

Diagnostic Laparoscopy Versus Exploratory Laparotomy

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ABSTRACT:

Diagnostic laparoscopy is a minimally invasive surgical procedure that allows the visual examination and documentation of intra abdominal organs in order to detect any pathology. Diagnostic laparoscopy was first introduced in 1901, when Kelling performed a peritoneoscopy in a dog and was called "Celioscopy". A Swedish internist named Jacobaeus is credited with performing the first Diagnostic laparoscopy on human in 1910. He described its application in patient with ascites and for the early diagnosis of malignant lesion. Elective diagnosis laparoscopy refers to the use of the procedure in chronic intra-abdominal disorders. Emergency diagnostic laparoscopy is performed in patients presenting with acute abdomen. This document describes and compares the diagnostic laparoscopy with exploratory laparotomy. Diagnostic laparoscopy is safe, well tolerated and can be performed in an outpatient and inpatient setting under general anaesthesia.

KEY WORDS:

Diagnostic Laparoscopy, Acute Appendicitis, Abdominal lymphoma, Primary and Secondary Malignancies, Gastric Cancer, Pancreatic Head Mass, Minimally Invasive Surgery in Pediatric Cancer Patients, Evaluation of Viral Hepatitis Patient with Potentially Resectable Hepatocellular Carcinoma, Duodenal Perforation, Acute Peritonitis, Sickle Cell Disease, Abdominal Trauma, Gynecological, Torted Ovarian Cysts, Ectopic Pregnancy,

AIMS:

The aim of this study was to compare the effectiveness and safety of Diagnostic laparoscopy and in comparison with the exploratory laparotomy. Following parameters were evaluated for both Diagnostic laparoscopic and exploratory laparotomy.

- 1) Method of patient selection.
- 2) Operative technique.
- 3) Operating time.
- 4) Intra Operative and post Operative complication.
- 5) Postoperative pain and amount of narcotics used.
- 6) Time until resumption of diet.

- 7) Post operative morbidity.
- 8) Hospital stay.
- 9) Cost effectiveness
- 10) Quality of life analysis.

MATERIAL AND METHODS:

A literature search was performed using search engine Google, Pubmed, High Wire, Online Springer library facility available at The Laparoscopy Hospital, New Delhi, India. Selected papers were screened for further references

CONTENTS:

The first step in diagnostics laparoscopy is through a systemic approach to exploration is essential to ensure that nothing is missed. At the time of diagnostics laparoscopy all the abdominal organs are inspected for any gross anatomical abnormalities. If there is fluid is present samples are taken for lab. Test.

ACUTE APPENDICITIS:

Laparoscopy is the only diagnostic procedure other than formal laparotomy that allows direct visualization of the appendix. The entire appendix must be seen before the operator can conclude it is normal (free of disease) feasibility of laparoscopy in obese patients and those with previous abdominal operation depend on the surgeon experience with the procedure. Diagnostics laparoscopy is most useful for female patient, since a gynecologic cause of symptoms is identified in approximately 10% to 20% of women with suspicion of appendicitis. The procedure begins with diagnostics laparoscopy and continues with appendectomy if appropriate. This benefits is greater for women, who have higher negative appendectomy rate, and in whom laparoscopy often reveals other pathology. Exploratory laparotomy for diagnosis appendicitis is rarely used [1] [3] [4] [5] [6].

ABDOMINAL LYMPHOMA:

The medical records of patients with suspected primary or recurrent lymphoma who underwent laparoscopy between March 1991 and March 2003 were reviewed. Demographic, clinical, operative, and pathologic data were collected. The feasibility, safety and effectiveness of the laparoscopic procedure were assessed. Laparoscopic lymph node biopsy safely provides adequate tissue for full histological evaluation on outpatient basis in most patients with intra-abdominal lymphoma. Laparoscopy biopsy was attempted in 94 patients. In 21 patients (22%), the procedure was performed in those with a prior diagnosis of lymphoma for presumed intra-abdominal relapse and in 73 patients (78%) to establish a new diagnosis of lymphoma. The study of population include 47 men (50%) and 47 women (50%). The median patient age was 60 yrs operative of the 94 patient, 22 (23%) had a history

of previous abdominal or pelvic operation [8] [9] [10]. Two cannulas were used in 21 operation (22%), 3 cannulas in 51 (54%) and 4 cannulas in 22(23%). The procedure was completed laparoscopically in 78 patients (83%). The median operating time was 31 minutes (rang, 7-94 min). during the laparoscopic procedure biopsy specimens were obtained from the following lymph node site : 48 mesentic lymph nodes (51%), 12 masses not otherwise specified but located mostly at the me sentence root (13%), 7 paraortic lymph nodes (7%), and retro peritoneal lymph node (6%) and miscellaneous site. After laparoscopic biopsy was performed in 36 patients who underwent preoperative core needle biopsy, 28 patient (78%) were definitively diagnosed as having malignant lymphoma with complete typing in all patient, 2 (6%) had an adeno carcinoma, 1 (3%) had an epitheloid leomyo sarcoma and 5 (14%) had benign adenopathy [11] [12] [13] [14].

PRIMARY AND SECONDARY MALIGNANCIES:

Diagnostics laparoscopy combined with laparoscopic ultra sonography is an adequate staging modality for primary liver malignancies for colorectal liver metastasis, more liberal resection criteria, a high failure rate due to adhesion from previous surgery, and better preoperative probably result in a lower efficacy [15]. Laparoscopy with laparoscopic USG avoids unnecessary exploratory laparotomy in patients with HCC [25].

GASTRIC CANCER:

Peritoneal seeding or liver metastases found at laparotomy usually preclude curative treatment in patients with gastric Aden carcinoma. Such exploratory laparotomy may be avoided by diagnostic laparoscopy. One hundred and twenty consecutive patient with primary gastric Adenocarcinoma were studied prospectively diagnostic laparoscopy was performed in patient with clinical T4 tumors or suspected metastases, unless laparotomy was required for symptomatic disease . Diagnostic laparoscopy in selected patients effectively limits the number of unnecessary invasive staging procedures. Routine use of diagnostics laparoscopy in all patients with gastric Adenocarcinoma is not warranted [26].

PANCREATIC HEAD MASS:

Laparoscopy has its role in diagnosis, in histological confirmation, in staging, and, in certain situations, in therapy. Laparoscopy enables us to examine the serosal surfaces of the anterior abdominal wall diaphragm, falciform ligament, omentum, pelvic viscera, bowels and their mesenteries. We can insufflate and enter the lesser sac and mobilize the head of the pancreas. Particular attention is directed toward the pelvis, as it is often the site of the earliest metastatic disease due its gravitational dependence. Anatomic survey of the liver, biliary tree, pancreas and peripancreatic structures is mandatory. However, by itself, it does not assessing non-resectability (T stage) compared with US (100% vs. 64%; $P < 0.05$) and CT (100% vs. 47%; $P < 0.005$) . No imaging investigation is able to assess the N stage accurately. Nodal enlargement is frequently the result of reactive hyperplasia and smaller nodes may harbour micro metastasis. Nodal malignancy requires biopsy confirmation. In M stage, laparoscopy with LUS is significantly more sensitive than US (94% vs. 29%; $P < 0.001$) and CT (94% vs. 33%; $P < 0.005$) . Because laparoscopy with LUS is the most reliable method for verifying

metastatic changes, it reliably predicts tumor non-resectability [30]. For benign lesions - such as pancreatic insulinoma,- LUS is one of the most sensitive tools available. Its detection rate is 83-100% [31]. All non-resectable patients could be found with the combination of BUS plus laparoscopy plus LUS [32]. Laparoscopy with L US should be considered to be the first step in any potentially curative surgical procedure [32].

PEDIATRIC CANCER PATIENTS:

MIS in children is a rapidly expanding field with many diagnostic and therapeutic indications, with utility not only as an adjuvant for patients undergoing cancer therapy, but also as a primary treatment of malignancy. Laparoscopy have been well described and have been proven effective in the treatment of many nonmalignant states, including appendectomy, Fundoplication, cholecystectomy, location of non palpable testes, and laparoscopic pull-through for Hirschsprung's disease and imperforate anus. Although its potential utility in the adult population continues to be described for the treatment of colon, gastric, and ovarian cancers, data are lacking concerning solid tumor resection in the pediatric population. Despite this, sufficient evidence that MIS can be an effective approach to the biopsy of solid tumors for tissue diagnosis, determination of resectability and staging, evaluation of metastatic or recurrent disease, second-look operations, and diagnosis of infectious complications Solid-tumor resection is not yet supported in most cases. The purpose of this retrospective review was to evaluate the 5-year experience at a single institution with. MIS in children with malignancy.

The biopsy of an intra-abdominal mass in a child is an important initial step in the multimodality approach to many pediatric solid tumors. MIS allows direct visualization of the tissue, visualizes hemostasis, and reveals more anatomical details. Combined with the fact that many of these children will perhaps be undergoing multiple procedures, MIS theoretically allows for minimal inflammation, fewer adhesions, decreased pain, and quicker recovery, facilitating" subsequent initiation of chemotherapy and second-look or delayed primary surgery Most of these data are extrapolated from adult studies and a few small series in children, identifying the need for more data in the pediatric population.

Pediatric malignancies are often sensitive to chemotherapy and require only initial tissue biopsy for diagnosis as part of a multidisciplinary approach to their treatment. Excellent results in diagnostic accuracy with laparoscopic biopsy techniques have been reported for a variety of malignancies. Points of debate still revolve around the excision of solid organ malignancies, with the potential for tumor spill and port-site recurrences. In addition, questions have been raised concerning the potential alteration of the pathologic margins and the subsequent impairment of appropriate histological evaluation of tumor specimens after morcellation [33].

EVALUATION OF VIRAL HEPATITIS PATIENT WITH POTENTIALLY RESECTABLE HEPATOCELLULAR CARCINOMA.

Despite significant recent improvements in liver imaging, preoperative evaluation of the potentially resectable patient with viral hepatitis and hepatocellular carcinoma (HCC) is often

inaccurate. Diagnostics laparoscopy may change management for patients with under appreciated nodular cirrhosis or intra hepatic metastases, preventing unnecessary open exploration. The purpose is to determine the effectiveness of routine laparoscopy as a separate procedure prior to resection in the evaluation of patients with potentially resectable. (HCC)

Patient with potentially resectable Hcc were evaluated preoperatively with routine blood test and axial imaging. All study patients also underwent diagnostic laparoscopy with laparoscopic ultra sonography. Laparoscopy was performed in an inpatient hospital setting with 23 hrs stay in most cases. Among 65 patients evaluated with hepatocellular carcinoma between Jul, 2001 and Nov 2003, 20 patients with potentially resectable disease were evaluated by diagnostic laparoscopy. All patients had viral hepatitis; 16 with hepatitis B and 4 hepatitis C. All study patients had cirrhosis, 18 classified as child's Pugh A and 2 as child's Pugh B. Diagnostic laparoscopy changed the management in 9/20 (45%) cases. Management was changed because of sever modular cirrhosis in 4 cases, inaccurate assessment of intrahepatic metastasis in 2 cases, inability to identify an HCC in 1 case, peritoneal carcinomatosis in 1 case, and inability to tolerate induction to general anesthesia in 1 case.

Diagnostic laparoscopy is useful in the evaluation of the potentially resectable patients with HCC information obtained from laparoscopy may change the clinical management in up to 45% of cases [34].

DUODENAL PERFORATION:

Perforation is a life threatening complication of peptic ulcer disease. Duodenal Perforation is a common complication of duodenal ulcer. Perforation duodenal ulcer is mainly a disease of young men but because of increasing smoking, use NSAID majority of patient of perforated duodenal ulcer are H-Pylorii positive. Perforated duodenal ulcer is a surgical emergency. Diagnostics laparoscopy is a useful method for diagnostic and repair duodenal perforation [23] [24].

ACUTE PERITONITIS:

The presence of peritonitis has previously been considered to be a contraindication for the laparoscopy approach because of the theoretical risk of malignant hypercapnia and toxic shock syndrome. The aim of this retrospective to demonstrate that laparoscopy is feasible, safe and efficient in cases of peritonitis. From Jan. 1990 to Jul. 1993, 231 patients had a laparoscopy for acute peritonitis in two centers (91) appendicular peritonitis, 69 gastro duodenal perforated ulcer, 35 perforation of the colon, 36 miscellaneous. The diagnostic accuracy of laparoscopy exploration was 84.8%. the clinical preoperative diagnosis was changed by laparoscopic exploration I n29.1% of patients. An unnecessary laparotomy was avoided in 6.5% of patients and the site of traditional incision was modified in 8.7%. conversion rates were 25% for appendicular peritonitis, 16% for gastro duodenal perforation and 83% (24 of 35 patients) for colonic perforation. The over all mortality rate was 3.9%. no malignant hypercapnia occurred [27] [28] [29].

SICKLE CELL DISEASE:

Diagnostics laparoscopy has clear benefit over exploratory laparotomy inpatient with sickle disease. Patient with acute appendicitis will certainly require surgery that may be associated with high morbidity and mortality as a result of pre-operative and postoperative complication, mainly vas-occlusive crises (voc). The D.L is believed to be associated with minimal risks to the patient due to its numerous advantages over conventional method. The morbidity associated with surgery in sickle cell patient can be further reduced by use of preoperative exchange transfusion and adequate maintenance of hydration in the patient with sickle cell disease [2].

ABDOMINAL TRAUMA:

Laparoscopy was first used for a trauma patient in 1956 by lamy, who observed two cases of Splenic injury. Since then, Gazzaniga et al. noted that laparoscopy is useful for determining the need for laparotomy. In 1991, Berciet al. reported that he had reduced the number of non-therapeutic laparotomy performed for hemoperitoneum by 25% through the use of laparoscopy 150 patients with blunt abdominal trauma. Laparoscopic techniques are beginning used with greater frequency for the diagnosis and management of traumatic injuries. Although laparoscopy is an operative intervention, it has a role in limiting the for a full laparotomy in some patients with gunshot injury and stab wound. The procedure allows examination of the anterior intra-abdominal structures in a minimally invasive fashion. It has a potential advantage over standard open laparotomy in that the incision are smaller, allowing quicker recovery time less pain, and shorter postoperative hospital stays. The limitation are that the entire abdominal cavity, especially the retro peritoneum and posterior diaphragm, can't be adequately visualized with the laparoscope and subtle injuries to the small and large bowel can easily be missed. In a retrospective, multicenter study from three institutions with expertise in laparoscopy for trauma, the records of 510 patients undergoing the procedure of the initial evaluation for penetrating abdominal trauma were reviewed. Of these, 194 were for gunshot wounds, and the remainders were stab wound. Laparoscopy assisted in determining the absence of peritoneal penetration in 113 (58%) gunshot wounds. Exploration performed on the remaining 81 gunshot wounds it peritoneal penetration resulted in only is non-therapeutic exploration, the most frequent sites of the injury begin the diaphragm, liver, and spleen [16] [17] [18].

BLUNT TRAUMA:

The utility of diagnostic laparoscopy is developing field. When performed in carefully selected hemodynamically stable patients, laparoscopy is safe and technically feasible, chot et al reported reduced negative and non therapeutic laparotomy rates in this identified population [19].

PENETRATING TRAUMA:

Diagnostic laparoscopy for the evaluation of penetrating trauma is more defined in thoracic abdominal stab wounds; laparoscopy may aid in the diagnosis of diaphragmatic and other

intra abdominal injuries, thus avoiding non therapeutic laparotomies. Gunshot wound to the anterior abdomen with questionable tangential trajectory similar may be assessed. The argument is that even if there are no clinical signs of intra abdominal injuries, the disadvantages associated with an unnecessary laparotomy are minor compared to the danger of peritonitis in cases of delayed diagnosis of intestinal perforation. An alternative to these extremes is laparoscopy which allows the inspection of the peritoneum for sign of perforation and further more, in selected case, the treatment of intra-abdominal injuries [20] [21] [22].

OVARIAN CYST:

Ovarian cysts are sac filled with fluid or a semisolid material that develops on or with the ovary. If the growth is larger than 10 cm, complex growing persistent solid and irregularly shaped, on both ovaries, causes pain or other symptoms. diagnostics laparoscopy management ovarian cyst depends on the patient age, pelvic examination, sonographic images, and serve markers. A large, solid fired or irregular adenexal mass accompanied by ascites is suspicious for malignancy [7].

ECTOPIC PREGNANCY:

Diagnostic laparoscopy is one of the major advancement for tubal and uterine disease. Ectopic Pregnancy usually occurs of cases on the uterine tube.

It can be found in:-

1. The Ampulla (64%)
2. The Isthmus (25%)
3. The Infundibulum(09%)

Laparoscopic surgery is a good option for rupture ectopic. If the patient is hemodynamically stable and initial Diagnostic laparoscopy indicates a moderate blood loss, it may be possible to control bleeding laparoscopic ally and perform any indicated procedure [7].

CONTRAINDICATION:

- 1) Hemodynamic Instability
- 2) Mechanical or Paralytic Ileus.
- 3) Uncorrected Coagulopathy
- 4) Generalized Peritonitis.

- 5) Sever Cardiopulmonary Diseases.
- 6) Abdominal Wall Infection
- 7) Multiple Previous Abdominal Procedures.
- 8) Late Pregnancy.

CONCLUSION:

Diagnostic laparoscopy is one of the very important methods of investigation for patients in whom the diagnosis or extent of the disease is unclear or the abdominal findings are equivocal it can be performed safely in an inpatient or outpatient setting, potentially expediting diagnosis and treatment. Diagnostic laparoscopy is the most commonly performed surgical and gynecological procedure. Its greatest advantage is that it has replaced exploratory laparotomy.

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