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IMMEDIATE PREOPERATIVE LAPAROSCOPIC ASSESSMENT OF RESECTABILITY OF PANCREATIC HEAD CARCINOMA

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To evaluate the role of laparoscopy in assessment of resectability of pancreatic head carcinoma, immediate preoperative laparoscopic staging was done for 18 patients with stage I disease. In absence of laparoscopic evidence contraindicating immediate operative treatment, resection was performed in the same sitting, but in presence of laparoscopic evidence of metastases, laparotomy was deferred and suitable biliary bypass was done later. Tumors in 12 patients (66.67%) were resectable. Tumors were resectable at laparotomy in 10 out of 12 patients (83.33%) as tumor infiltrated the portal vein in 1 patient (8.33%) and peripancreatic lymph nodes were involved in 1 patient (8.33%). The tumors were unresectable after staging laparoscopy in 6 patients (33.33%). Multiple hepatic nodules were present in 2 patients (11.11%), multiple small peritoneal metastases were present in 1 patient (5.56%), a nodule in the greater omentum was located in 1 patient (5.56%) and about 70-100 ml of ascites were aspirated from two patients (11.11%). Histopathological examination confirmed the presence of malignancy in the nodules and ascitic fluid in 1 patient while no malignancy was found in the ascitic fluid of the other patient. One patient developed mild infection at the trocar site and another patient developed mild bronchitis.
We conclude that laparoscopic examination is a valuable routine undertaking before laparotomy and operative assessment of resectability in patients with pancreatic head cancer as it optimizes patient selection for curative resection by avoiding unnecessary laparotomies. It does not significantly increase either the hazards or the operative time and its performance immediately before laparotomy avoids repeated exposure to anesthesia and shortens hospitalization time.

Key Words: Laparoscopy staging - pancreatic head carcinoma.

INTRODUCTION

Pancreatic cancer is one of the most commonly diagnosed malignancies. Whereas surgical resection with curative intent represents the only chance for long term survival, patients often present at late stages.[1] In the past, many patients with suspected pancreatic carcinoma underwent exploratory laparotomy for proper staging and possible curative or palliative therapy, even though only approximately 5-10% of patients met surgical criteria for curative resection. Laparotomy was justified because it provides a histologic diagnosis of malignancy and palliative biliary bypass.[2,3,4]

Imaging techniques such as abdominal ultrasonography, computed tomography, magnetic resonance imaging, CT guided biopsy, endoscopic retrograde cholangiopancreatography and visceral angiography helped surgeons for diagnosis and proper staging. Open exploration that may not offer the patient any benefits , may be associated with significant morbidity and mortality affecting both quality and duration of survival in patients who do not require palliative procedures.[5,6] With current development of techniques of endoscopic palliation, the need for laparotomy for palliative surgical bypass is questionable. The financial, emotional and psychological implications of a fruitless laparotomy are obvious.[7]

The concept that staging laparoscopy can avoid unnecessary exploration in patients with pancreatic cancer

is well known. It may demonstrate CT-occult M_1 disease by detecting peritoneal or surface liver metastasis.[8] It may also assess primary tumor extension to the superior mesenteric and coeliac vessels, colon, duodenum and jejunum after creation of a window in the gastrohepatic omentum.[8]

Staging laparoscopy may be used either as a separate staging procedure or as a part of combined approach in which initial laparoscopy precedes possible laparotomy.

The aim of this study is to evaluate the role of immediate preoperative laparoscopic staging in detection of resectability of pancreatic head carcinomas.

PATIENTS AND METHODS

This study was carried out on 18 patients with potentially curable stage I (T_{1-2} N_0 M_0) pancreatic head carcinoma according to the American Joint Committee on Cancer (AJCC)[9] admitted to the Department of General Surgery in Tanta University Hospital during the period from December 1998 to October 2002. Abdominal ultrasonography, abdominal computed tomography and endoscopic retrograde cholangiopancreatography were done to the patients. Magnetic resonance imaging of the abdomen and visceral angiography were needed in some cases. Biopsies from suspected metastatic lesions were taken for histopathological diagnosis under ultrasonographic or CT guidance.

Patients were subjected to immediate preoperative laparoscopic staging to assess the resectability of pancreatic head carcinoma. Patients with conditions contraindicating laparoscopy were excluded from this study.

Laparoscopic staging

Immediate preoperative laparoscopic staging was done under general anesthesia. Four cannulas (umbilical {10-11 mm}, left, right subcostal and left lumber {5 mm}) were used for inspection of the abdominal cavity. The peritoneal cavity was examined for peritoneal deposits, hepatic metastases and ascites. Examination of the mesocolon, duodenum, jejunum, superior mesenteric vessels and lymph nodes was possible after creation of a wide window in the gastrocolic omentum and introduction of 30-degree angle telescope inside the lesser sac. Biopsies from suspected metastatic lesions were taken for histopathological examination. Peritoneal irrigation was done with isotonic saline that was then aspirated for cytological examination.

Laparotomy

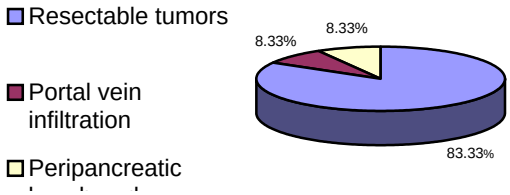
In absence of laparoscopic data contraindicating immediate operative treatment, laparotomy was done in the same sitting. Exploration of the abdomen included careful exclusion of hepatic or gross lymph node metastases, tumor infiltration of the adjacent great vessels or hepatoduodenal ligament as will as local examination of the tumor to detect resectability. If the tumor proved resectable, either pylorus preserving pancreaticoduodenectomy or classical Wipple's procedure was performed. In presence of laparoscopic data contraindicating immediate operative treatment, laparotomy was deferred for histopathological diagnosis and suitable biliary bypass was done later.

RESULTS

Laparoscopy was performed to18 stage I patients (defined on clinical and radiological basis). The average time of laparoscopic staging including biopsy taking was 35 ± 4.29 minutes (range 20-45 minutes).

Lparoscopically staged resectable group

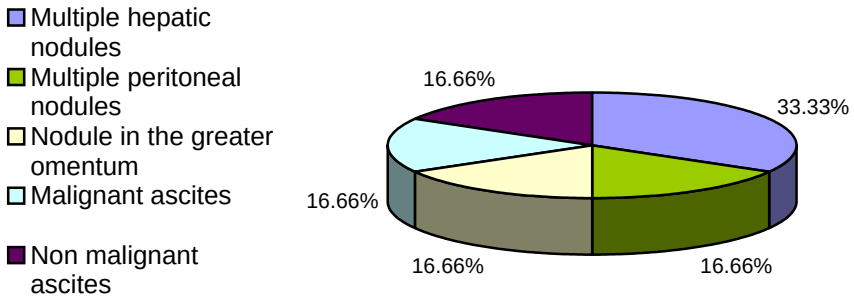
Tumors in 12 patients (66.67%) proved to be resectable (laparoscopically stage I). Laparotomy was done in the same sitting. Tumors were found resectable (surgically stage I) in 10 out of 12 patients (83.33%). They were subjected to either pylorus preserving pancreaticoduodenectomy or classical Wipple's procedure. Exploration of the abdomen revealed that tumor infiltrates the portal vein in 1 patient (8.33%). Some peripancreatic lymph nodes were involved in 1 patient (8.33%). Pancreaticoduodenectomy with lymphadenectomy was attempted for him. Cytological examination after peritoneal irrigation was done with no evidence of malignancy in these 12 patients.



(Fig. 1): Laparotomy staging and histopathological examination in laparoscopically resectable group (12 patients)

Lparoscopically staged unresectable group

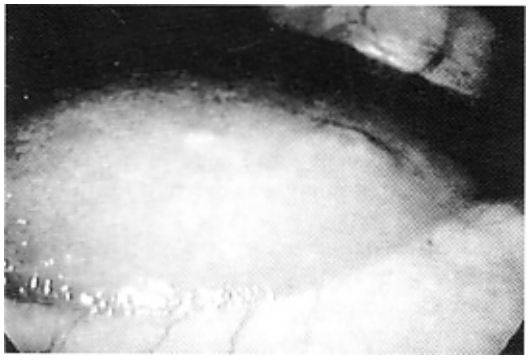
The tumors proved to be unresectable after staging laparoscopy in 6 patients (33.33%). Multiple hepatic nodules each less than 1cm in its greatest dimension were found in the anterior surface of the right and left lobes respectively in two patients (11.11%). It was possible to demonstrate multiple small peritoneal metastases in 1 patient (5.56%). A nodule about 1.5x1.5 cm in the greater omentum was located in 1 patient (5.56%). It was possible to find a small volume of ascites (about 70-100 ml after aspiration) in two patients (11.11%). Biopsies were taken from the nodules. Histopathological examination confirmed the presence of malignancy in the nodules. Cytological examination cells centrifuged from the ascitic fluid showed no evidence of malignancy in one patient while malignant cells were found in the other patient. Cytological examination after peritoneal irrigation done before taking biopsies showed malignancy in 4 out of these 6 patients. No malignant cells were found after peritoneal irrigation in the patient with 2 nodules in the surface of left hepatic lobe. Laparotomy was deferred for this group and suitable biliary bypass was done later. The patient with mild ascites free of malignancy had good liver functions so he was treated with pylorus preserving pancreaticoduodenectomy. One patient developed mild infection at the trocar site and another patient developed mild bronchitis.



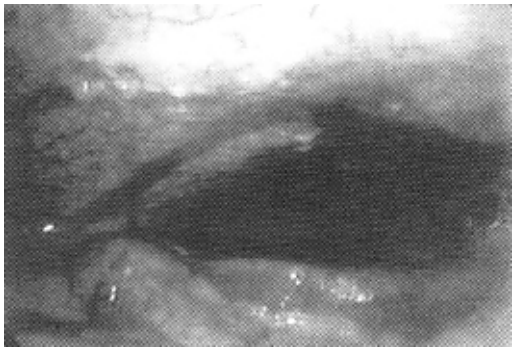
(Fig. 2): Laparotomy staging and histopathological examination in laparoscopically unresectable group (6 patients)

Table (1): *Comparison between clinical, radiological, laparoscopic and laparotomy staging of studied patients*

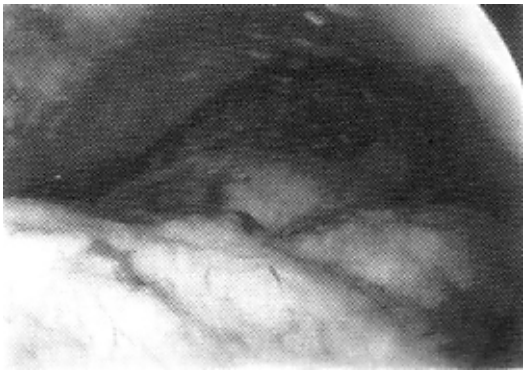
Stage	*Clinical and Radiological staging*	*Laparoscopic staging*	*Laparotomy staging and histopathological examination*
Stage I	18 patients	12 patients	11 patients 10 patients out of 12 staged laparoscopically as stage I 1 patient : minimal ascites devoid of malignant cells
Stage II		No patients	1 patient infiltration of the portal vein
Stage III		No patients	1 patient Involved peripancreatic lymph nodes
Stage IV		6 patients 2 patients: multiple hepatic nodules 1 patient: multiple peritoneal nodules 1 patient: nodule in the greater omentum 2 patients: ascites	5 patients 2 patients : multiple hepatic nodules 1 patient : multiple peritoneal nodules 1 patient: nodule in the greater omentum 1 patient : malignant ascites



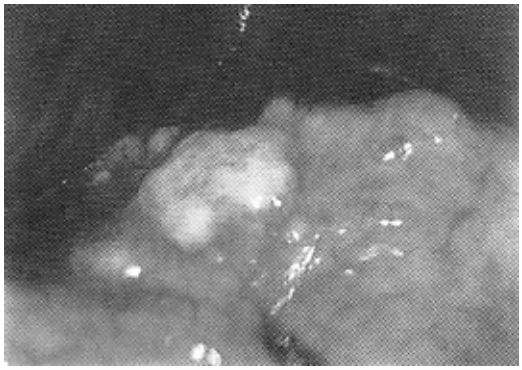
(Fig. 3): Laparoscopic view showing multiple hepatic nodules in the anterior surface of the left lobe



(Fig. 4): Laparoscopic view showing malignant ascites



(Fig. 5): Laparoscopic view showing peritoneal metastases



(Fig. 6): Laparoscopic view showing a nodule in the greater omentum

DISCUSSION

The currently available radiological tools have greatly revolutionized preoperative staging of pancreatic carcinoma, but their accuracy has not been enough to eliminate totally the misery of unnecessary laparotomy for an unresectable tumor.

The value of diagnostic laparoscopy in detection of CT occult metastatic disease especially in the liver and peritoneum is well established.[10] In the present study tumors proved to be unresectable after staging laparoscopy in 6 patients out of 18 (33.33%). In a series including 89 patients with pancreatic head carcinoma with no evidence of metastatic disease by CT, metastases were identified at laparoscopy in 27 patients (24%) while in another series by the same authors including 125 patients in the M_0 stage by CT, extrapancreatic disease was identified at laparoscopy in 39 patients (31%).[11] John et al.[12] prospectively performed laparoscopy to 40 patients whose lesions were resectable by traditional evaluation and detected occult metastases in 35% and treatment plane was changed in 25% of the patients.

Laparoscopy can also be used to identify tumor extension to critical retroperironeal vascular structures and to determine tumor extension to the stomach, mesocolon, duodenum or jejunum.[8] Laparoscopic examination of the pancreas can be facilitated by retraction of the liver from the duodenum and the lesser curvature of the stomach to expose the lesser omentum. The pancreas can then be approached from a supragastric, infragastric or intramesocolic approach.[13]

Some investigators have questioned the value of laparoscopy in detection of mesenteric or retroperironeal vascular involvement. They think that intraperitoneal inspection has a limited reliability in detection of mesenteric or retroperironeal vascular involvement. [14] We found that laparoscopy cannot assess the retropancreatic vascular involvement as they are difficult to be directly visualized even after creation of gastrocolic window.

The lack of tactile sensation limits the ability to assess intraparynchymal lesions in the head of pancreas as well as previously undetected intraparynchymal metastatic lesions of the liver.[7] The use of laparoscopic ultrasonography, unfortunately unavailable in our hospital, would enable direct visualization of the primary tumor and its association with the vasculature and peripancreatic lymphatics and soft tissues. Taylor et al.[15] reported that laparoscopic ultrasonography prevented unnecessary extensive surgery in 53% of the patients in his study and the positive predictive value of laparoscopic ultrasonography for defining tumor resectability was 91%. They concluded that laparoscopic ultrasonography is an accurate additional investigation for defining tumor resectability and directing management in patients with potentially resectable carcinoma of the pancreatic head.

While it is clearly desirable to minimize the number of patients who undergo unnecessary laparotomy, it may be equally important to quantify the number of patients who undergo tumor resection relative to the number of patients who undergo an invasive staging procedure requiring general anesthesia (i.e. laparoscopy), particularly when laparoscopy is performed under a separate general anesthesia induction. This may be compared with the 'radiographic resectability rate', i.e. the number of patients who undergo successful resection divided by the number of patients believed to have resectable disease following optimal pre-laparoscopy non-invasive staging.[10] Review of the experience with extended laparoscopy at Memorial Sloan-Kettering revealed a resectability rate (number resected/number undergoing laparotomy without resection after being assessed resectable by laparoscopy) of 91%[16] versus 83.33% (10 of 12 patients) in our study. However, the radiographic resectability rate in the same series was 53%[16] versus 61.11%(10 of 18 patients) in our study.

CONCLUSION

Our results suggest that laparoscopic examination is a valuable routine undertaking before laparotomy and operative assessment of resectability in patients with pancreatic head cancer as it optimizes patient selection for curative resection by avoiding unnecessary laparotomies. It does not significantly increase either the hazards or the operative time and its performance immediately before laparotomy avoids repeated exposure to anesthesia and shortens hospitalization time.

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