Impact of diagnostic laparoscopy in the management of gastric cancer in Egyptian patients

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Received 6 December 2018
Accepted 18 December 2018

The Egyptian Journal of Surgery 2019, 38:394–398

Background
Gastric cancer (GC) is one of the leading causes of cancer-related deaths. In Egypt, it is the 14th among cancers mortality. Preoperative imaging as Computed Tomography and Endoscopic Ultrasonography have limitations in predicting the advanced disease, leading to many unnecessary laparotomies with more morbidity and mortality. Therefore, diagnostic laparoscopy (DL) may play a vital role in preoperative staging.
The aim of the work
was to evaluate the role of diagnostic laparoscopy (DL) in detecting peritoneal, liver metastasis and malignant ascites.
Methods
40 patients of GC were involved, preoperative abdomen CT scan was done. DL was done under general anesthesia through 3 ports, the liver and whole peritoneal surfaces were examined for any metastasis, also any ascites was aspirated if there was no ascites irrigation with saline was done and re-aspirated. Any metastasis was biopsied and examined by frozen section also any aspirate was underwent immediate cytological examination.
Results
DL was positive in 12 patients (30%), detected as the following; 6 patients with liver deposits, 4 patients with peritoneal deposits and 2 patients with positive cytology. Therefore these 12 patients avoided unnecessary laparotomy, while the remaining 28 patients underwent curative resection of the tumor.
Conclusion
About 30% of GC is advanced once diagnosed. DL may be very helpful in detecting metastatic tumor missed by CT scan. Liver metastasis is the commonest metastasis of GC. Patients with positive DL avoid unnecessary laparotomy, and this does not delay them of having palliative treatment.

Keywords:
diagnostic laparoscopy, gastric cancer, linver metastasis, peritoneal deposits

Egyptian J Surgery 38:394–398

1110-1121

Background

Gastric cancer (GC) is the 5th most common malignancy in both sexes representing 6.8% of their total with an estimated 950,000 cases in 2012 worldwide.[1]

At the Egyptian National Cancer Institute (ENCI), GC is the 14th most common cancer representing 1.8% of cases in both sexes. The median age of GC in the Egyptians is 56 years. The incidence rises with age and 55% of cases occur between 50 and 70 years of age.[2]

Screening asymptomatic individuals for gastric cancer is controversial even in areas with a relatively high incidence of GC usually, it is performed by upper endoscopy and contrast studies. Moreover, there are only limited data that suggest that these programs may decrease the incidence of GC in areas of high incidence.[3]

Diagnosis of GC usually is made by upper endoscopy and biopsy, while staging of the tumor requires performing abdominal CT scan (CT), Endoscopic Ultrasonography (EUS), Positron Emission Tomography (PET) scan and CT chest.

There are two major staging systems of gastric cancer:

(a) The most widely used system developed by the American Joint Committee on Cancer (AJCC) and the Union for International Cancer Control (UICC), which based upon tumor, node, metastasis *(TNM)* and the current version is (seventh edition, 2010).[4]

(b) The less commonly used one is the Japanese classification system based upon refined anatomic location, particularly of the lymph node stations.[5]

Abdominal CT scan is usually performed early in the preoperative evaluation after a diagnosis of GC is made. It helps in evaluating widely metastatic disease, especially hepatic or adnexal metastases, ascites, or distant nodal spread avoiding the patients' unnecessary laparotomy, on the other hand, it inaccurately assesses the depth of the primary tumor and misses the peritoneal metastases and hematogenous metastases smaller than 5 mm and lymphadenopathy smaller than 8 mm.[6]

EUS is thought to be the most reliable nonsurgical method available for evaluating the depth of invasion of primary GC. EUS generally provides a more accurate prediction of T stage than does CT scan, also it gives the opportunity of having a biopsy. But the limitation of the field of vision of echoendoscope limits its use in assessing the distant metastasis, and being an operator-dependent procedure makes variability in findings.[7]

The role of PET scan using 18-fluorodeoxyglucose (FDG) in the preoperative staging of gastric adenocarcinoma is questionable, as a negative PET is not helpful since even large tumors with a diameter of several centimeters can be falsely negative if the tumor cells have a fairly low metabolic activity. Furthermore, most diffuse type gastric cancers (signet ring carcinomas) are not FDG avid.[8]

Tumor Markers as carcinoembryonic antigen (CEA), the glycoprotein CA 125 antigen (CA 125), CA 19-9 (carbohydrate antigen 19-9), and cancer antigen 72-4 (CA72 – 4) may be elevated in patients with GC, while they are not recommended in the NCCN guidelines.[9]

Unfortunately, 20 and 30 percent of patients who have the disease that is beyond T1 stage on EUS will be found to have peritoneal metastases despite having a negative CT scan. The risk of finding occult peritoneal dissemination is even higher for certain subsets of patients, including those with advanced (T4) primary tumors, or a linitis plastica appearance.

Therefore, in patients of advanced GC not detected preoperatively, unnecessary laparotomy would be of a high morbidity and mortality for such patients, while SL has the advantage of directly visualizing the liver surface, the peritoneum, and local lymph nodes. This may alter management by avoiding an unnecessary laparotomy in about half of the cases.[10]

The aim of the work

The aim of the present study was to evaluate the impact of diagnostic laparoscopy in the management of Egyptian patients with gastric cancer by detecting the presence of peritoneal, hepatic metastasis and malignant ascites.

Patients

The study was carried out on 40 patients who were admitted to Gastrointestinal Surgery Unit, Main Alexandria University Hospital over the period of (March 2017 to March 2018), with histologically proven GC that was found operable on CT scan of the abdomen/pelvis.

All patients received detailed information on diagnostic laparoscopy and only those who agreed to the study protocol were finally enrolled in the study.

Any patient with evidence of metastatic disease, complicated by obstruction, hemorrhage, or perforation, severe upper abdominal adhesions from prior surgery that may preclude the procedure and medical contraindication for pneumoperitoneum was excluded from the study.

Surgical procedures

The patients were in a supine position. The surgeon was located at the patient's right side and the monitor was beside the patient's left shoulder.

After induction of general anesthesia, a small supraumbilical or subumbilical incision was made. Abdominal access was established preferably with Verres Cannula or open technique. pneumoperitoneum was created with carbon dioxide and maintained at a pressure of 14 mmHg.

The first trocar (10 mm) is inserted through the same incision and the peritoneal cavity was entered and examined with 0° or 30°vision telescopes. A second (5 mm) or even a third (5 or 10 mm) trocar was inserted in the right hypochondrium and the left flank (Figure 1**)** respectively, and were used as the working ports which were placed to elevate the left liver lobe or mobilize the omentum for optimized visibility of the stomach or gastro-esophageal junction.

Then the four quadrants were inspected thoroughly for any malignancy. As the pelvis was inspected in

Figure 1

Trocar sites at DL.

Trendelenburg's position, while after that inverted Trendelenburg's position was established and the upper abdomen was visualized.

Inspection of, the surface of the stomach, liver surfaces, gastro-hepatic and gastro-colic omentum, right and left paracolic space, and the inferior surface of the transverse mesocolon and mesenteric root is performed, and the surface of the entire bowel was first examined.

In cases of tumors located in or invading the posterior gastric wall and those located in the proximal third, the lesser sac was entered by dissection of the gastrocolic omentum and the posterior wall of the stomach and the peritoneal surface of the lesser sac was examined.

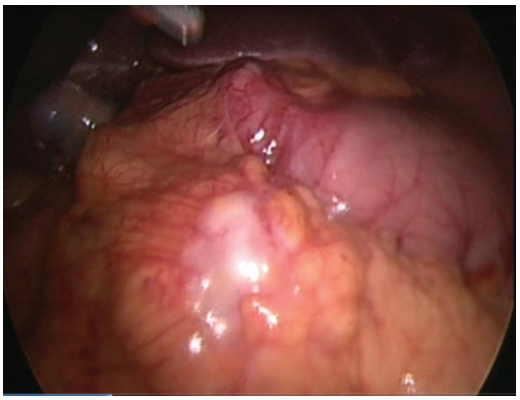
All liver or peritoneal lesions about which there is suspicion of metastasis were biopsied by Tru-cut or wedge biopsy for pathological demonstration.

If there was ascites, aspiration was obtained and cytological examination was done or peritoneal lavage was performed with 300 cc of saline for cytological examination of the peritoneal fluid. When the cancer cells are found in the peritoneal washing, the patient was classified as positive cytology.

All patients with potentially resectable disease, with or without invasion to adjacent organs, are immediately converted to open surgery for a formal resection trial. Patients with peritoneal implants, distant metastasis or ascites were considered irresectable and laparotomy was not performed.

The operative time was observed, also any intraoperative or postoperative complication of the procedure in a short-term follow up were recorded.

Figure 2



Peritoneal deposit by DL.

Results

The study included 24 (60%) males and 16 (40%) females. The age ranged from 33 to 65 years, with mean patient age was 47.3_+ 10.6 years.

Clinical staging was applied for all patients using the TNM staging system, 8 patients were stage II while 32 patients were stage III.

The site of the tumor was identified using upper endoscopy 28 (70%) patients had distal tumor while 12 (30%) patients had a proximal tumor.

Sorting of the tumor according to their histological type according to Lauren classification showed that, 24 (60%) were of intestinal type while 16 (40%) were of a diffuse type.

DL was done for all cases, time of the procedure was observed showing that maximum time was 75 minutes while minimum time was 30 minutes, with a mean operative time 52+-14, so the procedure is operator dependent with a learning curve

Ascites were found in 6 cases, 2 of them were positive by cytology and 4 were negative, while in the remaining 34 cases aspirate after saline irrigation was examined cytologically showing a negative result.

During DL, 12 (30%) patients revealed advanced disease, as 6 patients with liver metastasis, 4 with peritoneal metastasis and 2 patients with positive cytology (Figure 2**)**.

About 23.5% of all patients with distal gastric cancer and 66% of all patients with proximal gastric cancer diagnosed as advanced.

About 25% of all patients with intestinal type while 37.5% of diffuse type had positive DL.

In the 12 patients with positive laparoscopy, 2 of them was staged as stage II while other 10 were stage III.

During DL, morbidity was 2.5 % as intraoperative bleeding which was controlled successfully, while mortality was 0%.

Discussion

GC remains a lethal disease, in Egypt, it is the 12th leading cause of cancer death representing 2.2% of the total cancer mortality. The high mortality rate reflects the prevalence of advanced disease at presentation and relatively aggressive biology.[11]

Resection offers the best chance for long-term survival for patients with localized GC, A while a major problem is the identification of patients at a time when they are potentially curable.

Therefore, optimal therapy depends upon the accurate staging of the extent of disease, therefore DL has the advantage of directly visualizing the liver surface, the peritoneum, and local lymph nodes. This may alter management by avoiding an unnecessary laparotomy in about half of the cases.[10]

The current study revealed the high incidence of GC in males and elderly, this also was observed in Strandby RB et a study [12], included 159 (76.1%) were men and 83 (23.9%) were women, the age ranged from 50 to 70 years, in contrast to Luis F et al study [13] that 78 men and 73 females, with a mean age of 54.3+_ 13.9 .

Some studies suggest that all patients with EUS stage T3/4 disease should undergo SL, but not those with earlier-stage disease, as the risk of finding occult peritoneal dissemination is higher for these patients, [14] while in our study we were dependent only on preoperative CT of the abdomen to assess transmural invasion of the tumor and any patient who had any lesion more than T1 were included.

This was compatible with consensus-based guidelines from the NCCN, to use preoperative DL for any medically fit patient who appears to have more than a T1 lesion with no histologic confirmation of stage IV disease, and who would not otherwise require a palliative gastrectomy because of symptoms.

DL is not a time consuming one especially with its great clinical impact, also it has a learning curve.[13,15]

In current study 30% of the patient were advanced, these results were consistent with Luis F et al study, [13] where DL was the only procedure in 47 patients (31.1%) of 151 patients.

DL visualizing the liver and peritoneal surfaces, revealed that liver deposits are the commonest metastasis of GC, 15% of our patients had liver deposits.

Which were similar to Showkat MK et al.[15] where hepatic metastasis is most commonly found lesions in about 9 patients.

DL detected lesions essentially needs pathological confirmation as in *Luis F et al study* [13] Two were false positives as one patient with a liver granuloma and one patient with granulomatous lesions mimicking peritoneal implants. On the other hand, our results were all confirmed by pathology report, thus may attribute to a small number of patients.

On the other hands, some studies did not include the peritoneal washing in their procedure assuming that it is not important in absence of metastasis, despite DL gives the opportunity to perform peritoneal cytology in patients who have no visible evidence of peritoneal spread, as in *Showkat MK et al.*[15]

Other studies perform a cytological examination, considering positive cytology as advanced disease, this is consistent with our protocol in the management of GC.[13] More advanced GC (II-III) is associated with increased risk of being advanced at laparotomy, 10 (25%) of our patients were of stage III and Strandby RB et al.[12] were 91% with stage T3/T4 with an N-stage ≥1 of patients with a positive SL.DL may alter the management plan of GC by avoiding laparotomy once metastasis detected, 12 patients (30%) in our study aborted laparotomy and referred for palliative treatment, also *Showkat MK* et al. [15] study 18 an unnecessary laparotomy was averted in 14 (28%) patients, also in *Luis F et al.*[13] study laparoscopy was the only procedure in 47 patients (31.1%)..

In the current study, the follow up was of short duration, but there were little complications were detected, only one case suffered minimal intraoperative bleeding which was controlled laparoscopically.

Complications as low-degree fever were recorded, Insufflation of the preperitoneal, progression of malignant disease in the sites of insertion of the first trocar was recorded in some studies.[13]

Conclusion

About 30% of GC is advanced once diagnosed, as CT scan of the abdomen is not enough for preoperative staging. Therefore diagnostic laparoscopy may be very helpful in detecting metastatic tumor missed by CT scan.

Liver metastasis is commonly found in advanced gastric cancer. Patients with positive diagnostic laparoscopy avoid unnecessary laparotomy, and this does not delay them of having palliative treatment. diagnostic laparoscopy is of a little complication and short postoperative hospital stay.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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