

## A Prospective Study to Evaluate Diagnostic Laparoscopy Function in Patients with Intraabdominal Malignancy with a Focus on Staging

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### Abstract

**Background:** The objective of this study is to precisely determine the amount of disease, guide appropriate therapy, and prevent needless intervention using staging laparoscopy. Regular laparoscopy prior to laparotomy, particularly in malignancies with ambiguous operability, aids in reducing needless laparotomies.

**Methods:** Individuals with operable intra-abdominal cancers (carcinomas of the gallbladder, stomach, and colon) will have diagnostic laparoscopy, and the results will be compared to the results of the laparoscopy. Assessment of distant metastases (liver/peritoneum/omentum), resectability of the illness, and biopsies from lesions of ambiguous diagnosis are all included in laparoscopy.

**Results:** Out of the 70 patients included in the study, 58 were radiologically operable, and 12 had unclear operability. Only 30 of these 58 individuals had final resection after a diagnostic laparoscopy revealed they could be surgically removed. 28 patients were left, of whom 14 had isolated peritoneal metastasis, 6 had only hepatic metastasis (single or multiple), and 8 had metastases to both the liver and the peritoneum, as determined by frozen section and histological analysis.

**Conclusion:** The number of needless laparotomies that appear resectable on radiography but are discovered to be irresectable on laparoscopy can be decreased with diagnostic laparoscopy. It can help with the diagnosis of unclear cancers for which image guided biopsy is not advised in radiologically treatable illness (e.g. gall bladder malignancy). By collecting a sample from peritoneal nodules or liver nodules and avoiding a morbidly unneeded laparotomy, it also helps to demonstrate metastatic illness.

**Keywords:** Diagnostic Laparoscopy, Staging, Intra-Abdominal Malignancy.

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### Introduction

In the evaluation of patients with specific gastrointestinal cancers who are being considered for curative resection, diagnostic laparoscopy (DL) has emerged

as a key tool. Since many digestive cancer patients present with locally advanced or metastatic disease, correct staging helps in the selection of the best treatment for cure

or palliation. Accurate staging is crucial because research into neoadjuvant procedures for locally advanced tumours is still ongoing. Many patients are discovered to have undetected, incurable disease at exploration even after sophisticated preoperative imaging screening (trans-abdominal and endoscopic ultrasound, CT scan, MRI, and PET scan). A surgeon can diagnose patients with ambiguous radiological findings and learn more about the spread of disease using laparoscopy. The direct examination of intra-abdominal organs is made feasible by this process, and it also makes it easier to collect biopsy samples and aspirate cytology samples, which are often not achievable with imaging guidance. The magnified view of the laparoscope allows the surgeon to see small liver or peritoneal metastases that are not currently detectable with non-invasive imaging techniques, and it aids in the diagnosis and staging of GI tumours. Yet, surgery for these sorts of malignancies is frequently accompanied by a high level of morbidity and a poor prognosis, which would be better avoided if it were known that disease progression was worse than initially estimated by radiological staging.

We conducted a prospective study to evaluate the utility of DL in patients with intra-abdominal cancer, particularly in terms of staging of intra-abdominal cancer, to gather information that is complementary to radio-imaging modalities and to compare them, to assess operability and inoperability by verifying imaging studies, documenting hepatic or peritoneal metastases, cytologically evaluating ascitic fluid, planning and documenting appropriate treatment, and so on i.e. neo-adjuvant, curative or palliative following diagnostic laparoscopy and to analyse the incidence of perioperative morbidity and mortality related to procedure.

### Materials and Methods

From January 2019 to December 2019, a prospective observational study was

carried out at the Govt. Medical College and Hospital, Department of Surgery, Bettiah, West Champaran, Bihar. There were 70 patients altogether in this study. The study included all patients >18 years of age with intra-abdominal malignancy diagnosed or suspected, as well as any patient with suspected or known non-metastatic GI cancers with doubtful resectability by clinical evaluation and preoperative imaging, tumours with doubtful fixity to adjacent structures, especially organs that cannot be salvaged. Patients with liver and pancreatic cancer, Stage-IV or non-resectable diseases on imaging, lymphoma, gynecologic cancers, genitourinary cancers, retroperitoneal sarcoma, sarcoma, and abdominal metastases of non-GI cancers, as well as patients who were not suitable for general anaesthesia, were excluded from the study.

Clinical examination and history were used to evaluate patients. Patients were counselled about the potential results and informed consent was obtained. After normal exams, fitness for anaesthesia and major surgery was determined. The material was obtained by percutaneous, endoscopic, or colonoscopic techniques, and the pathological diagnosis was verified by cytological or histological testing. By conducting pertinent radiological investigations, operability was evaluated. Before the scheduled laparotomy, DL and ascitic fluid cytology were carried out while the patient was under general anaesthesia with endotracheal intubation. The peritoneal surfaces were carefully examined. The ligament of Treitz, the paracolic gutters, the pelvis, the surface of the bowel, the smaller sac, the root of the transverse mesocolon and small bowel, the suprahepatic and infrahepatic spaces, were all examined with bed position modifications as needed. When necessary, the smaller sac was opened. The exploration of the diaphragmatic hiatus was accomplished for lower oesophageal malignancies by cutting the esophagogastric peritoneal fold, blunt

dissection, and retraction of the patient's stomach to the right or left. All possible abdominal lesions were checked for during biopsies and frozen sections. The patients without distant metastases or with certain primary tumour resectability by DL had open laparotomy right away when no metastatic disease was found upon inspection. Postoperatively, perioperative problems, recovery time, and pathological diagnosis (pTNM) were evaluated.

## Results

A total 70 patients who were diagnosed previously to have no metastatic disease on pre-operative clinical evaluation and imaging were included in our study, following all inclusion and exclusion criteria.

**Table 1: Comparison of Resectability of primary tumour**

Resectability	Radiological (N=70)	Laparoscopy (N=70)	Laparotomy (n=34)
Resectable	82.9%	42.9% (n=30)	76.5% (n=26)
Unresectable	0%	51.4% (n=36)	23.5% (n=8)
Uncertain	8.6%	5.7% (n=4)	0.0%

Test of proportion showed that laparoscopy detected significantly higher proportion of unresectable primary tumours compared to radiological ( $Z=3.7$ ;  $p<0.05$ ).

DL has diagnosed all the patients with metastasis i.e. 28 cases out of 70, and radiology has identified the only suspicion of 12 cases preoperatively.

## Discussion

Our research was done to assess the utility of diagnostic laparoscopy as a staging and diagnostic technique for intra-abdominal malignancies. Study sites included the colon, gall bladder, bile duct, and stomach. Based on their radiological examinations, all of these individuals were candidates for curative treatment. To diagnose, stage, and evaluate intra-abdominal cancers in terms of primary tumour resectability, lymph node status, and distant metastases, DL was utilised as a technique. The procedure's complications and morbidity were evaluated.

A modest male preponderance for gastrointestinal cancers was found in numerous earlier research.[1,2] The most frequent types of cancer were shown to be

DL picked up 36 patients (51.4%,  $n=70$ ) to have occult, previously unidentified unresectable primary or secondary lesion over radiology. Unnecessary Laparotomy could be avoided in them.

Rest of 34 patients underwent laparotomy in the intent of definitive resection. Four more patients (11.4%, 8 of 70) were found to have unresectable lesions which could be confirmed only on laparotomy. These 8 patients were sent to Neo-adjuvant therapy; based on DL.

After both DL and Laparotomy, only 37% (26 out of 70) patients, were found to have resectable disease. Comparison of resectability of primary tumour by different methods is given in [Table 1]

colon, stomach, liver, and biliary system. The majority of gastrointestinal cancers were adenocarcinomas. [3-5]

Among 165 patients with digestive malignancies who had staging laparoscopies, Muntean *et al.*[1] discovered that 36 (36.4%) of the patients without distant metastasis on imaging pre-therapeutic staging were spared needless laparotomies. In our analysis, DL found 18 (51.4%) patients with original tumours that were radiologically undetectable and unresectable. Four patients (4 Patients) got neoadjuvant therapy for original tumours that were unresectable but did not have metastatic disease.

Popova *et al* retrospective research of 193 cases[6,7] revealed that in 42.5% of cases,

surgery for GC may have been avoided if laparoscopy had been done during the first evaluation. Another prospective comparison research by Stell *et al.* 61 in 103 patients revealed that laparoscopy was more reliable than ultrasonography and CT for finding metastases. Conlon *et al* investigation of 92 patients[8] at Memorial Sloan-Kettering Cancer Center found that laparoscopy revealed metastatic illness in one-third of the group where preoperative imaging had missed it. In patients with gastric tumours that were initially staged as resectable by conventional methods, D'Ugo *et al.*[9] discovered undiscovered metastatic disease in 13% to 57% of cases. Consequently, approximately 20% of patients did not require an exploratory laparotomy.

In our study, 26 of the 70 patients were determined to have no metastatic disease on clinical evaluation (M0-cTNM) by preoperative imaging, contributing to a 37.1% reduction in the need for needless laparotomy.

Laparoscopy revealed 84 inoperable patients out of 153 cases in D'Angelica study[10] on hilar cholangiocarcinoma and Ca GB, boosting resectability from 62% to 78%. While DL in the current investigation was able to identify 18 individuals with undetected, unresectable primary lesions (51.4%) through radiography, it overlooked unresectable primary lesions in 4 patients (11.4%) that could only be confirmed through laparotomy.

In Muntean *et al* study, DL was performed on 99 patients, of whom 61 had liver and peritoneal lesions that were not expected. 36 of these patients had metastatic disease that was detectable by frozen section (hepatic 4, peritoneal 24 and hepatic and peritoneal 8).

In our investigation, DL was performed on 35 patients who had either no evidence of metastasis (M0-cTNM) or lesions that were thought to be metastases. 14 patients (40%) had unrecognised peritoneal and

hepatic lesions. These 14 patients included 3 with just hepatic lesions (8.6%), 7 with only peritoneal lesions (20%), and 4 with both hepatic and peritoneal lesions (11.4%). All 11 instances with peritoneal metastases on DL were determined to be positive after frozen section and biopsy.

In one prospective multi-institutional investigation by the National Cancer Institute[11] 25% of the metastatic disease found by DL was missed by US, CT scan, magnetic resonance imaging, and endoscopic ultrasound. In our investigation, DL identified 14 cases (or 40%) with missing distant metastatic illness by preoperative radiography.

Blood loss, infections, visceral injuries, bile leaks (especially if a liver biopsy was performed), and complications due to anaesthesia are among the seldom reported consequences. Between 0 to 4% of procedure-related morbidity has been documented.[12,13] In a different investigation, we identified 119 individuals with DL and found 3 (2.5%) sequelae but no deaths. A 25% complication rate was reported by Nair C. K. *et al.*[14] for diagnostic laparoscopy in gastrointestinal cancer [15-18].

Our analysis identified two instances of bleeding during surgery and two instances of postoperative morbidity in the form of wound infection. This study's overall morbidity is 11.4% without any associated fatality.

The average hospital stay following SL was 1-3 days, which is much less than open exploration.[17,18] When laparoscopy is the only procedure required, it is more cost-effective than open exploration, with a 55–60% decrease in overall hospital costs.[16]

It is noteworthy that patients only spent an average of 3.97 days in the hospital. Most patients started taking oral medication the very following day.[17] In post-diagnostic laparoscopy, patients were kept off food and liquids for an average of 10±2 hours

(range 8–10 hours), with 9 hours serving as the median.

According to studies, the median hospital stay for patients who underwent just DL was 2 days, while the overall hospital stay was  $2.02 \pm 0.66$  days (range: 1-3 days). The immediate morbidity was 2.5%, and the average operational duration for SL was 48 minutes [17]. Our study's median operative time of 50 minutes and mean operative time of  $49.31 \pm 9.95$  minutes, which is comparable to earlier research.

Due to the small sample size, our study has limitations. Other gastrointestinal cancers were not taken into account in this investigation (pancreatic, hepatic).

### Conclusion

In patients that are declared resectable on radiography, DL can drastically minimise the incidence of needless laparotomies. It can help with the diagnosis of unclear cancers for which image guided biopsy is not advised in radiologically treatable illness (e.g. gall bladder malignancy). By doing a biopsy on peritoneal nodules, liver nodules, lymph nodes, or samples for ascitic fluid analysis, metastatic disease can also be demonstrated. A bigger sample size and multi-institutional research are needed for future studies that include all gastrointestinal malignancies.

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