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*Response to neoadjuvant chemotherapy of esophageal carcinoma
in computed tomography (CT)*

Carcinoma of the esophagus is an aggressive malignancy that continues to kill more than 90% of people with the disease within five years. The incidence of adenocarcinoma of the esophagus is rising faster than any other malignancy. The prognosis of esophageal carcinoma is poor (9,10). About one-half of esophageal cancer patients present with locally advanced unresectable disease or distant metastasis (7).

Patients with esophageal carcinoma may be offered combined treatment (11,13). Single-modality or multi-modality therapy may be applied in patients with esophageal carcinoma. Chemotherapy, radiotherapy and surgical resections may be used (2). Surgical esophagectomy remains the preferred treatment for clinically localized thoracic esophageal carcinoma (2,10). Both chemo- and radiotherapy may be used as pre- or post-operative treatment (3).

The aim of the study was assessment of the CT usefulness in evaluating response to neoadjuvant chemotherapy of esophageal carcinoma.

MATERIAL AND METHODS

The material comprises a group of 47 men (aged 35–72 years) and 5 women (aged 40–54 years) with diagnosed esophageal carcinoma. In all patients CT examination of the esophagus was performed, using CT scanner Somatom AR. T by Siemens. The examination was performed in 5 mm thick axial sections before and after administering contrast agent intravenously and orally. The control CT examination was performed in each patient after the proper course of neoadjuvant chemotherapy, using the same scanning protocol. The maximal thickness of the esophageal wall, the length of the tumour, the presence of the enlarged over 1 cm local and distal lymph node or the presence of distal metastases was assessed before and after chemotherapy.

RESULTS

Adenocarcinoma was found in 16 patients and squamous cell carcinoma in 36. Twenty-five patients were in clinical stage IIA, 5 patients in stage IIB and 22 patients were in stage III. In 51 patients narrowing of the esophageal lumen was found (3–10 mm) (Fig. 1), with dilatation above the narrowing (17–30 mm) in 30 of them (Fig. 2). The thickness of the esophageal wall was between 5–25 mm (Fig. 3).

Local lymph node enlargement was found in 23 patients (Fig. 4). In four of them there was enlargement of multiple lymph nodes. After chemotherapy the enlarged local lymph nodes were found in 17 patients. After chemotherapy the complete CT response was found in six patients (11.54%), and in three of them it was complete histopathological response. In 15 patients (28.85%) the partial response was found. In seven patients minimal response was found. In 14 patients there was no change after chemotherapy, and in 10 the progression was found. Total response rate was 53.85% (28 patients; Fig. 5).



Fig. 1. Esophageal carcinoma. Intense narrowing of the esophageal lumen with thickened esophageal walls



Fig. 2. Esophageal carcinoma. Dilated esophageal lumen above the tumour filled with contrast agent



Fig. 3. Esophageal carcinoma, with thick walls, narrowing the esophageal lumen



Fig. 4. Esophageal carcinoma. Local lymph node enlargement

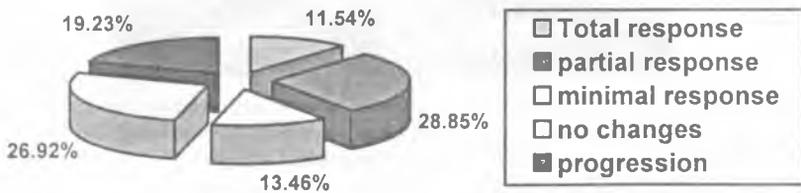


Fig. 5. The response rate to neoadjuvant chemotherapy

DISCUSSION

Neoadjuvant treatment of esophageal cancer prior to surgery was thought to improve survival by reduction of the primary tumour lesion as well as of regional and systemic tumour spread (5). The expected benefits of preoperative systemic therapy are the preoperative elimination of potential systemic micrometastases in patients with both local/regional and locally advanced tumours and the lowering of the stage of the primary tumour. Such a regimen should increase the R0 resection (i.e., a complete macroscopic and microscopic removal of tumour as the basic requirement in the surgery) in patients with locally advanced and in patients with tumour at unfavorable location and should reduce the rate of local and distant recurrences, thereby increasing the chances for long-term survival (6,8,9). Preoperative chemotherapy treatment should result in better drug delivery to the tumour as the local blood supply has not been disturbed by operative dissection. Distant control should be enhanced as remote micrometastases are treated early without having to wait for postsurgical recovery (1).

The drawback of early systemic therapy, in general include the theoretical possibility of a growth advantage for tumor cells undergoing spontaneous mutation into chemotherapy-resistant tumour cells and the possibility of a delay in achieving effective local tumour control, increasing the risk of tumour spread from the primary during preoperative chemotherapy (6). Additionally there is an ongoing discussion on substantial risks of pretreatment to increase postoperative morbidity and mortality. Considerable expenses in time and money have to be accepted when expecting neoadjuvant protocols to be beneficial (5).

In assessing the response to the neoadjuvant chemotherapy different imaging modalities may be used. Endoscopic ultrasound (EUS) can accurately assess the tumour and adjacent lymph nodes, but in highly stenosing tumours the EUS assessment is not reliable. Moreover the distinguishing peritumoral inflammation from tumour is not reliable in endoscopic ultrasound.

CT can overcome some of these difficulties. Even highly stenosing tumours can be fully assessed (4). The standard method for assessing the response of a tumour to treatment is to determine its change in maximum cross-sectional area. Using WHO criteria for tumour response are as follows: complete response (CR) – complete disappearing of all known diseases; partial response (PR) – at least 50% reduction in tumour size; no change (NC) – neither PR or PD; progression of the disease (PD) – greater than 25% increase in size of at least one lesion (or a new lesion) (12).

Response rates to neoadjuvant therapy range from 19% to even 70%. Complete disappearance of viable tumour cells after cytotoxic pretreatment was observed in 2.5%, to 51% (5). In the present study the total response rate was 53.82%. The reduction of enlarged lymph node was found in five patients. The complete response was found in six patients, in three of them it was complete histopathological response. 46.16% of patients did not respond to chemotherapy.

Serial PET images allow an accurate estimate of the response to induction therapy. Simple visual comparison of the PET images obtained before and after a treatment allows a clinically useful response assessment estimating the degree of downstaging of the initially present tumour load. A pathologic complete response cannot accurately be predicted by FDG-PET. The response assessed by serial FDG-PET is strongly correlated with survival (3).

CONCLUSIONS

CT examination was a valuable method of pretreatment staging of esophageal carcinoma. The tumour mass as well as lymph node enlargement or distant metastases can be assessed. After chemotherapy, CT enables reliable assessment of the response to the therapy.

The total response rate assessed in CT after neoadjuvant chemotherapy of esophageal carcinoma is about 54%. But total histopathological response was noted only in 6% of patients.

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SUMMARY

Carcinoma of the esophagus is an aggressive malignancy that continues to kill more than 90% of people with the disease within five years. The incidence of adenocarcinoma of the esophagus is rising faster than any other malignancy. The prognosis of esophageal carcinoma is poor. The aim of the study was assessment of the CT usefulness in evaluating response to neoadjuvant chemotherapy of esophageal carcinoma. The material comprises a group of 47 men and five women with esophageal carcinoma. In all patients CT examination of the esophagus was performed before and after the proper course of neoadjuvant chemotherapy. After chemotherapy the complete CT response was found in six patients (11.54%), and in tree of them it was complete histopathological response. In 15 patients (28.85%) the partial found response was foun. In seven patients minimal response was found. In 14 patients there was no change after chemotherapy, and in ten the progression was found. Total response rate was 53.85% (28 patients). CT examination was a valuable method of pretreatment staging of esophageal carcinoma. The tumour mass as well as lymph node enlargement or distant metastases can be assessed. After chemotherapy CT enables reliable assessment of the response to the therapy. The total response rate assessed in CT after neoadjuvant chemotherapy of esophageal carcinoma is about 54%.

Ocena odpowiedzi na chemioterapię przedoperacyjną raka przełyku w tomografii komputerowej

Rak przełyku jest złośliwy w rokowaniu, o śmiertelności 5-letniej sięgającej 90%. Częstość gruczolakoraka przełyku wykazuje tendencję wzrostową. Rokowanie jest złe. Celem pracy jest przedstawienie użyteczności TK w ocenie odpowiedzi na chemioterapię przedoperacyjną raka przełyku. Materiał obejmuje 47 mężczyzn i 5 kobiet z rakiem przełyku. U wszystkich pacjentów wykonano badanie TK przełyku przed i po przedoperacyjną chemioterapię. Po chemioterapii całkowitą odpowiedź TK stwierdzono u 6 pacjentów (11,54%), a 3 z nich miało całkowitą odpowiedź histopatologiczną. U 15 pacjentów (28,85%) stwierdzono częściową odpowiedź. U 7 pacjentów stwierdzono odpowiedź minimalną, u 14 brak zmian po leczeniu. U 10 pacjentów stwierdzono progresję choroby. Całkowity odsetek odpowiedzi na chemioterapię przedoperacyjną wynosi 53,85%. Badanie TK jest wartościową metodą oceny wstępnej stopnia zaawansowania raka przełyku. Umożliwia ocenę zarówno masy guza, jak i zajęcie miejscowych i odległych węzłów chłonnych, oraz obecność odległych przerzutów. Po chemioterapii TK jest wiarygodną metodą oceny odpowiedzi na leczenie przedoperacyjne. Całkowity odsetek odpowiedzi na przedoperacyjną chemioterapię sięga 54%.