Leaving a Mobilized Thoracic Esophagus In Situ When Incurable Cancer Is Discovered Intraoperatively

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Background. **Occasionally incurable cancer is encountered after completion of the thoracic (first) phase of a three-phase esophagectomy. The outcome of aborting the operation at this stage, leaving the mobilized thoracic esophagus in situ, is unknown.**

Methods. **A multicenter retrospective analysis was performed of patients in whom a completely mobilized thoracic esophagus was left in situ when incurable disease was discovered intraoperatively. The occurrence of esophageal necrosis or perforation, mortality, and all other adverse events were recorded and graded by severity.**

Results. **Some 18 patients were included. The median admission time was 9 days. All patients had resumed oral intake at discharge, except for 1 patient who was fed through a nasojejunal tube. After the operation, the median overall survival was 2.9 months. Postoperatively, 7 patients (39%) experienced major surgical adverse events, and 11 patients (61%) had no or only minor adverse events. Major adverse events were associated with the patient's death in 6 patients (33%), within 5 to 34 days postoperatively. Esophageal perforation or ischemia developed in 4 patients (22%) and 1 patient (6%), respectively. No predictive factors could be identified.**

Conclusions. **Leaving a completely mobilized thoracic esophagus in situ when incurable cancer was discovered intraoperatively was a successful strategy in more than half of the patients. However, one third experienced major adverse events leading to mortality.**

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During a transthoracic esophagectomy, incurable disease may be discovered after complete mobilization of the thoracic esophagus. In this case, a long section of the esophagus has been devascularized, resulting in a clinical dilemma. Resection of the esophagus and reconstruction expose the patient to the risks associated with an esophagectomy without curing the patient. On the other hand, leaving a mobilized esophagus in situ may result in esophageal ischemia with the associated adverse events.

It has been suggested that the mobilized esophagus retains an excellent blood supply because of the rich anastomotic network of the intramural vessels [1]. It can be questioned, however, whether this proves to be true in clinical practice. Therefore, we performed a multiinstitutional retrospective review of all patients in whom the thoracic esophagus was completely mobilized but left in situ. The aim of this study was to assess the safety of leaving a completely mobilized thoracic esophagus in situ when incurable disease is discovered intraoperatively.

Patients and Methods

Design

This was a retrospective multicenter case series to determine the safety of leaving a completely mobilized and devascularized thoracic esophagus in situ. This study was approved by the independent ethical committee of the University Medical Center Utrecht for all centers.

Patients

We retrospectively reviewed institutional databases, including 824 patients scheduled for transthoracic esophagectomy between January 1, 2003, and December 31, 2013, in the University Medical Center Utrecht (n = 259), the Catharina Hospital Eindhoven (n = 156), and the Erasmus MC Rotterdam (n = 311), and between

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January 1, 2008, and December 31, 2013, in the Atrium Medical Center Heerlen (n = 98).

Patients were included when the operation was aborted after complete mobilization of the entire thoracic esophagus. Also patients with a T4b tumor with a nearly complete mobilization of the thoracic esophagus, except for the small part where the tumor was fixed, were included.

Preoperative Workup

Routine staging before treatment consisted of upper gastrointestinal endoscopy, endoscopic ultrasonography (EUS), computed tomography (CT) of the thorax and abdomen, and ultrasonography of the neck. In case of a high tumor, bronchoscopic examination was added. Positron emission tomography-CT and diagnostic laparoscopy were reserved for patients with suspected metastasis. Neoadjuvant treatment consisted of chemotherapy (paclitaxel and carboplatin or cisplatin) or chemoradiotherapy (23 cycles of 1.8 Gy, total dose 41.4 Gy, combined with paclitaxel and carboplatin). Operations were was planned 6 weeks after neoadjuvant treatment. Restaging after neoadjuvant treatment was not performed routinely [2].

Postoperative Management

A nasogastric tube was routinely placed at the end of the operation unless the tumor could not be passed by the nasogastric tube. During the first postoperative days epidural analgesia was provided. Imaging of the esophagus was performed on indication only, such as a suspected perforation or to place a nasojejunal tube. Blood determinations to closely monitor the patients were routinely measured during the first postoperative days. Patients were allowed sips of water on the first postoperative day, and intake was expanded as tolerated to a solid diet. Oral intake was terminated immediately when there was suspicion of esophageal perforation or ischemia.

Data Items

All postoperative adverse events, with special attention to esophageal ischemia or perforation, were collected and graded by severity according to the Clavien-Dindo classification [3]. Other outcomes were the length of hospital stay and intensive care unit admission, route of feeding at discharge, overall survival from the moment of operation, and cause of death. Adverse events graded 3 or higher were considered to be major [4]. All data were retrospectively collected from existing surgical databases and verified with data from the clinical records.

Data on all relevant patient characteristics were collected: sex, age, American Society of Anesthesiologists (ASA) classification, medical history, indication for operation, preneoadjuvant treatment uTNM7 stage [5], neoadjuvant treatment, operation time, surgical technique, and reason for irresectability.

Analysis

All continuous data were summarized as medians (lower-upper quartile) and dichotomous data as percentages. Fisher's exact test, Student's *t* test, and Mann-Whitney *U* test were used when appropriate to compare patient characteristics and surgical characteristics between the groups with and without esophageal necrosis or perforation.

Results

Patient Characteristics

Eighteen patients were included, with a median age of 60.5 years (IQR 58–73) and median ASA classification of 2 (IQR 1–2) (Table 1). Thirteen patients had a completely mobilized thoracic esophagus without tumor ingrowth in thoracic structures, and 5 patients had a tumor with ingrowth into vital thoracic structures. Preoperatively, the median uT stage was 3 (IQR 3–3), consisting of a T2 tumor in 1 patient, a T3 tumor in 13 patients, a T4a tumor in 2 patients, and a Tx tumor in 2 patients because the tumor could not be passed with the endoscope for accurate staging (Table 1). Neoadjuvant chemoradiotherapy was administered to 8 patients (44%) and neoadjuvant chemotherapy to 4 patients (22%). None of the included patients underwent salvage esophagectomy.

Operation Characteristics

All patients were scheduled for three-stage esophagectomy, and in all patients the thoracic esophagus was entirely mobilized. The exceptions were the 5 patients with tumor ingrowth in vital thoracic structures, in whom part of the tumor ingrowth remained fixed. In 10 patients (56%) a minimally invasive approach was used, and in 8 patients (44%) an open approach (Table 2). Of the minimally invasive procedures, three were converted to a thoracotomy, two to a laparotomy, and 1 to a thoracotomy and laparotomy, to evaluate tumor ingrowth.

The esophagectomy was aborted because of discovery of distant metastatic disease after entire mobilization of the thoracic esophagus in 10 patients (55%) local thoracic or abdominal unresectability in 6 patients (33%), and a combination of metastatic disease and local unresectability in 1 patient (6%). In 1 patient (6%) who had previously undergone a gastrectomy, the vascularization of the colon was so poor that it could not be used for reconstruction (Table 1). All patients with ingrowth in thoracic structures had a tumor in the midesophageal segment.

Postoperative Course

The postoperative outcomes are presented in Table 2. Overall, 7 patients (39%) experienced major adverse events, and 11 patients (61%) had none or only minor adverse events. The median length of stay was 9 days (IQR 6–15 days). Of the 14 patients who were discharged alive, 13 patients (93%) had resumed oral intake at discharge. Tube feeding through a nasojejunal tube remained necessary for 1 patient (7%). After the operation, the median overall survival was 2.9 months (IQR 1.0-4.9 months).

The major surgical adverse events were esophageal perforation and empyema in 4 patients (22%), massive aspiration after endoscopy during which ischemic