Lymph Node Metastasis and Recurrence in Patients with a Carcinoma of the Thoracic Esophagus Who Underwent Three-Field Dissection

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Abstract: The indication, efficacy, and extent of extended lymphadenectomy for a carcinoma in the thoracic esophagus remain controversial and under clinical investigation. Here we report the frequency and mode of lymph node metastasis at operation and of lymph node recurrence after operation in 70 patients who underwent three-field dissection and 75.7% of whom suffered from metastasis or recurrence in the lymph nodes (metastasis in 71.4% and recurrence in 21.4%). Metastasis or recurrence in the cervical and cervicothoracic nodes were found in 18.6% and 41.4%, respectively. The frequency of cervical and cervicothoracic lymph node metastasis or recurrence was, respectively, 40.0% and 90.0% for a carcinoma in the upper thoracic esophagus, 21.6% and 37.8% for a carcinoma in the middle thoracic esophagus, and 4.3% and 26.1% for a carcinoma in the lower thoracic esophagus. Lymph node metastasis at operation was most frequently found in the right recurrent nerve nodes, right paracardiac nodes, periesophageal nodes, and lesser curvature nodes, whereas lymph node recurrence after operation was found in the left upper recurrent nerve nodes and the right supraventricular, celiac, and abdominal paraaortic nodes. Metastasis or recurrence was rarely found in the internal jugular, pretracheal, greater curvature, common hepatic, or splenic nodes. This finding suggests the need for recurrent nerve node dissection for all cases and for three-field dissection for a carcinoma in the upper or middle thoracic esophagus.

Three-field dissection differs from en bloc esophagectomy by additionally dissecting the cervical and upper mediastinal lymph nodes. There is current interest as to the optimal indication and extent for three-field dissection [11]. The purpose of this research was to determine the mode of lymph node metastasis from esophageal carcinoma at operation and the distribution of lymph node recurrence after the operation to evaluate the efficacy of three-field dissection and to substantiate its wider acceptance by surgeons.

Materials and Methods

We investigated 70 patients with squamous cell carcinoma in the thoracic esophagus who underwent subtotal esophagectomy with three-field dissection through a right thoracotomy in Kurume University Hospital during the 7 years from 1985 to 1991. All patients underwent curative (R0) esophagectomy (UICC, 1987) [12] according to both operative and pathologic descriptions. The patient male/female ratio was 62:8, and their average age was 58.5 years old. The distribution of the tumor location was 10 tumors in the upper, 37 in the middle, and 23 in the lower thoracic esophagus. The distribution of the pT category in the TNM classification (UICC, 1987) was 11 in pT1, 12 in pT2, 46 in pT3, and 1 in pT4. That of pN category was 20 in pN0 and 50 in pN1. The incidence of pN1 involved 54.5% of those in pT1, 83.3% of pT2, 71.2% of pT3, and all of those in pT4. The distribution of the pM-Lym category (UICC, 1987) was 57 in pM0 and 13 in pM1. The p-stage distribution was 5 in stage I, 15 in stage IIa, 13 in stage IIb, 24 in stage III, and 13 in stage IV. Thirty-eight patients received pre- or postoperative adjuvant therapy (or both). Among them, 32 patients received postoperative chemotherapy using two courses of cisplatin (70 mg/m²) and vindesine (3 mg/m²), another 3 patients received 50 Gy of postoperative radiation, and 3 patients received 50 Gy of pre- and postoperative radiation. Another 3 patients received pre- or postoperative adjuvant therapies: 30 Gy of preoperative radiation in one, 30 Gy of preoperative radiation and postoperative chemotherapy using two courses of cisplatin (70 mg/m²) and 5-fluorouracil (SU; 700 mg × 5/m²) in one, and postoperative...
treatment using 50 Gy of radiation and two courses of cisplatin and 5FU in the other.

The present study investigated the route and extent of the lymph node metastasis and recurrence from carcinomas in different locations, ranging from the upper, to middle, to lower segments of the thoracic esophagus. Each esophageal carcinoma was classified as to the location in which it was predominant. The frequency of metastasis or recurrence was calculated as the ratio of the number of patients with metastasis or recurrence in the particular lymph nodes to the total number of patients (n = 70).

Immediately after surgery, the lymph nodes were separated from the resected specimen, placed in a bottle containing formalin, and labeled according to our original classification (Fig. 1), which is a modification of the lymph node classification authorized by the International Society for Diseases of the Esophagus (ISDE classification) [13]. These nodes were later examined histologically for metastasis.

There are four main differences between our classification and the ISDE classification. First, the right recurrent nerve nodes in our classification include the right recurrent nerve nodes and the right cervical paraesophageal and paratracheal nodes of the ISDE classification. Second, the left upper recurrent nerve nodes are classified as cervical nodes. The right recurrent nerve nodes and the left upper recurrent nerve nodes are classified as cervicothoracic nodes. The left lower recurrent nerve nodes and the pretracheal, infraaortic arch, infracarinal, lower posterior mediastinal, and the periesophageal nodes are classified as thoracic nodes. The paracardiac, lesser curvature, greater curvature, left gastric, common hepatic, splenic, celiac, and abdominal paraaortic nodes are classified as abdominal nodes.

Lymph node recurrence was determined by computed tomography, magnetic resonance imaging, and ultrasonography, as well as by histologic analyses following biopsy or surgery.

During 3-field dissection through a right thoracotomy, the esophagus and the neighboring mediastinal tissues in the thorax including the esophageal vessels, the thoracic duct, and the azygos arch were resected, although the bronchial vessels, the pulmonary branches of the vagus nerve, the recurrent laryngeal nerves, and the azygos vein were preserved together with the heart, pericardium, lung, tracheobronchus, aorta, and vertebral [4]. Lymphadenectomy during three-field dissection extended over the lower part of the bilateral neck, the upper and lower mediastinum, and the upper abdomen. Accordingly, the supraclavicular, recurrent nerve, infraaortic, periesophageal, lower posterior mediastinal, paracardiac, lesser curvature, and left gastric nodes were resected in all patients as shown in Table 1. The indication for resecting the internal jugular, infraaortic arch, pretracheal, common hepatic, splenic, celiac, and abdominal paraaortic nodes was decided based on the cancer location, preoperative staging, and risk analysis. The infraaortic arch nodes and the pretracheal nodes were resected mainly in patients with a carcinoma in the upper or middle thoracic esophagus, whereas the common hepatic, splenic, and celiac nodes were resected mainly in those with a carcinoma in the middle or lower thoracic esophagus. The average number of resected lymph nodes per patient was 81.8:33.0 in the neck, 30.4 in the thorax, and 18.4 in the abdomen.

Three-field dissection was performed only for patients (1) less than 70 years old, (2) having a low risk of morbidity and mortality in preoperative risk analysis, and (3) having a tumor of stage II or above at preoperative staging. There was no mortality within 30 days and only one case (1.4%) of hospital mortality in the present series.

Results

The outcomes for the 70 patients are shown in Table 2. Thirty-nine patients (55.7%) are alive to date after a mean follow-up of 35.9 months (range 11–79 months). The 1-year cumulative survival rate was 82.9%, 2-year survival 60.5%, 3-year survival 54.3%, 4-year survival 47.9%, and 5-year survival 43.1% when calculated by the Kaplan-Meier method. Of these survivors, four patients are alive with recurrence. Thirty-one patients (44.3%) died after a mean 17.0 months postoperatively; of them, 20 had recurrence and 11 had no recurrence.