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Conservative surgical management of Boerhaave's syndrome: Experience of two tertiary referral centers

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ABSTRACT

Background: Surgery is generally proposed for Boerhaave's syndrome, spontaneous rupture of the esophagus. But diagnosis can be difficult, delaying appropriate management. The purpose of the present study was to evaluate outcome of conservative surgery for primary or T-tube repair performed in two tertiary referral centers.
Methods: From June 1985 to November 2010, among 53 patients presenting with Boerhaave's syndrome treated surgically, 39 underwent a conservative procedure. These patients were retrospectively divided into two groups by type of repair: primary suture (group 1, $n = 25$) or suture on a T-tube (group 2, $n = 14$). Patients in group 1 were further stratified into two subgroups depending on whether the primary suture was made with reinforcement (subgroup rS) or not (subgroup S).
Results: Length of stays in hospital and intensive care were shorter in patients in group 1 ($p = 0.037$), but after a shorter delay before therapeutic management ($p = 0.003$) compared with group 2. For the other variables studied, outcome was more favorable in group 1, but the differences were not significant. Comparing subgroups rS and S showed that the rate of persistent leakage was significantly lower after reinforced suture ($p = 0.021$).
Conclusions: These findings from the largest reported cohort of Boerhaave's syndrome patients undergoing conservative surgery showed that primary and T-tube repair provide at least equivalent results. Reinforced sutures appear to provide better outcomes by reducing postoperative leakage.

1. Background

Spontaneous perforation of the esophagus occurs as a result of a sudden vomiting-induced increase in the internal esophageal pressure. Called Boerhaave's syndrome since the first description by Boerhaave in 1724,[1] spontaneous rupture of the esophagus accounts in only 10–35% of all perforations of the esophageal wall.[2–4] Knowledge of this rare entity is of particular importance because of the high mortality, 20–40%,[5–7] which is directly related to delay in diagnosis and therapeutic management, the main factors of poor outcome.[5,8] Beyond 48 h, and for up to 5 days, mortality increases proportionally with therapeutic delay.[4,9] Fatal outcome results from mediastinitis caused by chemical, enzymatic and infectious processes.[10] To date, studies in the literature have reported small series of Boerhaave's syndrome or grouped together different types of esophageal perforation. Analyses of such heterogeneous populations cannot provide the specific information required to establish appropriate strategies for Boerhaave's syndrome, explaining the lack of any real therapeutic consensus. The largest series published to date specifically devoted to Boerhaave's syndrome was reported by Griffin et al. in 2008 and included 51 patients.[11] Based on experience, most teams prefer a conservative surgical approach[7,8,12,13] using primary repair as described in 1947 by Barrett[14] or repair over a T-tube for drainage as proposed by Abbott et al.[15]

The purpose of this study was to report the surgical experience of two specialized tertiary referral centers with management of spontaneous rupture of the esophagus. Morbidity–mortality was the primary endpoint, comparing patients who underwent primary repair versus repair over a T-tube. Outcome after primary suture repair, with or without reinforcement, was the secondary endpoint.

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2. Methods

2.1. Patients

From June 1985 to November 2010, 53 patients were referred for treatment of Boerhaave's syndrome to two French centers (Rennes and Brest) specialized in esophageal surgery. Data were collected and analyzed retrospectively.

Diagnosis was established with contrast swallow, computed tomography scan or fibroscopy. Spontaneous perforation was defined as a full thickness tear of the esophageal wall not caused by an underlying disease or invasive procedure.[16] Patients receiving conservative nonoperative care were excluded from this analysis (Fig. 1).

The followed data were collected: patient age and gender, time from symptom onset to therapeutic management, type of surgical management, length of hospital stay, length of stay in the intensive care unit, hospital mortality, persistent esophageal leakage, reoperation.

Hospital mortality was defined as death within 30 days post-surgery or during the initial hospital stay.

To analyze the impact of conservative surgical management on morbidity and mortality, patients were divided into two groups according to the type of procedure performed: primary repair suture (group 1); repair suture on a T-tube to control development of an esophago-pleuro-cutaneous fistula (group 2).

In the primary repair group, sutures were reinforced (subgroup rS) or not (subgroup S).

2.2. Surgery

Senior surgeons specialized in esophageal procedures performed all operations. A two-way approach was used in all cases: primary thoracotomy (side determined by the localization of the perforation) and laparotomy (for feeding jejunostomy).

All thoracic proceedings were performed by thoracotomy enabling debridement, decontamination and drainage of the mediastinal and pleural cavities. In the primary repair patients, the esophageal injury was sutured with or without reinforcement using a gastric patch or an absorbable mesh (group 1). In the other patients (group 2), the injury was repaired over a T-tube inserted through the perforation and drawn out to the skin at the end of the operation.

2.3. Outcomes

The main morbidity and mortality end points were compared between group 1 and group 2. The impact of reinforced sutures was a secondary end point.

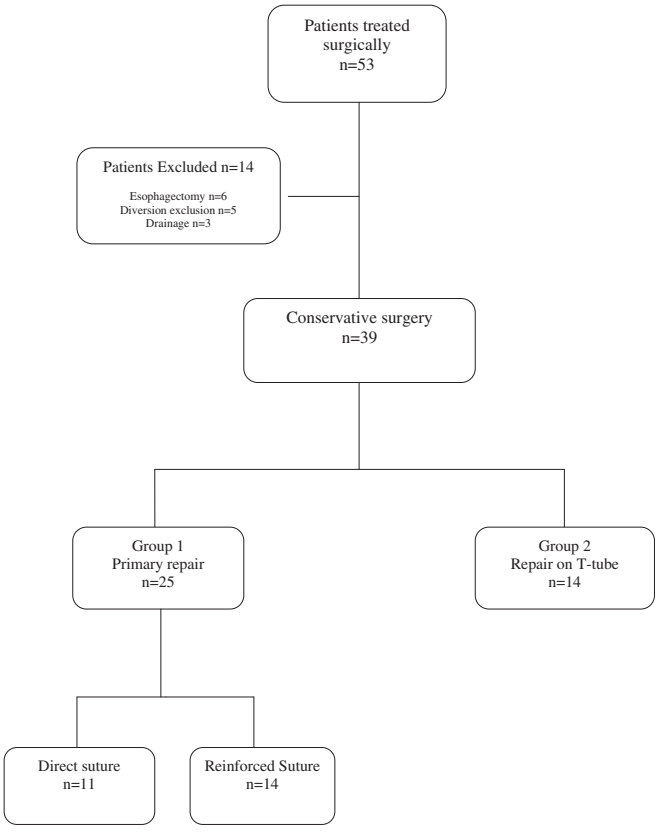

Fig. 1. Diagram chart.

2.4. Statistical analysis

Continuous variables were expressed as mean ± standard deviation (SD) or median for between-group comparisons with Student's *t*-test or Wilcoxon test. Discrete variables were expressed by number and percentage, and compared using the chi-squared test or Fisher's exact test, as appropriate. A p value of <0.05 was considered to be statistically significant.

3. Results

3.1. Demographic and operative data

During the study period, 53 patients were treated surgically for spontaneous perforation of the esophagus. Among these patients, 39 underwent conservative surgery and constituted the study cohort (Fig. 1). Mean age at diagnosis was 63.6 ± 13 years. There were 32 men (82.1%) and 7 women (17.9%) (sex ratio: 4.57).

Mean time from symptom onset to surgical management was 2 days (range 0–9 days). Mean length of hospital stay was 39 days (range 22–59 days), including 12 days (range 6–32 days) in the intensive care unit. Postoperative esophageal leakage developed in 14 patients (35.9%). Nine patients died (23.1%) and 16 (41%) required a revision procedure. The inaugural signs of esophageal perforation are summarized in Fig. 2. Pain in the lower thorax or epigastric region was the main sign (71.8%), followed by vomiting (43.6%). The classical triad described by Mackler[17] was noted in two patients (5.1%).

3.2. Comparison between the group 1 and 2

Outcomes observed in groups 1 and 2 are presented in Table 1. The two groups were comparable for age and gender, but time to therapeutic management was significantly longer in group 2 ($p = 0.003$). In addition, more perforations were on the right side in group 2 ($p = 0.047$).

The duration of intensive care was significantly shorter in patients treated with primary suture repair ($p = 0.037$). There was no significant difference between the two groups for the other variables studied. Group 1 displayed trends for longer overall hospital stay ($p = 0.39$), higher mortality ($p = 0.23$), persistent leakage ($p = 0.30$) and revision surgery ($p = 0.60$).

3.3. Reinforced versus direct repair

The comparison between subgroups rS and S is presented in Table 2. The esophagus was repaired with a primary suture in 25

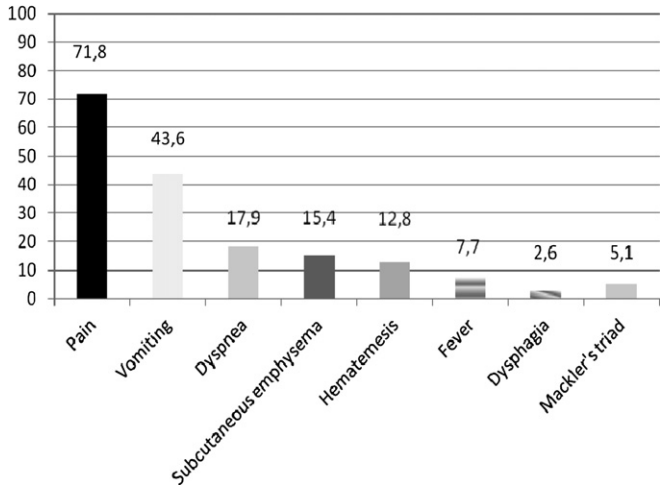

Fig. 2. Clinical signs leading to diagnosis.