

# THE EFFICACY OF VIDEO LAPAROSCOPY FOR RESECTABILITY PREDICTION OF GASTRIC CANCER

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**Abstract-** Cancer of the stomach carries poor prognosis. Surgery is the best treatment for gastric cancer. Prediction of survival depends on the stage at the time of presentation. Fluoroscopy, sonography, and computerized tomography are used for advanced gastric cancers staging, but they are not accurate enough to grade advanced gastric cancers. Laparoscopic findings of lesions under direct vision, are magnified 15 times and have been used for gastric cancer staging and more specific prediction. To demonstrate the importance of laparoscopy, we carried out this study on 84 confirmed cases of gastric cancer prior to laparotomy. Results of computerized tomography were compared with the findings of laparoscopies, and laparotomy was the gold standard in this study. Abdominal CT of gastric lesions had recommended resectability in 84 cases. Resectability was believed possible by laparoscopy only in 65 patients (19 false positives). Sixty-five patients were considered to have true positive diagnosis of resectability and one false negative and two false positive cases had false laparoscopic finding, which were confirmed by laparotomy and all of them were resectable. Eleven patients were diagnosed as stage IV because distant metastases were found during laparoscopy. This study showed that there are 42% differences between CT and laparoscopic findings. In this study the sensitivity and specificity of CT for stage II are respectively 77.7% and 82% but sensitivity and specificity of laparoscopy for stage III are respectively 78% and 55% and sensitivity and specificity of laparoscopy for stage III gastric cancer are respectively 94.5% and 100%. Laparoscopic examination is a valuable tool for diagnosing metastases and should be used for the management of advanced gastric cancers. We observed that 22% of patient had no need to undergo surgical operation, if they had pre-operative laparoscopic examination. This study suggests that terminally ill patients, and in advanced gastric cancer where surgery may be ineffective, laparoscopic examination may predict and avoid unnecessary surgical interventions.

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**Key Words:** Abdominal surgery, laparoscopy, gastric cancer, resectability prediction, cancer staging

## INTRODUCTION

Cancer of the stomach carries poor prognosis. However, long term survival is possible if the patients are diagnosed at an early stage. The disease is incurable in about half of the patients at presentation. More than two third of patients in United States present at stages III and IV (1). The classification is based on liver metastases, lymph nodes involvements, and ascites but these are not accurate enough to grade advanced gastric cancers (2,3). With regional lymph node metastases, five-year survival after gastrectomy is about 10%. In those with only perigastric lymph node involvement survival rises to 30%, and in those with gastric carcinoma confined to the stomach, five-year survival is about 70% (4). Only 10% of patients with hepatic metastases survive for one year. Nowadays, both curative and palliative surgery are the

best forms of treatments, but most of these patients are encountered late, and the cancer may be unresectable or even inoperable. Some patients with distant metastases undergo by-pass procedures, because it has palliative effects and prevents further obstruction (2). Prediction of survival depends on the stage of the cancer at the time of presentation. Endoscopy, computed tomography (CT), endoscopic ultrasonography (EUS), and laparoscopy have been reported to be useful in the selection of candidates for surgical resection or identification of occult metastatic disease (5). Sometimes patients undergo unnecessary surgical operations and suffer intensified pain with laparotomy. This can be avoided by pre-operative laparoscopy. Laparoscopy permits the diagnosis of peritoneal metastasis in 20-30 percent of Western patients with gastric cancer in whom no such involvement was seen by CT scanning, and who would have been otherwise considered potentially resectable (6). Because computerized tomography may not recognize small liver metastases, small peritoneal deposits, and lymph nodes involvement, accurate staging of advanced gastric cancers by CT scanning results in failure (7).

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Laparoscopy has been used since 1971 in gastric cancer as part of the pretherapeutic staging protocol and to perform palliative procedures or even gastrectomy (8). However, its role in the selection of patients for resection or for the best therapeutic option has not been definitely stated. The aim of the present study is to compare the results of abdominal CT staging system with the laparoscopic findings and to evaluate the prediction of resectability. In laparoscopic examination, the lesions are directly seen up to 15 times magnified, which enables the physician to recognize small liver metastases, peritoneal depositions and lymph nodes involvements easily. It may also find remote metastases (9). During the past two decades increased videoscopies abilities and advanced technology with better insufflations, has broadened vision with new video cameras. It has been reported that diagnostic videoscopy can decrease unnecessary surgical procedures up to 67% (10). To demonstrate the efficacy of video laparoscopy for resectability prediction, we carried out this study in North of Iran on 84 confirmed cases of gastric cancer prior to laparotomy.

## MATERIALS AND METHODS

In this retrospective study, the records of patients with gastric adenocarcinoma diagnosed by endoscopy and biopsy were reviewed. The preoperative staging protocol included clinical history, physical examination, chest x-ray, blood cell count, blood coagulation tests, liver function tests, blood chemistry, urinalysis, endoscopy, and abdominal CT scan. Patients with tumors of 4 cm or with tumor invasion limited to mucosa or submucosa by this preoperative protocol did not undergo laparoscopy, given the low probability of unsuspected metastasis, and a surgical resection trial was performed. Patients with distant metastatic diseases underwent palliative treatments, and laparoscopy was not performed, nor was it performed in patients with gastric outlet obstruction because gastro-jejunal bypass was indicated.

### Routine laparoscopic technique

The surgeon is stationed on the patient's right side and the monitor is beside the patient's left shoulder. Pneumoperitoneum is developed using the veress needle with gas pressure of approximately 15 mmHg through a small infraumbilical incision. The first trocar (10 mm) is inserted through the same incision and the peritoneal cavity is entered and examined with 0° side

vision telescopes. The pelvis is inspected, and in suspected cases liquid is aspirated for cytological examination or peritoneal washing with 150 ml saline is performed. Then the upper abdomen is visualized. A second (5 mm) or even a third (10 mm) trocar (ethicon) are inserted in the right hypochondrium and the left flank, respectively. Inspection of pelvic cavity, liver surfaces, gastro-hepatic and gastro colic ligament, right and left paracolic space, and inferior surface of the transverse mesocolon and mesenteric root is performed.

In cases of tumors located in or invading the posterior gastric wall, the lesser sac is entered by section of the gastrocolic ligament through avascular area. The posterior wall of the stomach and the peritoneal surface of the lesser sac, are examined. All liver or peritoneal suspected lesions are biopsied for pathological demonstration. Additionally, all accessible and suspicious lymph nodes are biopsied. Peritoneal implants or distant metastases are considered unresectable and laparotomy is not indicated unless palliative resection appears feasible. The accuracy of laparoscopic diagnosis of metastasis was calculated, and the gold standard was the surgical pathology demonstration of metastatic lesions (liver, ovarian, peritoneal). However, isolated liver metastasis and limited peritoneal metastasis (H1 and P1 metastatic disease) were considered as relative criteria of resectability (11). Diagnostic sensitivity and specificity were calculated as a measure of accuracy. During a seven years period between October 1994 to October 2001, 113 consecutive gastric carcinoma patients were referred to our department. Eighty-four patients with gastric cancer stage II or more were selected for laparoscopic examinations for gastric cancer's staging and to predict resectability. Results of computerized tomography were compared with the findings of laparoscopies. Later, all of patients were explored by laparotomy as gold standard of our investigation.

## RESULTS

Out of 113 patients, in 22 (19.4%) patients, laparoscopy was not indicated because CT scan demonstrated metastatic disease of stage IV (hepatic, peritoneal, pulmonary, or ovarian metastasis or extensive retroperitoneal disease). The tumor was apparently small and resectable in 7 patients (6.1%), therefore considered as stage I, and they underwent laparotomy. Eighty four laparoscopies were attempted

## Resectability prediction of gastric cancer

on 84 patients (74% of 113). The cases studied were 53 male and 31 female in age group 50-79 years with a mean age of  $64.2 \pm 12$  years.

In abdominal CT, the cancer was confined to stomach (stage II) in 28 patients with no evidence of metastatic lesions. In 56 patients, definite focal metastasis were reported in lymph node, pancreas, or adjacent organs (stage III). In 28 cases with no evidence of metastasis in CT, laparoscopy revealed that only 16 (57%) cases had confirmed gastric lesion (stage II). But 7 cases had prevesel lymph node involvement and 5 cases had extension to liver and pancreas, showing 12 (42%) false negative diagnosis of stage II, which were reported by CT. Therefore in this study the sensitivity and specificity of laparoscopy for stage II are respectively 90% and 86%. In 56 patients with definite focal metastasis to adjacent organs (stage III) which was reported by CT, laparoscopy found unresectable large prevesel lymph nodes in 9 cases and distant metastases in two cases. The detailed findings are as follows:

Resectable single metastasis to a distant organ in one case.

Multiple small foci to distant organs in 5 cases.

Ascites confirmed malignancy by cytology in 2 cases.

Multiple foci in liver with multiple deposits in peritoneum (3 cases).

In 2 patients there were no metastases at laparotomy (False positive diagnosis).

Therefore the sensitivity and specificity of CT scan for stage III gastric cancer are respectively 78% and 55% but sensitivity and specificity of laparoscopy for stage III are respectively 94.5% and 100%.

Abdominal CT of gastric lesions in this study had recommended resectability in 84 cases. Resectability was believed possible by laparoscopy only in 65 patients (19 CT false positives). Sixty-five patients were considered to have true positive diagnosis of resectability, false negative was found in two cases and false positive in one case. Eleven patients were diagnosed as stage IV because distant metastases were found during laparoscopy.

## DISCUSSION

Regardless of the promising results of the new anti neoplastic drugs and of improved results with radical surgery, the prognosis of patients with gastric cancer remains poor (3). Multimodal induction treatments have received extensive attention as an attempt to

increase the rate of complete tumor resection and to increase survival (12). However, it has been stated that an accurate pretreatment staging system is a prerequisite. Laparoscopy is probably the best diagnostic test for distant metastasis, particularly if combined with CT scan. The role of PET scanning in the staging of gastric cancer is under evaluation (13). In 71 patients studied by Asencio et al. it was shown that laparoscopy was a valuable diagnostic tool for distant metastases (2). In the present study in 42% of patients there was a difference between laparoscopic findings and conventional tools for gastric cancers staging. Computerized tomography can not demonstrate small lesions, they have low accuracy in recognizing less than one-centimeter lesions (14). Nowadays, with the availability of laparoscopy and its high diagnostic accuracy, laparoscopy for gastric cancer staging in all gastric cancer patients especially in stage 2 or higher is the best choice (15). This benefit is due to magnifying effect of laparoscopy (up to 15 times), so liver metastatic lesions are accurately recognizable. Moreover with laparoscopy and sonography, interparenchymal lesions in liver can also be recognized (16). Most studies have shown that preoperative laparoscopic examinations for advanced gastric cancers staging have more diagnostic precision and accuracy than preoperative imaging, and for a considerable number of patients can avoid unnecessary surgery procedures (16). The entire intra-abdominal space can be observed from a small wound, including the lesser sac, and the clinical stage of the patient can be accurately defined. It is easy to obtain ascitic fluid or tissue samples of peritoneal implants in the abdominal wall and from suspicious lymph nodes. Many patients with laparoscopic stage I do not even require laparoscopy because surgical or endoscopic resection is certainly required and resectability is virtually 100%. Endoscopic ultrasound study (EUS) is probably very useful in this setting, identifying small tumors with mucosal or submucosal involvement. Early gastric cancer is accurately differentiated from advanced gastric cancer in 90% of cases by EUS (17) but in our center EUS is not a routine procedure. Serosal involvement defines the second laparoscopic stage, which also entertains feasible surgical resection. However, a high probability of recurrence suggests that these patients should be included in research trials of adjuvant or even neoadjuvant treatments (18). Advanced locoregional disease with invasion to adjacent structures or organs is associated with approximately 50% resectability (palliative resections included). Neoadjuvant multimodal treatments should

be undertaken to increase complete resection rates. The fourth laparoscopic stage includes patients with metastatic disease who should be included in research projects with new drugs or new multimodal approaches.

Peritoneal cytology was not used for staging purposes in our study. The present study in Gilan (North of Iran) showed that in 42% of patients there was some difference between laparoscopy findings and computerized tomography findings. We observed that 22% of patients did not need surgical operations if they had preoperative laparoscopic examination. Lowy et al. reported that they found 16 patients with metastases at laparotomy and only 5% of them needed further laparotomy procedures and 95% escaped from unnecessary laparotomies (6).

There was no postoperative complication of laparoscopy in 84 gastric cancer cases in this study. Dugo et al. did not find any complication in 100 patients undergoing laparoscopic examinations for advanced gastric cancers staging (18). Minared et al. in 90 laparoscopy procedures for pancreatic cancers reported zero complication (19). Our results in present study were similar. In conclusions this study suggests that in terminally ill patients, and in advanced gastric patients where surgery may not be helpful, laparoscopic examination may avoid unnecessary surgical interventions. Pretherapeutic laparoscopy should be used in selected population with gastric cancer with high probability of unresectable disease according to preoperative CT. The results shown in this study demonstrate an excellent correlation of laparoscopic findings with the final histological specimen. Laparoscopic examinations are a valuable tool for diagnosing metastases and should be used for predicting resectability of gastric cancers.

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### **Resectability prediction of gastric cancer**

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