

Laparoscopy in Gastro- Intestinal Tumors

Ahmed Abd Elmawgoud El-Tokhy

Department of General Surgery, Faculty of Medicine, Al-Azhar University, Egypt

Corresponding author: A. El-tokhy, Email.eltokhy81@gmail.com phone.01153477679

ABSTRACT

Background: Cancer is a major public health problem worldwide. Many studies have shown that the completion of adjuvant chemotherapy improves the survival rate.

Objectives: The aim of the current study was to discuss the efficacy and role of diagnostic and therapeutic laparoscopy as a new trend in managing gastrointestinal tumors.

Patients and Methods: This prospective study included a total of 50 patients, whom had gastro-intestinal tumor diagnosed by tissue biopsy and histopathology attending at General Surgery Department, Sayed Galaal Al-Azhar University Hospital. The hospital statistically significant data for the included 50 patients, pre and post diagnostic laparoscopy and surgical intervention were collected and analyzed.

Results: A significant percentage of intra-abdominal cancers prove to be inoperable because of metastatic or locally advanced disease despite a preoperative workup suggesting a potentially resectable disease.

Conclusion: It could be concluded that diagnostic laparoscopy is accurate staging tool for gastro intestinal tumors as staging method prior to surgery that can change plan to start neoadjuvant chemotherapy (CTR) instead of surgery. Laparoscopic surgery shows also short post- operative patient stay at hospital and early start of CTR.

Keywords: Diagnostic Laparoscopy, Staging of abdominal malignancies, Staging Laparoscopy, Operability, Resectability.

INTRODUCTION

Laparoscopy dates back to 1901 when George Keeling of Dresden, Germany performed diagnostic laparoscopy on the dog's peritoneal cavity. Using a cystoscope introduced through trochar with pulmonary pneumonia with filtered air. His style was described in the German Biological and Medical Association as koelioskopie, published in 1902 ⁽¹⁾.

Laparoscopy in general surgery was mainly performed for the diagnosis of liver disorders and abdominal trauma, until the intuition of Lukichev in 1983 and Muhe in 1985 who performed their personal technique of laparoscopic cholecystectomy in humans ⁽²⁾.

Although its incidence is low, stomach cancer remains global, the third most common cause of cancer-related deaths. An estimated 1 million new cases of stomach cancer were reported in 2008. Two out of three cancers occurred in East Asia, Eastern Europe and South America, with 78% of the deaths occurring, compared to 65% of cancers. The Industrial World ⁽³⁾. The incidence of small

bowel cancer has steadily increased over the past two decades. The overall incidence has steadily increased from 11.8 cases per million people in 1973 to 22.7 cases per million people in the most recent decade ⁽⁴⁾.

Colorectal cancer is the second most commonly occurring cancer in the USA and was estimated and to affect over 150,000 men and women in 2005. Based on epidemiological studies, there is convincing data that obesity is an important risk factor for colorectal cancer ⁽⁵⁾.

The initial application for laparoscopy was diagnostic only, however this tool rapidly became popular across the world for viewing and diagnosing of a wide range of intra-abdominal pathology. The technique improved with the

descripatiensions and inventions of the Trendelenburg position in 1912, the use of needle insertion to obtain pneumoperitoneum, and the creation of the dual-trochar technique, which opened the door to operative laparoscopy ⁽¹⁾.

Most of the abdominal malignancies on exploration were found to be unresectable or non-operable. Despite advances in radiology, pre-operative imaging studies are far less accurate in staging. Staging of the malignancy is very important that each patient receives necessary treatment with less morbidity ⁽⁶⁾.

Despite advances in technology, the accuracy of radiographic evaluation in identifying hepatic metastasis and peritoneal disease in gastric cancer is limited. In one study the accuracy of ultrasound (US) and CT in detecting liver metastasis was only 76 % and 79 %, respectively similarly, peritoneal carcinomatosis was only correctly identified by US and CT in 84 % and 81 % of cases, respectively ⁽⁶⁾.

Starting laparoscopy is a safe and effective starting method in patients with stomach cancer. It avoids the unnecessary abdomen in a large number of patients and should be mandatory if new treatment is planned ⁽⁶⁾.

The aim of the current study was to discuss the efficacy and role of diagnostic and therapeutic laparoscopy as a new trend in managing gastrointestinal tumors.

PATIENTS AND METHODS

This prospective study included a total of 50 patients, whom had gastro-intestinal tumor diagnosed by tissue biopsy and histopathology attending at General Surgery Department, Sayed Galaal Al-Azhar University

Hospital. **Approval of the ethical committee and a written informed consent from all the subjects were obtained.** This study was conducted between January 2016, and December 2017.

The hospital statistically significant data for the included 50 patients, pre and post diagnostic laparoscopy and surgical intervention were collected and analyzed. Patient demographics, clinical presentation, surgery, histopathology, postoperative course, and oncological outcomes were also reviewed and analyzed.

Inclusion criteria: All patients with malignant gastro-intestinal tumors proved to be operable and resectable by preoperative radiological investigations.

Exclusion criteria: Patients unfit for surgery. Patients with inoperable or irresistible gastro-intestinal tumors proved by preoperative radiological investigations and were candidates for surgical palliation. Patients with laparoscopic contraindication: Anatomic Limitations (Reoperative abdomen- Intraperitoneal mesh- Cirrhosis and portal hypertension- Peritonitis- Mechanical bowel obstruction- Gravid uterus) Physiologic Limitations (CO₂ retention /hypoventilation- Decreased venous return/

metabolic acidosis- Hemorrhage/ shock- Ventriculoperitoneal shunt- coagulation disorders- Pregnancy).

Data registry from the patients will fill the following: History taken, Clinical general examination

Routine preoperative laboratory investigations: Complete Blood Count, INR, serum creatinin, liver enzymes, serum albumin, serum electrolytes, ECG, Echocardiogram for known cardiac patients, hypertension (HTN) patients over 50 year and above 60 year. Pulmonary function test for esophageal tumor patients and chronic chest disease patients, to exclude ineligible cases.

Radiological imaging: CT abdomen for patients with stomach, small bowel, colon tumors, and MRI abdomen and pelvis for rectosigmoid tumor patients, CT chest for lower third esophageal tumor patients and triphasic CT dynamic MRI for liver in suspicious hepatic lesion patients.

Patient had undergone diagnostic laparoscopy then continue as laparoscopic or open surgery according to European Society of surgical oncology guidelines (ESSO).

RESULTS

Table (1): Result of preoperative diagnostic laparoscopy.

Cause of non op		No.	%
Radiological imaging	Operable	50	100.0%
Diagnostic laparoscopy	Inoperable	19	38.0%
	Operable	31	62.0%
Locally invasion	Negative	36	72.0%
	Positive	14	28.0%
Multiple LN	Negative	41	82.0%
	Positive	9	18.0%
Malignant ascites	Negative	48	96.0%
	Positive	2	4.0%
Peritoneal deposit	Negative	45	90.0%
	Positive	5	10.0%

This table shows that 50 patients whom preoperative radiological imaging (CT/MRI) show that tumor is respectable. Preoperative diagnostic laparoscopy find 31 (62%) patients had respectable and operable tumor and 19 (38%) had unrespectable or inoperable tumors. Out of those 19 there was 4(25%) had local invasion to surround structure, multiple enlarged lymphnode was in 9(18%). Peritoneal malignant deposit was 5(10%). Malignant ascites was 2(4%) of inoperable case.

Table (2): Type of surgical intervention post diagnostic laparoscopy and time required to start chemotherapy post-operative.

		Total no. = 31
Type of surgery in operable	Lap	14 (45.2%)
	Open	17 (54.8%)
Starting CTR after Op day	Mean ± SD	16.39 ± 6.66
	Range	7 – 29

This table show that laparotomy and open surgical resection in 17 (54.8%) of cases, while continue on laparoscopic procedure and laparoscopic resection in 14 (45.2%). Early recovery and starting post-operative chemotherapy range from day 7-29 post-operative with mean 16.39±6.66.

Table (3): Relation between the site of tumor and diagnostic laparoscopy result.

Site of tumor	Inoperable		Operable		Test value*	P-value	Sig.
	No.	%	No.	%			
Colon	5	25.0%	15	75.0%	10.00	0.001	HS
Colorectal	5	35.7%	9	64.3%	2.286	0.130	NS
Esophagus	2	66.7%	1	33.3%	0.667	0.414	NS
Small bowel	2	50.0%	2	50.0%	0.000	1.000	NS
Stomach	5	55.6%	4	44.4%	0.222	0.637	NS

This table shows statistically highly significant for colon cancer radiology in assisting local invasion and ascites by 5 cases (25%) found inoperable P-value (0.001) on other hand cancer esophagus, stomach, colorectal radiological imaging was non-significant.

Table (4): Cause of inoperable case:

		Inoperable		Operable		Test value*	P-value	Sig.
		No.	%	No.	%			
Locally invasion	Negative	5	26.3%	31	100.0%	31.725	0.000	HS
	Positive	14	73.7%	0	0.0%			
Multiple LN	Negative	10	52.6%	31	100.0%	17.908	0.000	HS
	Positive	9	47.4%	0	0.0%			
Malignant ascites	Negative	17	89.5%	31	100.0%	3.399	0.065	NS
	Positive	2	10.5%	0	0.0%			
Peritoneal deposit	Negative	14	73.7%	31	100.0%	9.064	0.003	HS
	Positive	5	26.3%	0	0.0%			

P-value > 0.05: Non significant; P-value < 0.05: Significant; P-value < 0.01: Highly significant

*: Chi-square test

This table shows highly significant to locally invasion of surround structure T4 tumors 14 (73%) P-value (0.00), multiple LN highly significant 9(47.4%) P-value (0.00), peritoneal deposit highly significant 5(26%) P-value (0.003), while malignant ascites 2(10.5%) non-significant P-value (0.065).

Table (5): Diagnostic laparoscope result

Diagnostic laparoscope	Radiological imaging	
	Operable	
	No.	%
Inoperable	19	38.0%
Operable	31	62.0%

Sensitivity of radiological imaging = 62.0%

Table (6): Early recovery in laparoscopic approach versus open laparotomy:

Starting CTR after Op day	Lap	Open	Test value	P-value	Sig.
	No. = 14	No. = 17			
Mean ± SD	10.64 ± 3.73	21.12 ± 4.39	7.068	< 0.001	HS
Range	7 – 21	15 – 29			

DISCUSSION

Many patients with digestive cancers present with locally advanced or metastatic disease and therefore accurate staging assists in the appropriate treatment selection for cure or palliation. Moreover, research regarding neoadjuvant protocols for locally advanced cancers is ongoing, which makes accurate staging imperative. Even after modern preoperative imaging screening (trans- abdominal and endoscopic ultrasound, CT scan, MRI and PET scan), many patients are found to have unsuspected, unresectable disease at exploration⁽⁷⁾.

Staging laparoscopy (SL) may aid in the more accurate staging of digestive cancers, offering guidelines for the most appropriate treatment and avoiding the morbidity associated with non-therapeutic laparotomy⁽⁷⁾. The procedure enables the direct inspection of intra-abdominal organs and facilitates obtaining biopsy specimens and aspiration cytology.

Laparoscopic ultrasound (L-US) can be used to evaluate deep organ parts that are not amenable to inspection. In some patients, the therapeutic intervention can be performed through a laparoscopic approach. The use of DL altered treatment in 8.5–59.6% of cases, avoiding laparotomy in 8.5–43.8% of cases⁽⁸⁾.

In this study we used diagnostic laparoscopy on 50 patient of primary GIT tumors 36 male and 14 female, 31 patients found operable, where 14 continue as laparoscopic and 17 underwent open laparotomy and 19 patients (38%) of patients avoided unnecessary laparotomy.

Esophageal cancer preoperative imaging may suggest resectable disease, though a significant percentage (20- 65%) of esophageal cancers is found to be unresectable at the time of exploration⁽⁹⁾.

In this study 3 patient of esophageal cancer underwent DL, 2 patients (66.7%) found to be inoperable.

For gastric cancer, several investigators reported that diagnostic laparoscopy has an accuracy of 89-100% for staging, identifies occult metastasis or unresectable disease, and avoids nontherapeutic laparotomy in 13-57% of gastric patients despite a negative preoperative imaging workup⁽⁹⁾.

In this study 9 patient of CA stomach underwent diagnostic laparoscopy, 5 patients (55.6%) found inoperable.

Over the last 10 years, laparoscopic surgery for colon cancer has dramatically increased. Many factors have contributed to this increase. The dissemination and implantation of cancer cells at the port site can be successfully prevented during the surgical procedure. Also, many studies have reported on the short- and the long-term follow-up results of laparoscopic and open surgery, and those results have consistently shown the oncological outcome of laparoscopic surgery not to be inferior to outcome of open surgery. This is the major reason laparoscopic surgery is recognized as a safe

surgical method nowadays. Moreover, advances in surgical techniques and development of various laparoscopic surgical instruments are other causes for this increase⁽¹⁰⁾.

The stage of cancer, its histologic grade, lymphovascular invasion, and adjuvant chemotherapy have been reported to be factors that influence the survival rate of colon cancer patients^(11,12).

with primary colorectal cancer but without evidence of systemic metastases seldom benefit from diagnostic laparoscopy, primarily because of its low yield in identifying occult or subclinical metastasis but also because most patients undergo a colectomy (laparoscopic or open) with curative intent or as palliation for bleeding, obstruction, or perforation. When colorectal cancer presents with isolated liver metastases without evidence of extra hepatic disease, diagnostic laparoscopy with intraoperative ultrasonography can be extremely useful for the identification of the number and location of hepatic metastases as well as to rule out peritoneal or extra hepatic disease. When a staging laparoscopy is performed for this indication, a Nontherapeutic laparotomy can be avoided in 25-45% of patients^(7,13).

In this study 5 patients (25%) of cancer colon and 5 patients (35.7%) colorectal. Due to use of tri-phasic CT liver and dynamic MRI liver low number of liver metastasis found in this study case.

On other hand local invasion by tumor can't be well assisted.

Patients who undergo laparoscopic surgery have some advantages, including shorter hospital stay and recovery period, early postoperative ambulation and physical activity, and reduced postoperative pain⁽¹⁴⁾.

This result showed that the laparoscopic group started their chemotherapy earlier, that affected difference between the two groups was statistically significant ($P = 0.044$).

In our study P value 0.001 highly significant at GIT tumor patient preoperative we assisted for surgery and chemotherapy fitness so after wound healing can started their first does in laparoscopic patient its around 7-15 day while open laparotomy around 14-20 in normal case if sepsis occur its delayed the time around 7 more day⁽¹⁵⁾.

CONCLUSION

It could be concluded that diagnostic laparoscopy plays an important role in abdominal malignancies. It is very accurate in detecting peritoneal deposits and hepatic deposits which are not detected on imaging modalities. Diagnostic laparoscopy, performed before the planned surgical procedure to know the operability is found to be safe and effective. Laparoscopy is found to be more useful in staging of gastric, pancreatic cancers, when compared to colon cancers. Staging Laparoscopy gives more details about extent of the disease which changed the course of management in significant number of patients.

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