

# Role of Laparoscopy in Diagnosing and Staging of Abdominal Malignancies: A Prospective Study

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## Abstract

**Introduction:** In the diagnosis of abdominal/extra-abdominal malignancies, a wide range of non-invasive techniques are available to the present day surgeon. The diagnosis and staging of malignancies have been revolutionized by the advent of non-invasive investigations such as ultrasonography, computed tomography, and magnetic resonance imaging.

**Materials and Methods:** This study was conducted in 20 patients admitted on routine opd/emergency basis in GMC Jammu as diagnosed/undiagnosed cases of intra/extra abdominal malignancies from October 2011 to October 2013. All patients with suspected abdominal malignancies were included in the study. Patients with severe co-morbidities were excluded from the study. Patients with contraindications for laparoscopic procedures were excluded from the study.

**Results:** It was seen that staging laparoscopy has a significant role in the management of abdominal malignancies and can improve the outcome in large numbers of patients.

**Conclusion:** We suggest that staging laparoscopy should be a routine tool in the armamentarium of all surgeons operating on abdominal malignancies. It should be used as a diagnostic tool complementing other imaging modalities.

**Key words:** Abdominal, Laparoscopy, Malignancy, Ultrasonography

## INTRODUCTION

In the diagnosis of abdominal/extra-abdominal malignancies, a wide range of non-invasive techniques are available to the present day surgeon. The diagnosis and staging of malignancies have been revolutionized by the advent of noninvasive investigations such as ultrasonography, computed tomography (CT), and magnetic resonance imaging (MRI).<sup>1</sup> However, a definitive diagnosis is not always possible with non-invasive imaging tests. The management of malignancies is becoming more and more complex comprising surgical resection, investigational neoadjuvant, adjuvant or palliative chemotherapy, or supportive care. Despite an increasingly sophisticated

radiological diagnostic armamentarium, many patients with gastric, hepatic, or pancreatic malignancy continue to have the diagnosis of unresectable or metastatic disease made at exploratory laparotomy. For those who do not require palliative procedure, exploration confers little benefit and may be associated with a significant morbidity and mortality affecting both quality and duration of their survival.

However, during the last decade, laparoscopy has replaced open laparotomy as the preferred approach in patients who require surgical diagnosis and staging of cancer.<sup>2</sup> The role of laparoscopy as a biopsy tool is reserved primarily in patients in whom tissue diagnosis is needed to direct therapy but cannot be obtained by image-guided needle biopsy or by endoscopic means. Laparoscopy allows the surgeon to diagnose and obtain information about dissemination of disease and to diagnose patients with equivocal abdominal findings. Laparoscopy has also been used as second-look procedure to evaluate responses to therapy. Surgical laparoscopy offers high accuracy for detecting intra-abdominal small metastasis. Recent studies have suggested that laparoscopy can play a complementary

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role in the staging of abdominal malignancies. It has been found to be more sensitive in detecting hepatic, nodal, and peritoneal metastasis than CT and ultrasonography.<sup>3</sup>

### Aims

The study was done on 20 patients who suffered from various malignant diseases with the following aims and objectives:

1. For proper staging of preoperatively diagnosed intra- and extra-abdominal malignancies
2. For diagnosis and staging of preoperatively histologically undiagnosed abdominal malignancies
3. To look for any abdominal lesion in case of undiagnosed primary.

## MATERIALS AND METHODS

The study was conducted in 20 patients admitted on routine OPD/emergency basis in postgraduate department of surgery, Government Medical College, Jammu, as diagnosed/undiagnosed cases of intra-/extra-abdominal malignancies from October 2011 to October 31, 2012. A brief history was taken along with a detailed physical examination (both systemic and local) and a set of investigations, which were then recorded on a predefined and pretested pro forma. All these patients were subjected to ultrasonography, CT, and other imaging modalities. Diagnostic laparoscopy was also performed in all the patients, and whenever possible, a chunk of tissue was taken with punch biopsy forceps which were sent for histopathological examination for more conclusive diagnosis.

### Inclusion Criteria

1. Patients with intra-abdominal malignancies without distant metastasis on ultrasonography (USG), CT/MRI.
2. Patients with histologically undiagnosed malignancies for obtaining tissue for histological diagnosis.
3. Patients with extra-abdominal malignancies who are having likely chance of intra-abdominal metastasis but not shown/detected by USG, CT/MRI.

### Exclusion Criteria

1. Those who did not consent for laparoscopy.
2. Those patients in whom preoperative workup had confirmed Stage IV disease.
3. Those patients who had contraindication for pneumoperitoneum such as severe chronic obstructive pulmonary disease and cardiac arrhythmias.

## OBSERVATION

The age group with maximum number of cases was 51-60 age group followed by 41-50 and 61-70 age groups with the mean age being 53 years.

There were 12 males (60%) and 8 females (40%). The youngest male patient was 21 years of age and the oldest was 70 years of age, so the mean age of male patient being 53.4 years. The youngest female patient was 40 years of age and the oldest was 70 years of age, the mean age of female patient being 52.6 years.

In the study of 20 patients, there were 6 patients of colorectal (30%), 8 of stomach (40%), 4 of gallbladder (GB) malignancies (20%) and two cases of non-Hodgkin's lymphoma (NHL) (10%).

Out of 18 cases, half were found to be resectable, and the other half were unresectable. About 75% of GB malignancies were found unresectable. For stomach, 50% of malignancies were unresectable. While for colorectal malignancies, 2 (33.3%) out of 6 cases were found unresectable.

After subjecting the patients to diagnostic laparoscopy, it was found that only 5 cases, i.e., 27.7% of patients had liver metastasis. Out of these 5 cases, 2 cases were from stomach and GB each, and only one case was from colorectal malignancy while rest of 13 cases had no hepatic metastasis on staging laparoscopy.

Peritoneal nodules were found in 5 (27.78%) patients with maximum number of cases, i.e., 3 from stomach and one each from colorectal and GB.

Omental nodules were found in 4 (22.22%) patients. All these nodules were found in gastric malignancies only.

Pelvis is one of the most important sites for malignant deposits due to the gravitational effect; it is found on laparoscopy that only 3 patients out of total 18 had pelvic deposits. Moreover, there was one case with positive pelvic metastasis in each group.

Only 1 (5.5%) case, i.e., of GB malignancy had mesenteric nodules.

In GB malignancies, there was upstaging in 3 out of 4 cases (75%). All these were considered resectable, but after laparoscopy, it was found that only one case was resectable while the other 3 were unresectable.

In colorectal malignancies, in Stage II, there was upstaging in 2 cases out of 3 (66.6%), and out of 3, one case was found to be unresectable. While in Stage III, there was upstaging in 2 out of 3 (66.6%), and out of 3, one case was found to be unresectable.

In case of stomach malignancies, in Stage II, there was upstaging in 1 case out of 3 (33.3%), and one out of 3 was found to be unresectable. In Stage III, there was upstaging

in 3 out of 4 (75%), and out of these 4, 3 cases were found to be unresectable (75%), thus preventing unnecessary laparotomy in 75% of cases.

## DISCUSSION

Our aim was to study the role of diagnostic laparoscopy for staging in abdominal malignancies. Diagnostic laparoscopy was performed in 20 patients admitted to Government Medical College, Jammu, during October 2011–October 31, 2012. Diagnostic laparoscopy was performed in each patient immediately before the planned elective surgery. It resulted in change in the further course of management of significant number of patients and was associated with low morbidity.

Out of 20 cases studied, 12 were male patients and 8 were female patients constituting 60% and 40%, respectively. Patient ranged from 21 years to 70 years with the mean age being 53 years. Maximum patients in our study were in the age group 51-60 followed by 41-50 and 61-70 years. It was observed that abdominal malignancies show increasing trend with age. Studies conducted by Ozmen *et al.*, Hemming *et al.*, and Lehnert *et al.* also showed that incidence of abdominal malignancies was higher in males as compared to the females and also the incidence increases with age.

In our study, there were 20 cases comprising 8 (40%) cases of stomach tumor, 6 (30%) cases of colorectal, 4 (20%) cases of biliary tract malignancies, and 2 cases of NHL (10%). Similar trend was also seen in the study conducted by Muntean *et al.*

Liver metastasis was found in 5 (27.7%) cases while 13 cases had no liver involvement on staging laparoscopy (SL). Various studies conducted by Lehnert *et al.*, Muntean *et al.*, and Ozmen *et al.* revealed that liver metastasis was found in a 12-33% of cases. Moreover, in the study conducted by Muntean *et al.*, it was found that 18 out of 20 cases of colon tumor had liver metastasis with 2 of them being unresectable.<sup>4</sup>

Peritoneal nodules were found in 5 (27.7%) cases in our study. Mostly, they were seen in patients with stomach malignancies. Only one case of colorectal malignancy and one case of GB malignancy had peritoneal nodules. The previous studies conducted by Muntean *et al.* and Ozmen *et al.* have revealed peritoneal nodules in 32.3% and 16.6% cases, respectively. These peritoneal nodules were missed on CT scan and other imaging modalities. SL was found to be most sensitive modality for peritoneal seedlings.

Omental nodules were found in 4 cases, and all the cases were of carcinoma stomach. No GB and colorectal malignancies resulted in omental nodules.

Mesenteric and pelvic nodules are not found commonly and were reported in only 1 and 3 cases, respectively. Pelvic nodules were seen in one case of colorectal malignancy. One case of stomach tumor had secondaries on bilateral ovaries found on staging laparoscopy. Mesenteric nodules were not seen in colorectal and stomach tumors. Only one case of GB malignancy had mesenteric nodule. One case of GB tumor was found to have Krukenberg tumour.<sup>5</sup>

On SL, 9 cases were deemed resectable and 9 cases as unresectable. Thus, 50% cases were found to be unresectable on SL. These patients were prevented from undergoing unnecessary exploratory laparotomy. Muntean *et al.* and Hemming *et al.* in their studies had seen that SL in intra-abdominal malignancies is of value and can prevent futile laparotomies.

Further subdivision according to tumor site revealed 4 cases of stomach malignancies to be unresectable out of total 8 cases (50%). Out of 6 colorectal malignancies, 2 (33.3%) were found unresectable on diagnostic laparoscopy. Out of 4 GB cases, 3 were found to be unresectable (75%). High unresectability of GB malignancy was found in our study due to small sample of patients as well as aggressive nature of GB malignancy.

In our study, 50% of stomach tumors were found to be unresectable.

There were 6 cases of colorectal malignancies which were further comprised of 2 cases of cecum and ascending colon, 2 cases of splenic flexure, and 2 of rectum; only 2 (33.3%) cases were found to be unresectable. While Muntean *et al.* found in their study that 20% cases were unresectable. Grobmyer *et al.* in their study on diagnostic laparoscopy before planned hepatic resection for colorectal metastasis found that SL prevented non-therapeutic celiotomy in 10% of patients.

Only 4 cases of extra-hepatocellular tumors were present in our study, out of which 3 were found to be unresectable on SL. Muntean *et al.* found 50% cases to be unresectable which were found to have extensive spread on SL.

There were total nine, i.e., 50% cases that were found to be resectable on SL and all of them underwent definitive procedure. Two cases of unresectable colorectal tumor underwent colostomy as a palliative procedure.

Mean duration of SL was 18.83 min (10-30 min). It was little higher in unresectable group compared to resectable (20 vs.

17 min respectively) which was found to be significantly different. Muntean *et al.* in their study had 48 min mean operative time for SL (25-90 min). In this extended study, SL, peritoneal lavage, laparoscopic ultrasonography (LUS), including color Doppler were done resulting in more mean time for SL. Short duration that is based only on inspection of abdominal organ surfaces can be performed very quickly (usually within 10-20 min), can be done through one or two ports, and has good diagnostic accuracy. Extensive procedure includes opening up of lesser sac, assessment of vessels, and LUS.

There was no complication and mortality related to diagnostic laparoscopy itself.

## CONCLUSION

SL has a very significant role in abdominal malignancies. It is very accurate in assessing peritoneal seeding, hepatic metastasis which was not found on imaging modalities. A short SL performed just before the planned surgical procedure to certify the operability is found to be safe and very effective and need not to be performed as a separate procedure. However, short SL is less sensitive in staging compared to extended SL and use of LUS.

SL is found to be more useful in staging gastric and extra-hepatic biliary tumor when compared to colorectal cancers. It gives additional information regarding extent

if the disease intra-abdominally which changes the course of management in significant number of patients. It has a significant impact in decisions regarding the treatment plan in patients. It helps in more careful planning of palliative and resectional procedure in advanced condition. It also spares malignancy patients from unnecessary laparotomies and has an associated decreased morbidity, pain, and faster recovery.

However, as per our own experience and that from the pertinent literature, we suggest that SL should be a routine tool in the armamentarium of all surgeons operating on abdominal malignancies. It should be used as a diagnostic tool complimenting other imaging modalities.

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