

Diagnostic Laparoscopy in Gastric Cancer: An Essential Tool for Proper Staging

Sherif A. Mustafa, Tamer A. El-Bakary, Mohamed A. Mlees

General Surgery Department, Tanta University Hospital, Egypt.
mohamedmless@gmail.com

Abstract: Background: Gastric cancer is a leading cause of cancer related death worldwide. Pre-operative accurate staging is crucial for proper planning of treatment strategy. In spite of great advances in CT scan, MRI, PET scan, and endoscopic ultrasound (EUS), about 30% of resectable tumors will have distant metastases at the time of surgery. **Aim:** to assess the role of diagnostic laparoscopy in proper pre-operative staging of gastric cancer and reducing the number of unnecessary laparotomies. **Patients & Methods:** the study included 35 patients with resectable gastric adenocarcinoma as proved by pre-operative CT scan and EUS. All the patients were submitted to diagnostic laparoscopy prior to the definitive resection. **Results:** in 8 out of 35 patients (22.8%), the curative resection was postponed due to presence of liver nodules in 2 patients (5.7%), peritoneal metastases in 2 patients (5.7%), and ascetic fluid in 4 patients (11.4%). Pathological examination revealed malignant nature in 7 out of these 8 patients. In 1 patient with ascites, cytological examination of the ascetic fluid did not show malignant cells. Diagnostic laparoscopy had a sensitivity rate 100% & a specificity rate of 96.4%. Morbidities or mortalities were recorded with diagnostic laparoscopy in this study. **Conclusion:** diagnostic laparoscopy is a sensitive tool in detecting distant metastases of gastric cancer if compared to CT scan & EUS. It helps to avoid unnecessary laparotomy with low morbidity and mortality rates.

[Sherif A. Mustafa, Tamer A. El-Bakary, Mohamed A. Mlees. **Diagnostic Laparoscopy in Gastric Cancer: An Essential Tool for Proper Staging.** *Life Sci J* 2016;13(12):7-9]. ISSN: 1097-8135 (Print) / ISSN: 2372-613X (Online). <http://www.lifesciencesite.com>. 2. doi:[10.7537/marslsj131216.02](https://doi.org/10.7537/marslsj131216.02).

Keywords: Gastric cancer, diagnostic laparoscopy, staging.

1. Introduction:

Gastric cancer is considered the fourth most common cancer all over the world (1). More than 21000 new cases are diagnosed every year in the United States (2). Pre-operative accurate staging is important for proper assessment of the extent of the disease which is the most important factor in determining the patient prognosis and planning the treatment strategy (3). Endoscopic ultrasound (EUS) has recently evolved as an important tool for pre-operative staging and assessment of the depth of invasion of gastric cancer (4).

In spite of the great development of the diagnostic tools including EUS, CT scan, MRI, and PET scan, about 30% of patients with pre-operative M0 disease will have occult metastasis in the liver, peritoneum, or non-regional lymph nodes at the time of surgery (5). So, in these cases, curative resection should not be attempted as it will not show any improvement in survival. Unnecessary laparotomy was reported in up to 25% of gastric cancer patients with 13-23% morbidity rate of this laparotomy (6). Diagnostic laparoscopy can be done for gastric cancer patients to detect these occult metastases and hence, it can help the surgeon to avoid exposing the patient this unnecessary laparotomy (7). According to National Comprehensive Cancer Network (NCCN) guidelines in 2013 (8), locally advanced gastric cancer (T2 or higher with any N) should be treated by pre-operative

neoadjuvant chemo-radiotherapy. But, in case of laparoscopic finding of metastatic disease (M1), the treatment strategy should be changed to palliative therapy.

The aim of the present study is to assess the usefulness of diagnostic laparoscopy in improving the pre-operative staging of gastric cancer patients and reducing the incidence of unnecessary laparotomies.

2. Patients & Methods:

Between January 2013 and July 2016, thirty five patients with proven gastric adenocarcinoma were included in this study. All the patients had abdominal CT scan and EUS for tumor staging and detection of any metastasis.

Patients with metastatic disease, ascites, or unresectable tumors were excluded from the study. Prior to the definitive treatment, patients were submitted to diagnostic laparoscopy, where 30 degrees scope was inserted through 10 mm supra-umbilical incision with placement of 5 mm port in the left hypochondrial region. The T stage is assessed by looking for serosal involvement or involvement of adjacent organs. The N stage was assessed by looking for lymph nodes involvement. Then, we assessed for M stage by looking for liver nodules, peritoneal nodules, and examining the whole abdomen and pelvis for ascetic fluid.

Any suspicious nodule was biopsied for histopathological examination while a sample of the ascetic fluid was taken for cytological assessment. If there was no distant metastasis or malignant ascites, the surgeon can proceed directly to the curative resection.

3. Results:

This study included 35 patients presented with non-metastatic adenocarcinoma as proven by pre-operative CT scan and EUS.

The T stage of the patients included in our study as proven by EUS was as follows: 9 patients with T1 (26%), 5 patients with T2a (14%), 11 patients with T2b (31.5%), 6 patients with T3 (17%), and T4 was found in 4 patients (11.5%).

All the patients were submitted to diagnostic laparoscopy prior to curative resection. Age of the patients ranged between 43 and 68 years with mean of 55.97 years. There were 24 males (68.6%) and 11 females (31.4%). All the 35 tumors were M0 as proven by CT scan and EUS. However, on diagnostic laparoscopy, only 27 tumors (77.14%) were non metastatic. In 8 patients (22.8%), definitive therapy was deferred due to detection of liver nodules (figure 1) in 2 patients (5.7%), peritoneal metastases in 2 patients (5.7%), and ascetic fluid in 4 patients (11.4%). (figure 2 & Table 1).

Table 1: Patients and tumor criteria in the included study

	No.	%
Sex of the Patients		
Male	24	68.6
Female	11	31.4
T Stage:		
T1	9	26
T2a	5	14
T2b	11	31.5
T3	6	17
T4	4	11.5
Surgical Findings:		
Non Metastatic	27	77.14
Suspected Metastasis:	8	22.8
Liver Nodules	2	5.7
Peritoneal Nodules	2	5.7
Ascites	4	11.4

Pathological examination revealed malignant nature in 7 out of these 8 patients. While in 1 patient with ascites, cytological examination of the ascetic fluid did not show malignant cells. So, he was submitted to curative resection. According to these results, sensitivity of diagnostic laparoscopy was 100% while its specificity was 96.4%.

By using diagnostic laparoscopy, 7 patients (20%) were saved against exposure to unnecessary laparotomy and they were shifted directly to palliative adjuvant therapy. There was no morbidity or mortality related to the diagnostic laparoscopy.

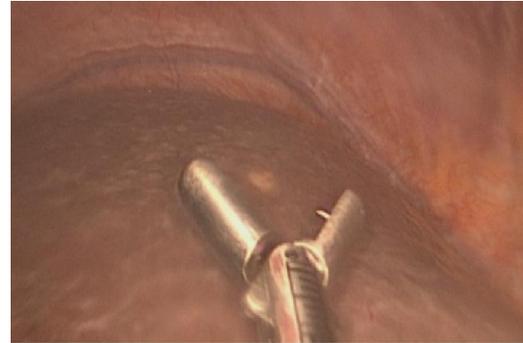


Figure 1: Taking biopsy from a suspicious liver nodule

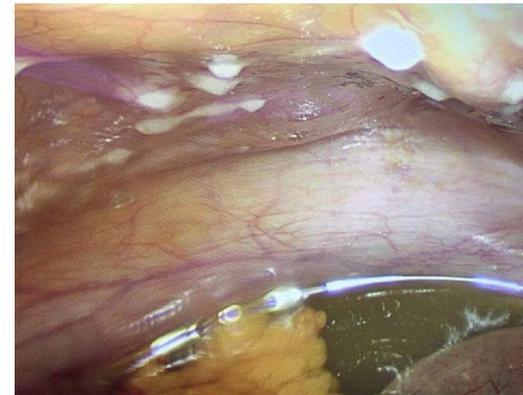


Figure 2: Suspicious peritoneal nodules and ascites

4. Discussion:

As in any malignancy, pre-operative staging of cancer stomach is a crucial step in assessing the prognosis and planning the treatment strategy. Recent diagnostic modalities e.g. CT scan and MRI do not have the sufficient accuracy. Depending on their results alone may expose the patient to unnecessary laparotomy (9). Assessment of tumor resectability by laparotomy was reported to have morbidity rate of 13-23% and mortality rate of 10-21% in unresectable patients (10). Limitations of CT scan in proper staging of gastric cancer may include concurrent perforation, T3 tumors in which extra-mural tumor may not be differentiated from early local peritoneal involvement, and the time lapse between CT scan and surgery specially in patients who received neoadjuvant therapy (11). Recently, EUS has been integrated as a part of gastric cancer staging (8) as it shows clearly the depth of invasion of the tumor into the gastric wall (4).

The main limitation of EUS is its low sensitivity in detection of peritoneal metastasis that is only 34% (12).

Diagnostic laparoscopy is an effective tool for diagnosis of metastasis, directing therapy, and avoiding unnecessary laparotomy with minimal morbidity (7, 13).

In 8 patients included in the current study (22.8%), the diagnostic laparoscopy showed liver nodules, peritoneal nodules, and ascetic fluid. Metastatic nature was confirmed in 7 out of these 8 patients with a sensitivity rate of 100%. So, diagnostic laparoscopy saved 7 patients (20%) unnecessary laparotomy with no morbidity or mortality.

These results are consistent with results from other studies. Gretschel et al reported in their study a sensitivity rate of 85% for detection of peritoneal metastases by diagnostic laparoscopy (14). In another study by Karanicolas et al (13), they reported that in 30% of patients futile laparotomy can be avoided by diagnostic laparoscopy.

The metastatic disease was diagnosed in 17% of cases by diagnostic laparoscopy in another study by Mahadevan et al (9).

However, diagnostic laparoscopy is not without limitations. T1 and T2 patients are difficult to be assessed by laparoscopy. Also, the lymph node status assessment did not show significant difference when we compare laparoscopy with CT scan (15).

In conclusion, the use of diagnostic laparoscopy in patients with gastric cancer is a simple procedure with low morbidity rates. It can reduce the number of unnecessary laparotomies in patients with advanced disease. We believe that it should be performed as a first step in patients booked for curative resection of gastric cancer.

References:

1. ParkinDM., Bray F., Ferlay J., & Pisani P. (2005): Global cancer statistics:2002. CA. Cancer J Clin.; 55: 74-108.
2. Jemal A., Siegel R., Ward E., et al (2008): Cancer statistics: 2008. CA Cancer J. Clin.; 58: 71-96.
3. Martin RI., Jaques D., Brennan M., & Karpheh M. (2002): Achieving R0 resection for locally advanced gastric cancer: Is it worth the risk of multigrain resection? J. Am. Coll. Surg.; 194: 568-577.
4. Cho JW. (2015): The role of endosonography in the staging of gastro-intestinal cancer. Colin. Endosc.; 48: 297-301.
5. Sarela A., Lefkowitz R., Brennan M., & Kapeh M. (2006): Selection of patients with gastric adenocarcinoma for laparoscopic staging. Am. J. Surg.; 191: 134-138.
6. Yano M., Tsujinaka T., Shiozaki H., et al (2000): Appraisal of treatment strategy by staging laparoscopy for locally advanced gastric cancer. World J. Surg.; 24: 1130-1136.
7. Lehnert T., Rudek B., Kienle P., et al (2002): Impact of diagnostic laparoscopy on the management of gastric cancer: prospective study of 120 consecutive patients with primary gastric adenocarcinoma. Br. J. Surg.; 89: 471-475.
8. Ajani JA., Bentrem DJ., Besh S., et al (2013): Gastric cancer, Version 2.2013, Featured updates to the NCCN guidelines. J. National Comprehensive Cancer Network; 11,5: 531-546.
9. Mahadevan D., Sudirman A., Kandasami P., & Ramesh G. (2010): Laparoscopic staging in gastric cancer: An essential step in its management. J. Mini. Access Surg.; 6, 4: 111-113.
10. Viste A., Hawgstvedt T., Eide GE., & Swreide O. (1988): Post-operative complications and mortality after surgery for gastric cancer. Ann. Surg.; 207: 7-13.
11. Burbidge S., Mahady K., & Naik K. (2013): The role of CT and staging laparoscopy in the staging of gastric cancer. Clin. Radio.; 68: 251-255.
12. Wahg Z. & Chen JQ. (2011): Imaging in assessing hepatic and peritoneal metastases of gastric cancer: a systemic review. BMG Gastroenterol.; 11: 19-23.
13. Karanicolas PJ., Elkin EB., Jacks LM., et al (2011): Staging laparoscopy in the management of gastric cancer: A population-based analysis. J. Am. Coll. Surg.; 5: 644-651.
14. Gretschel S., Siegel R., Estivez-Schwarz L., et al (2006): Surgical strategies for gastric cancer with synchronous peritoneal carcinomatosis. Br. J. Surg.; 93: 1530-1535.
15. McCulloh P., Johnson M., Jairam R., & Fischer W. (1998): Laparoscopic staging of gastric cancer is safe and affects treatment strategy. Ann. R. Coll. Sure. Engl.; 80: 400-402.