instruments & minimise the risk of injury to intra abdominal viscera.

2. Regional anaesthesia

Thoracic epidural anaesthesia with a segmental nerve block of T_2-L_1 is an acceptable technique for laparoscopy. The advantage is that patient is awake, protective & airway reflexes are intact & post operative anaesthesia recovery is shorter.

Sub arachnoid block can also be used. However it is associated with post dural puncture headache.

3. General anaesthesia

General endotrachea anaesthesia is usually preferred in theraputic laparoscopy.

It affords several advantages:

1. Surgical conditions can be optimised with the use of muscle relaxants, placement of nasogastric tube & proper positioning.
2. Endotracheal intubation allows control of the airway & protect against the aspiration of gastric contents.
3. The cardiopulmonary changes that occur with insufflation of CO_2 may be managed more effectively by maintaining adequate minute ventilation, oxygenation & hydration.
4. Controlled ventilation may reduce the incidence of dysrrithmia in comparison to spontaneous ventilation, particularly in the presence of CNS depressants & respiratory acidosis.
5. Continuous endtidal CO_2 monitoring allows appropriate adjustments of minute ventilation to maintain normal PCO_2 levels & facilitates the rapid detection of CO_2 embolus.

SPECIAL PRECAUTION IN CASES OF ASCITES

George berci & sacker et al (1991) described following precautions during laparoscopy in cases of ascites:

1. The patient should be placed in a reverse trendlenberg position because this will allow the organs to float away form umbilicus.
2. Since many patients will have portal hypertension, the laparoscopist should be ware of it & veress needle and trocar - canula should be inserted from left to right sac fossa.
3. Pneumoperitoneum is still required, since the gas filled viscera floats in the pool of ascites. Once the veress neddle is in the peritoneal cavity, it should be tilted such that it lies almost parallel to the abdominal wall so the hole in obturator will not lie within the ascites.
4. Gas should be introduce very slowly to avoid forathing which would obscure surgeon's view.
5. After introduction of trocar, ascites should be slowly aspirated and replaced with gas in step wise fashion.
6. The abdominal puncture site should be closed in layers to prevent the development of leak.

IV. Material And Method

Present study was performed on in patients with clinical evidence of ascites, admitted in J.A. Group of Hospitals, Gwalior during the period from Oct. 2002 to Oct. 2003 (i.e. 1yr.)

- **Inclusion criteria was :**
- Clinical features of ascites where diagnosis remained obscure despite complete clinical laporatory and radiological evaluation.
- Patients with suspected deseminated intraabdminal metastasis which may perclude surgery.
- **Exclusion criteria**
- Patients were not selected if they had previously undergone abdominal surgical procedure
- If they were pregnant (Specially 3rd Trimester)
- If they had obvious metastatic disease which may not improve survival even after tissue diagnosis
- Patients with severe coagulation abnormalities were also not selected.

Present study includes cases of ascites admitted in various wards of G.R. Medical College and associated hospital, Gwalior.

In all the patients of ascities, selected to undergo peritoneoscpy, the diagnosis remained obscure despite complete clinical, laboratory, reengenological and sonographic evaluation, so that in the absence of peritioneoscopic examination the next logic step in the diagnostic work up would have been exploratory laparotomy.

1. Preparation of the patient

After taking detailed history, patients were thoroughly examined to reach a clinical diagnosis. Along with generation examination, thorough evaluation of respiratory and cardiovascular system was done to rule out any co-existing medical problem. Examination of the abdomen was done to detect the presence of ascites. Abdominal distention with fullness in flanks. Shifting dullness and fluid thrill were noted. Associated features consiquent on ascites such as distortion or eversion of umblicus were noted.

The clinical evaluation was followed by following relevant investigations.

Complete Blood Count	LFT
BT	Xray chest
CT	ECG in old subject

Blood Urea	USG
S. Creatinine	Fluid analysis

Final confirmation was based on successful aspiration and complete analysis of ascitic fluid (Routine Microscopy, Culture, Cytology).

TECHNIQUE OF LAPAROSCOPY

All the patients were explained about the procedure in required details so as to gain confidence and prepare them to-operate during procedure. All the patients were kept fasting overnight and some were given sedative at night before. Written consent was taken, xylocaine sensitivity was done. Abdomen, private parts and thigh were shaved. Patient was asked to pass urine before going to operation room or were cathetrized.

a. Premedication

0.6 mg of Atropine and 10 mg of Diazepam were injected intramuscularly, before the procedure.

b. Position of Patient

The patient was positioned in trendlenberg position where minimal ascites was there. In cases of patient having moderate to massive ascites patient was positioned in reverse trendlenberg position because this allows the organs to float away from umblcus. Skin of the anterior abdominal wall was then meticulously painted and drapped.

c. Selection of Anaesthesia

Most of the procedures were performed under local anaesthesia and sedation. 10-15 ml of 2% xylocaine was infiltrated locally in all the layers of abdominal wall up to the peritoneum at the proposed site of incision. diazepam and fortwin were given slowly intravenously titrated during the procedure.

d. Incision

Transverse infra umblical incision was made to divide the skin and subcutaneous tissue down to linea alba.

e. Creation of Pneumoperioteritoneum

The abdominal wall was lifted up by pinching with the thumb and forefinger. The veress needle was pierced in the abdominal wall through incision at an angle. Two click were felt one when passing through the rectus sheath and second on entering the peritoneal cavity. A variety of maneuvers wre performed to confirm the needle tip is inside the peritoneal cavity. Needle tip was manipulated to ascertain free movement of its tip. Free drops of ascites was taped to confirm the presence of verress needle in the peritoneal cavity.

Pneumoperitoneum was created by connecting the veress needle to insufflating device. The amount of air required for pneumoperitoneum was indicated by distention of abdomen and obliteration of liver dullness. Air was introduced slowly to avoid froathing of ascitic fluid, which can obscure surgeons view. In cases of massive ascites only small amount of air was introduced and in 1 case of massive ascites trocar and cannula was directly thrusted into the peritoneal cavity without creating pneumoperitoneum.

After creating pneumoperitoneum needle was withdrawn.

f. Trocar Insertion

Trocar was inserted with a drilling and pressing action, all the while elevating the abdominal wall and was directed at an angle of 45^{o} towards the pelvis. Penetration into the peritoneal cavity was indicated by cessation of resistance.

g. Aspiration of Ascitic Fluid

Trocar was removed from cannula and aspiration of ascites was done slowly and peritoneal cavity was replaced with air in a stepwise fashion.

h. Introduction of Telescope

The laparoscope was introduced slowly through the canula.

i. Laparoscopic Examination

The room was darkened and abdominal cavity was examined in a systematic approach commencing from the falciform ligament. With patient is left lateral position the left lobe of liver, the diaphragm and spleen were examined. The stomach (Greater curvature), the anterior and inferior surface of light lobe of liver and gall bladder were seen with the patient in supine position. The mid abdomen, omentum, small and large intestine wen then examined. Examination of pelvic organs were done in trendlenberg position. The peritoneum was then inspected for any nodules or adhesions with intra abdominal organs.

j. Second Puncture

Biopsy instrument was inserted through a second puncture. In most of the cases it was made in the right hypochondrium midoxillary line. Biopsy was done under direct vision.

k. Termination of Procedure

Before removing the peritoneoscope, another through inspection was done to ascertain that no bleeding or other complication were present. If reassured then accessory cannula was withdrawn first under direct vision, then laparoscope was removed from the trocar sheath. Then its valve is opened to let the air escape from the abdominal cavity. Finally the trocar sheath itself was removed and incision was closed in 2 layers to prevent acitic fluid leakage. Dressing was applied.

POST OPERATIVE MANAGEMENT

The patient was then returned to wards and kept nil orally for 6 hours. After that sips were allowed and ambulation was permitted.

Findings of laparoscopic examination were recorded in proforma attached and biopsy (if taken) was sent for histological examination.

The patient who did not require further intervention were discharged within 2-5 days and asked to report after 7 days for stitch removal.

OBSERVATION

The Present study "Diagnostic laparoscopy in cases of ascites" was performed in 25 patients admitted in Gajara raja medical college J.A. Group of Hospital Gwalior (M.P.) between Dec. 2002to january 2004. Patients details were recorded in Prescribed proforma & following observation were made

Table 1
DISTRIBUTION OFCASES ACCORDING TO AGE

S.No.	Age group (in yrs)	Number of aptients	Percentage
1	0-20	-	-
2	21-40	6	24%
3	41-60	14	56%
4	61-80	5	20%
5	Above 80	-	-

Asevident from above table that maximum number 56% of patients belong to agegroup 41-60 yrs following by the age group 21-40 years (24%) and 61-80 year (5%). The youngest patients included in our study was 30 years old & oldest patients ws 70 years old, No. study had been in the age group of 0-20 year and above 80 years. Mean age of patients in our study was 50 years.

Table 2
DSITRIBUTION OF CASES ACCORDING OT SEX

S.No.	Sex	Number of patients	Percentage
1.	Female	15	60%
2.	Male	10	40%
	Total	25	100%

In Our study female patients outnumbered male patients in all age group Overall Male : female atio in our study was 0.66 : 1.

Table 3
DISTRIBUTION OF CASES ACCORDING TO SYMPTOMS IN PATIENETS OF ASCITES

S.NO.	Symptoms	Number of ptietns	Percentage
1.	Distension abdomen	25	100%
2.	Loss of weight	22	88%
3.	Loss of appetite	23	92%
4.	Fever	8	32%
5.	Pain of abdomen	22	88%
6.	Jaundice	11	44%
7.	Other	4	16%

Table No.3 show the common symptom in patients with ascites. As evident from the table that the most common symptom present was distension of abdomen which was present in all (100%) cased. Next most common symptoms were loss of apetite (92%) loss of weight (88%) Jaundice (44%) pain in abdomen (88%) and fever. (32%) 16% have discreased urine out put.

Table No. 4
DISTRIBUTION OFCASES ACCORDING TO FINDINGASPER ABDOMINAL EXAMINATION

S.No.	Finding	Number of patient	Percentage
1	Distension of abdomen	25	100%
2	Visible veins	3	12%
3	Tenderness	21	84%
4	Fluid thrill	21	84%
5	Shifting dullnes.	23	92%
6	Hepato megaly	11	44%
7	Splenomegaly	3	12%
8	Lump	12	48%

The commenest finding as per abdomional examination was distension of abdomen, which was presesent in all (100%) cases. Next common findings were fluid thrill and shifting duness, each present in 84% & 92% respectively other perabdominal findings were tenderness in 84%, visible vein in 12% and lumpin abdomen in 48% cases. Hepatomegaly was present 44% cases whilesplenomegaly was present only in 12% cases.

Table No. 5
DISTRIBUTION OF CASES ACCORDING TO NUMBER OFPORT USED FOR TROCAR INSERTION

S.No.	No. of port used	Number of paatients	Percentage
1	There Two port used	11	44%
2	Port used	14	56%
	Total	25	100%

In our study two trocar ports were used in 44% cases. Second trocar port was mainly used for taking biopsy and retraction of viscera. Third trocar port used in 56% cases.

Table No. 6
RESULT OF LAPAROSCOPIC VISUAL DIAGNOSIS IN CASED OF ASCITES

S.No.	Diagnosis	Number of patient	Percentage
1	Lessions suggestive of Metastatic Carcinomatsis	9	36%
2	Lesions suggestive of tuberculosis	9	36%
3	Lesions suggestive of cirrhosis	6	24%
4	Normal (No gross abnormality other then ascites)	1	4%
	Total	25	100%

In our study lapaaroscopic visual diagnosis of cause of ascites was suspected in 96% cases. Laparoscopic visual diagnosis of cancer as a cause of ascites was suspected in 36 .00% cases, on the basis of presence of haemorhagic or turbid ascitic fluid and presence of large 1-5 cm size nodule present on parietal peritoneum, omentum, falciform ligament and liver. Nodules were grayish white in colour and were hard on feeling by palpation probe.

Laparoscopic visual diagnosis of tuberculosis was suspected in 26% cases on the basis of presence of milky or turbid ascitic fluid and peculiar yellowish white military tubercles of uniform size (Less than 5 mm) on visceral and parietal peritoneum of small bowel.

Visual diagnosis of cirrhosis of liver was suspected in 24% cases due to presence of pale yellow colour of ascitic fluid, and diffuse irregular surface of liver with either fine micro or macro nodularity of liver with whitish lash like pattern of fibrous tissue over the surface of liver.

In 4% cases, no gross abnormality (other than ascites) could be detected in the peritoneal cavity.

Table 7
DISTRIBUTION OF CAES ACCORDING TO BIOPSY OF TISSUE FOR HISTOLOGICAL EXAMINATION

S.No.	Biopsy of tissue	Number of patient	Percentage
1	Liver	11	44%
2	Peritoneum	4	16%
3	L.N.	6	24%
4	ENAC	4	16%
	Total	**25**	**100%**

In our study laparoscopic guided biopsy from liver and peritoneum were taken in 44% and 16% respectively biopsy from LN was taken in 24% cases.
In 16% laparoscopic FNAC was taken.

Table No. 8
RESULTS OF HISTOLOGICAL DIAGNOSIS IN CAES OF ASCITES

S.No.	Biopsy of tissue	Number of patient	Percentage
1	Metastatic carcinomatosis	9	36%
2	Tuberculosis	7	28%
3	Cirrhosis	7	28%
4	Chronic non specific inflamation	0	0%
5	Biopsy & histology not done	2	8%
	Total	25	100%

In our study histological diagnosis was established in 23(92%) cases of ascites. Histology delineated metastatic carcinomatosis in 36%, tuberculosis in 28%, cirrhosis in 28%. Biopsy was not taken in 8% cases, so histological diagnosis could not be established in these cases.

Histological diagnosis of cancer was established in 9(369%) cases on the basis of presence of large number of mitoses, loss of polarity, plemorphism and altered nucleocytoplasmic ratio. In our study majority (8 cases) were due to metastaticadeno-carcinoma. Apart from this other histological patterns were also found.

In our series visual diagnosis of tuberculosis confirmed late by histology in 7 out of 7 cases (100%).

In our series histological diagnosis of cirrhosis was confirmed in all 7 cases (28%) on the basis of presence of deranged lobular architecture with islands of surviving parenchyma, undergoing slow proliferation forming regenerative nodules having disorganized masses of hepatocytes with predominant fibrosis. In 2 cases fatty changes were seen with alcoholic hyaline body which are eosinophillic intra cytoplasmic inclusions seen in perinuclear location within swollen and ballooned hepatocytes, suggestive of alcoholic cirrhosis.

Table No. 9
COMPARISION OF CLINICAL, VISUAL HISTOLOGICAL DIAGONSIS

	Clinical Diagnosis	Visual Diagnosis	Histological Diagnosis
I			
a. Carcinoma alone	5	1	1
b. With liver metastacis	3	2	3
c. With peritoneal metastaiss	-	-	-
d. With liver & peritoneal metastais	1	6	5
II. Tuberculosis	7	8	9
III. Cirrhosis of liver	2	6	5
IV. TB + cirrhoosis	-	1	1
V. Normal , only asites	3	-	-
VI. Hepatomegaly with asites	3	-	-
VII. Lump with ascites	1	-	-
VIII. Non specific	-	-	1
IX. Normal	-	1	-
Total	**25**	**25**	**25**

On comparing the clinical diagnosis (which included all pre operative investigation) with laparascopic visual diagnosis of histopathological diagnosis in malignant cases,

Clinically 5 patients were supposed to have organ confined carcinoma with no metastasis but an visual diagnosis only 1 (20%) was having organ confined disease of rest having metastatic disease which precluded the possibility of resection of this morbidity of laparotomy was avoided.

Peritoneal meastasis was not diagnosed on clinical basis in any one of the case on visual diagnosis 6 patients were shown to be having peritoneal seedlings & histologically (83%) proved to be carcinomatosis peritoni one patient showed non specific inflamation in peritoneal biopsy report.

Tuberculosis was diagnosed clinically in 7 patients while as visual diagnosis it was present in 9 patient in 4 patients so the missed abdominal tuberculosis as cause of ascites in 2 patients (23% n =9).

Cirrhosis of liver was diagnosed clinically in only 2 patients while on laparoscopic & histological diagnosis 6 patients were shows to have ascites with cirrhom liver so, clinically we missed 4 (66% n = 6) patients of cirrhosis of liver.

3 patients were diagnosed as normal with only ascites on clinical diagnosis but 2 of these had micronodular cirrhosis which was missed on USG & 1 showed no pathological defect.

Table No. 10
DISTRIBUTION OF CASES ACCORDING TO COMPLICATIONS OF LAPAROSCOPY

S.No.	Biopsy of tissue	Number of patient	Percentage
1	Leakage of ascitic fluid	2	8%
2	Hepatorenal Failure	1	4%
3	Wound infection	1	4%
4	No complications reported	21	84%
	Total	**25**	**100%**

In our series of 25 cases, two cases (8%) had problem of ascitic fluid leakage. Wound infection was reported in 4%. All were treated conservatively.
Major complications like hemorrhage from biopsy site, visceral injury, cardiac anythmia, etc. were fortunately not encountered by us.
No complications were reported in 84% cases.
One patient expired in post operative period of hepato renal failure.

V. Discussion

Laparoscopy is the endoscopic visualization of peritneal cavity & its content, its contents through anterior abdominal wall. Precise tissue biopsy can be taken form abnormal organs simultaneously making it possible to have accurate diagnosis in vast majority of cases.

There are various indications of laparoscopy like chronic abdominal pain, lump in abdomen, evaluation of jaundice, hepatomegaly, ascites, infertility, various intra and retroperitoneal malignancies and various acute abdominal conditions.

Sackier J.M. (1991) reported that the diagnostic laparoscopy is useful adjunct to many other diagnostic modalities. In cases like assessment of abdominal pain, abdominal masses, fever of unknown origin and gastro intestinal haemorrhage. In the assessment of oncology cases, this modality is superior to conventional radiology because biopsy may be obtained.

Salky B. (1993) described the indications of diagnostic laparoscopy which include acute or chronic abdominal pain, focal liver disease, ascites, preoperative evaluation of malignant disease and second look evaluation after medical therapy for malignant disease.

In the present study, laparoscoy was performed in 25 patients with undiagnosed ascites over a period of 13 months from 12-12-02 to 07-01-04 at Gajra Raja Medical College and J.A. Group of Hospital, Gwalior (M.P.).In our series majority (56%) of cases of ascites were between age group of 41-60 years. The oldest patient in our series was 70 years old and youngest patient was 30 years age. The mean age was 50 year. Laparoscopy was not performed in our series between age group of 0-20 years. It doesn't mean that there were no cases of ascites of unknown origin in paediatric ward of our hospital. The cause was that the parents of paediatric age group patients were apprehensive of the procedure and we could not make them agree for laparoscopy.

Male to female ratio encountered in our study was 0.66:1.

The commonest symptom in patients having ascites in this series was distension in abdomen (100%) followed by loss of weight, loss of appetite, jaundice, fever and pain in abdomen. The common signs include presence of shifting dullness, fluid thrill, hepatomegaly. The less common signs were splenomegaly, tenderness in abdomen and visible veins. These are classic symptoms and signs associated with cases of ascites.

The third trocar port was used in our series in 56% cases. It was used for taking biopsy and retraction of viscera.

In our study laparoscopic visual diagnosis of cancer as a cause of ascites was established in 9(36%) cases on the basis of presence of haemorhagic or burbid ascitic fluid drained during procedure, presence of 1-5 cm. metastatis nodules present over parietal peritoneum, omentum, falciform ligament and liver. Nodules were grayish white in colour and were hard in feeling by palpation probe. Laparoscopic visual diagnosis of tuberculosis was suspected 9 cases (36%) on the basis of presence of milky or turbid ascitic fluid peculiar yellowish white milliary tubercles of uniform size over visceral and parietal peritoneum. Visual diagnosis of cirrhosis of liver was suspected in 6 cases (24%) due to presence of pale yellow colour ascitic fluid and diffuse irregular surface of liver with either fine micro or macro nodular if with whitish like pattern of fibrous tissue over the surface of liver.

RESULTS OF VISUAL DIAGNOSIS

	Out study (n=25)	Richard I Menzies et. al.	Chia-Ming Chu et al
Carcinoma	36%	8.6%	60.9%
Tuberculosis	36%	40%	20.2%
Chroniclives d/s (Cirrhons)	24%	46%	5.4%

Figure of laparoscopic visual diagnosis reported by Richard I. Menzies eet al (South Africa 1985) and Chia-Ming-Chu et al (Taiwan 1994) are 8.6% and 60.9% for cancer, 40% and 20.2% for tuberculosis and 46% and 5.4% for chronic liver disease respectively.

DIAGNOSTIC ACCURACY ON HISTOLOGICAL EXAMINAITON

	Our series	Richard I Menzies et. al.	Chia-Ming Chu et al
Metastatic Carcinomatora	100% (n=9)	100%	85%
Tuberculosis	100% (n=9)	91%	86%
Cirrlosis	100%	100%	

Out of 9 cases of cancer suspected by laparoscopy visually, histological laparoscopic biopsy diagnosis was confirmed in all 9 cases on the basis of presence of large No. of mitoses, loss of polarity, plemorphism and altered nucleocytoplasmic ratio, making a diagnostic accuracy of 100%. Ruddock (1937) reported 87.4%, Jori and Paschale (1972) 70.6%, Kuster and Beil (1967) 100% and Riverra and Boycee (1972) reported 82.5% confirmation of malignancy by histology. Richard I. Menzies et al (1985) observed positive histology result in 100% cases of malignant ascites while Chia-Ming Chu et al (1994) observed positive histology for carcinomatosis in 85% of cases. They further reported that the majority of cases (92%) wre adenocarcinoma. In our series also majority of cases 8 out of 9 i.e. 88% were due to adeno carcinoma.

In our series visual diagnosis of tuberculosis was confirmed later by histology in 9 out of 9 cases (100%). Udwadia T (1978) reported and confirmed diagnosis of tuberculosis in 86.6% cases. Richard I. Menzies et al (1985) were able to confirm tuberculosis in 91% of cases while Chia-Ming Chu et al in 86% of cases.

Similar observations were also made by Richard I. Menzies and Chia-Ming Chu et al.

In our series histological diagnosis of cirrhosis was confirmed in all 6 cases on the basis of presence of deranged lobular architecture with island of surviving parenchyma undergoing slow proliferation forming regenerative nodules having disorganized masses of hepatocytes with predominant fibrosis. In 2 cases fatty changes were seen with alcoholic hyaline body which are cosinophilic intra cytoplasmic inclusions seen in perinuclear location within swollen and ballooned hepatocytes, suggestive of alcoholic cirrhosis.

Similar observations were made by Kuster and Bein (1967), Truzillo (1976). Pagillaro et al (1983). Ruddock (1937) and Anita (1963) observed positive results in 95% and 94% of cases. Richard I. Menzies et al also observed histological confirmation for all cases of cirrhosis subjected to laparoscopy.

Diagnostic accutacy of laparoscopy

Our Series	**Pullock et al.**	**Anita et al**	**Riverra et al**
92%	95%	94%	97%

In our series an accurate diagnosis of cases of ascites could be established in 23(92%) cases by subjecting them to laparoscopy. This figure of peritoneoscopic accuracy agrees with that of Kuster and Beil (1967), Trujllo (1976). Figures of diagnostic accuracy represented by Pullock (1957), Anita (1963), Riverra and Boycee (1972) are 95%, 94%, 97.3%, respectively. Success rate of lower than 90% has been reported by others Handley and Nurich (1956) 79.4%, Herrera-Litrendi (1961) 73.3%, Mosenthal (1973) 84%, Bisbery et al (1978) 74.3%, Friedman and Wolf (1978) 80%, Shrivastava et al (1978) 81.6%.

Richard I. Menzies et al (1985) and Chia Ming Chu et al (1994) reported diagnostic accuracy of 95.2% and 80% respectively in cases of ascites.

Our findings of diagnostic accuracy are consistent with that of other studies.

Cause of ascites varies from country to country and place to place. In our series, our of 25 cases of ascites, study revealed cancer as a cause of ascites in 36% cases, tuberculosis as cause of ascites in 36% cases and cirrhosis as a cause of ascites in 24% cases. Laparoscopy failed to detect additional abnormality other than ascites in 4% of cases. Thus in our study cancer was the leading cause of ascites followed by tuberculosis and cirrhosis. Moore S.C. et al (1984) from USA revealed 60% of 51 cases of undiagnosed ascites were due to either chronic liver disease or intra abdominal malignancy. Runyan BA (1986) reported that out of 1500 cases of ascites, chrrhosis (80%) was leading cause of ascites in American population, while cancer was (10%) found to be next. Tuberculosis was found only in 2% of cases while 5% of cases had mixed aetiology of ascites. Remaining cases were due to heart failure nephritic syndrome or pancreatic ascites. R.I. Menzies et al (1985) from South Africa reported that 40% of 92 cases with undiagnosed ascites were due to tuberculosis. Chia-Ming Chu et al (1994) from Tiwan reported that cancer and Tuberculosis accounted for 57% and 24% of cases of ascites.

When we compared diagnostic laparoscopy with other diagnostic modalities then we found laparoscopy to be a far superior diagnostic modality in establishing the precise cause of ascites.

DIAGNOSTIC MODALITIES ACCURACY

	Clinical	USG	Laparoscopy
Metastatic Carcinomatora	66%	77%	100%
Tuberculosis	77%	44%	100%
Cirrlosis	50%	66%	100%

X-ray as a radiological diagnostic tool had failed to prove its importance in revealing the diagnosis. Out of 9 cases of tubercular ascites, abnormal X-ray chest was present in 3 cases (47%) indicating that tubercular abdomen may not be associated always with pulmonary tuberculosis and on the basis of presence of pulmonary T.B. we can not conclude that ascites is due to tuberculosis.

Though utra sonography was more helpful than X-ray studies as ultrasonography delineated diagnosis of gross morphological changes that is hepatomegaly, enlargement of gall bladder and dilatation of CBD but failed to delineate the fine morphological changes such as liver changes of cirrhosis and changes of tuberculosis in the peritoneal cavity. In our series pickup rate for metastasis by USG was 77% where as laparoscopy revealed Pick-up rate of 100%.

This was the same observation made by other authors. Cuschieri (1975) found that for secondary hepatic tumours laparoscopy was superior to hepatic scanning in a group of 25 patients. Shandall and Johnson (1985) found the value of staging laparoscopy superior to hepatic scintigraphy and ultrasonography examinations in the detection of secondary deposits. I Watt et al (1989) found the laparoscopy was 50% better for detection of metastasis than C.T. Scan or Ultra sound and achieved a sensitivity of 88%. Cuesta et al (1992) found the diagnostic laparoscopy superior to per cutaneous ultrasound, CT Scan and MRI because all fail to detect some metastatic deposits of liver and peritoneum that alter the stage of disease.

Laparoscopic guided biopsy has advantage over blind percutaneous biopsy. Limitation of blind percutaneous biopsy are well known and further it has lower diagnostic accuracy Pagilar et al (1984) observed a failure rate of 20% by blind percutaneous liver biopsy in cases of cirrhosis as compared to laparoscopic guided biopsy. Jori and Peschle (1972) found that with needle biopsy of liver secondary metastasis are positive in 31% of cases, where as with laparoscopic guided biopsy 87.5% Cuscheri (1975) found peritoneoscopy superior to blind needle biopsy in retrival of secondary malignant tissue from liver in 88% as compared to 40% by blind biopsy. Our series indicate that with peritoneoscopy biopsy was picked up very precisely from diseased organ, so our results were 100% positive in cases of malignancy, cirrhosis of liver and tuberculosis.

Cytological examination of ascitic fluid for malignant cells which is considered reliable in the diagnosis of cancer as a cause, was positive in 4 cases (36%), where as final diagnosis of cancer was established in 9 cases. We had a lower positivity of cytology for cancer as compared to 58-75% shown by Johnson W.D. and Cordazo P.L. (1966). Lately Runyan B.A. (1988) observed cytology positive in as much as 75 to 100% of cases of peritoneal carcinomatosis if performed carefully. Taking even this in to consideration laparoscopy definitively scores over cytology particularly in cases where cytology in consistently negative.

In our series laparoscopic visual or histological diagnosis could not be made in 1(4%) case. This case later proved to be because of spontaneous bacterial peritonitis in which there was no morphological changes. Laparoscopy ruled out presence of any intra-abdominal pathology in this case. Richard I. Menzies et al (1985) and Chia-Ming Chu et al (1994) failed to establish diagnosis in (6.12%) and 13.9% of cases respectively.

COMPLICATIONS OF LAPAROSCOPY

	Our series	Richard I Menzies	Chia Ming Chu et al
Fluid leakage	8%	8%	1.6%
Wound infection	4%	2%	1%
Hepato renal failure	4%	0%	0%
No Complications	84%	90%	97.4%

In our series minor complications were encountered in 3(12%) cases. This complication rate is similar to that of Anderson et al (1987) 8.2%, Berci et al (1973) 11.3%. De Grown et al (1987) 9.4%.

Low complication rate of 2.8%, 1.8%, 1.3% and 4.2% are reported by Herrera Lirendi (1956), Ruddock (1937), Gaisford (1975) and Lewis and Archer (1981) respectively. Complications may be entirely absent as depicted by Hall et al (1980). In cases of ascites, fluid leakage is one of the common complication. WE had fluid leakage in 2(8%) cases. Richard I Menzies et al (1985) encountered fluid leakage in 8% and Chia-Ming Chu (1994) encountered fluid leakage in 1.6% of cases. Wound infection was present in 2% & 1% of cases in studies in studies of Richard I Menzies et al & Chia - Ming Chu et al respectively.

Most common major complication (Ruddock 1937, Trujillo 1975) which can occur during laparoscopy is severe or fatal haemorrhage from biopsy site. There was no such complication encountered in our study as we included only those cases if which the coagulation profile of patients were completely normal. Other major complications may be visceral injury, thermal injury, cardiac arrythmia which were fortunately not encountered

by us. De Orawne et al (1987) and Chia-Ming Chu encountered major complication rate of 1.8% and 1.6 respectively.

One patient after the laparoscopy and sephanoperitoneal shunt went into hepato renal syndrome and died in post operative period so mortality in our series was 4%.

VI. Summary And Conclusions

The present study entitled Diagnostic laparoscopy in cases of ascites was carried out in 25 cases of ascites in the Department of surgery, Gajra Raja Medical College and J.A. Group of Hospital, Gwalior (M.P.) from Dec. 2002 to Jan 2001. In all the patients of ascites, selected to unergo peritoneoscopy, the diagnosis remained obscure despite complete clinical, laboratory, roentgenological and sonographic evaluation. In some patients, where provisional diagnosis could be established were subjected to laparoscopy to confirm the extent and histological nature of the disease.

After taking detailed history, patients were examined to arrive at a clinical diagnosis. The clinical evaluation was followed by complete blood count, urine analysis and biochemical tests of blood. Investigations like liver function tests, ascitic fluid analysis, (including cytology and ascitic fluid, culture sensitivity) were done in all patients. Some special investigations like ultrasonography and barium metal were done where deemed essential. Laparoscopy was performed in all cases and findings were recorded in the prepared proforma. After critical analysis of the findings following conclusions were made:-

1. Maximum number (56%) of patients of ascites belonged to 41-60 years of age group.
2. 10 patients (40%) of ascites were male and 15 patients (60%) were female. Male:Female ratio was 0.66:1.
3. Local anaesthesia supplemented with Inj. Diazepam and Fortwin was used in 23(92%) cases and general anaesthesia was required in 2(8%) cases only.
4. In our study laparoscopic visual diagnosis of cause of ascites could be made in 92% cases.
5. In our series laparoscopially visual diagnosis of carcinoma was suspected in 9 (36%) cases, tuberculosis in 9(36%) cases and cirrhosis in 6(24%) cases. No gross abnormality other than ascites could be detected in 4% cases.
6. Laparoscopic guided biopsy from liver and peritoneum were taken in 44 and 16% respectively and from LN in 6(24%) cases.
7. Histological diagnosis of cause of ascites was established in 23(92%) cases. Histology revealed malignancy in 9(36%) cases, cirrhosis in 9(36%), tuberculosis in 6(24%) cases.
8. Laparoscopic visual diagnosis of cancer and cirrhosis were confirmed later on histologically in all (100%) cases. Visual diagnosis of tuberculosis was confirmed later by histology in 9 out of 9 cases (100%).
9. Laparoscopy failed to attribute the cause of ascites in 1(4%) cases. Further investigations revealed the cause of ascites as spontaneous bacterial peritonitis in 1 (4%) case.
10. Incidence of complications reported in our study was 16%. Two cases (8%) had ascitic fluid leakage. Wound infection were reported in 4% cases.

Hence we concluded that laparoscopy is safe, simple and superior diagnostic modality in the evaluation of cause of ascites and should be done in all cases of ascites especially in which the cause of ascites remains uncertain even after other investigative methods.

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