The Role of Preoperative 64 MDCT in the Evaluation of Tumor Stage for Advanced Gastric Carcinoma

Chang-jing WANG, Yan-zhuo SU, Chang LI and Li-bo SUN

Department of Gastrointestinal Colorectal and Anal Surgery, China-Japan Union Hospital of Jilin University, Changchun, China

*Corresponding author

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Abstract. To evaluate the accuracy of preoperative 64–detector row computer tomography (MDCT) enhanced scanner in tumor stage prediction for advanced gastric carcinoma, the data of 62 patients with advanced gastric cancer who underwent preoperative 64 MDCT were retrospectively analyzed. Pathological tumor stage was based on international TNM stage of Gastric Carcinoma Association. All MDCT results were compared with surgical and postoperative pathologic results. Results showed that the prediction accuracy of MDCT for T2, T3 and T4 stage evaluation is 42.8% (9/21), 80.7% (21/26) and 60.0% (9/15) respectively. The prediction sensitivity for N2 metastasis is 75%, sensitivity is 92%, and accuracy is 88.7%. It is concluded that preoperative 64 MDCT can provide relatively higher accuracy for detection of T3 and T4 layer invasion of gastric carcinoma, and help to predict the N2 lymph node metastasis for AGC.

Introduction

Gastric carcinoma is very common in China and other Asian countries. Most of the patients are found in advanced stage, and surgery is still the main strategy of treatment [1, 2]. Therefore, preoperative evaluation of tumor stage becomes very necessary and may help to guide operation style. The resection of second station lymph node (N2) metastasis has been considered as the standard resection for advanced gastric carcinoma (AGC) [3, 4]. In this study, we aims to evaluate the role of 64–detector Row computer tomography (MDCT) in the prediction of tumor depth invasion and N2 lymph node metastasis.

Methods

Patients

Altogether 64 patients were selected in this study, among whom 47 are male and 15 are female. The age is from 39 to 79 with a mean age of 56.3. The diagnosis of gastric carcinoma was based on gastric endoscopy and biopsy. All patients were performed MDCT for stage evaluation and diagnosed by a group of senior doctors of Radiology Department. All the patients received surgery and AGC was confirmed by postoperative pathological examination. The tumor locates at the pylorus in 26 patients, gastric body in 33, and proximal part in 2. Postoperative pathological examination reports middle differentiated carcinoma in 14 cases, lower differentiated carcinoma in 34, undifferentiated carcinoma in 2, and mucinous carcinoma in 11.

MDCT Examination

Different layer invasion is described by certain number of T, for example T2 indicates muscle layer, T3 indicates serosa layer, and T4 indicates surrounding tissue invasion. N2 lymph node refers to the lymph nodes at left gastric artery, common hepatic artery, and those around truncus coeliacus. At least one of the lymph nodes at above area is considered metastasis, N2 positive is identified. Figure 1A shows a case of T3 depth invasion and figure 1B shows a case of N2 positive metastasis.
Depth and N2 Lymph Node Invasion Determination

Different layer invasion is described by certain number of T, for example T2 indicates muscle layer, T3 indicates serosa layer, and T4 indicates surrounding tissue invasion. N2 lymph node refers to the lymph nodes at left gastric artery, common hepatic artery, and those around truncus coeliacus. At least one of the lymph node at above area is considered metastasis, N2 positive is identified. Figure 1A shows a case of T3 depth invasion, and figure1B shows a case of N2 positive metastasis.

![Figure 1. A: The serosa layer is invaded for advanced gastric carcinoma. B: The second station lymph node metastasis found by MDCT.](image)

Results

Depth Invasion Prediction by MDCT

Among the 21 cases of T2 invasion confirmed by postoperative pathological examination, 9 were correctly diagnosed, and 12 was wrongly considered as T3. Of the 26 T3 invasion, 21 were correctly diagnosed. The other 5 were wrongly taken as T2 in 3 cases and T4 in 2 cases. The prediction accuracy of MDCT for T2, T3 and T4 stage evaluation is 42.8% (9/21), 80.7% (21/26) and 60.0% (9/15) respectively. The data of depth invasion prediction by MDCT was listed in Table 1.

<table>
<thead>
<tr>
<th>Preoperative 64 MDCT staging</th>
<th>Postoperative Pathological staging</th>
</tr>
</thead>
<tbody>
<tr>
<td>T2</td>
<td>(21)</td>
</tr>
<tr>
<td>T3</td>
<td>(26)</td>
</tr>
<tr>
<td>T4</td>
<td>(15)</td>
</tr>
<tr>
<td>Accuracy</td>
<td></td>
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</tbody>
</table>

N2 Lymph Node Metastasis Prediction by MDCT

Among the 12 N2 positive cases confirmed by postoperative pathological examination, 9 were correctly diagnosed by MDCT. Of the 50 N2 negative cases, 46 were correctly predicted by MDCT. The prediction sensitivity for N2 metastasis is 75%, sensitivity is 92%, and accuracy is 88.7%. The data of N2 lymph node metastasis prediction by MDCT was listed in Table 2.
Table 2. N2 stage prediction of preoperative 64 MDCT for advanced gastric carcinoma.

<table>
<thead>
<tr>
<th>Postoperative pathological staging</th>
<th>Preoperative 64 MDCT staging</th>
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<tbody>
<tr>
<td></td>
<td>n</td>
</tr>
<tr>
<td>N2+</td>
<td>(12)</td>
</tr>
<tr>
<td>N2-</td>
<td>(50)</td>
</tr>
</tbody>
</table>

Sensitivity: 75%
Specificity: 92%
Accuracy: 88.7%

Discussion

Presently surgery is still the main strategy for the treatment of AGC. Preoperative evaluation of the tumor state is very important for the guidance of operation style and method choice [5, 6]. Besides endoscopy and preoperative biopsy, computer tomography is commonly used to evaluate the tumor stage of AGC [7, 8]. In this study we evaluate the 64 MDCT in the prediction of depth invasion and N2 lymph node metastasis. Our results indicate that MDCT can better predict T3 and T4 depth invasion, but poorly indicate T2 depth invasion. MDCT can present a higher sensitivity and specificity for N2 positive lymph node metastasis.

Depth invasion state decide whether the tumor can be totally removed. If tumor is limited in T3 layer, a radical resection of tumor is quite possible [9], and if T4 layer invasion is suspected combined organ resection maybe necessary [10]. On the other hand, N2 lymph node resection is the standard requirement for operation of AGC. If N2 positive is suspected enough lymph node resection at N2 station should be considered [11], otherwise, modified resection can be selected[12]. Therefore accurate preoperative evaluation of tumor layer invasion and N2 lymph node metastasis state is the critical points for surgeons to select certain operation method.

In conclusion this study suggests that preoperative 64 MDCT can provide relatively higher accuracy for detection of T3 and T4 layer invasion of gastric carcinoma, and help to predict the N2 lymph node metastasis for AGC.

Acknowledgement

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References


