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Esophageal duplication cysts and closure of the muscle layer



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ABSTRACT

Background: Foregut duplication cysts are rare congenital anomalies that require surgical intervention with approximately 10%-15% of all gastrointestinal duplication cysts originating from the esophagus. Consensus is lacking among surgeons regarding closure of the esophageal muscle layer after resection of an esophageal duplication cyst and long-term outcomes are poorly documented. Therefore, we conducted the first study comparing complication rates in patients undergoing closure *versus* nonclosure of the esophageal muscle layer after esophageal duplication cyst resection.

Materials and methods: A retrospective cohort study at Boston Children's Hospital, Massachusetts General Hospital, Brigham and Women's Hospital, and the Floating Hospital for Children at Tufts Medical Center was conducted. Patients undergoing resection of esophageal duplication cysts between 1990 and 2012 were classified according to whether the esophageal muscle layer was closed or left open. Demographic data, surgical technique, preoperative symptoms, and both short-term (<30 d) and long-term (≥30 d) complication rates were abstracted from patient medical records.

Results: Twenty-five patients were identified with a median age of 15-y old (range, 2 mo to 68-y old) and an average follow-up of 1 y. Eleven patients had the esophageal muscle layer closed after surgical resection (44%). Of those 11 patients, one developed a short-term complication, dysphagia (9%, 95% CI: 2%, 38%). Only one patient returned to the operating room, after 30 d, for an upper endoscopy after developing symptoms of gastroesophageal reflux disease. Of the 14 patients who had their muscle layer left open, three patients (21%, 95% CI: 8%, 48%) developed short-term complications, two of whom required surgical intervention within 30 d. Furthermore, two additional patients required surgical intervention after 30 d for a long-term complication (diverticulum and cyst recurrence).

Conclusions: Surgical complications occurred more frequently in patients who had the muscle layer left open after resection of an esophageal duplication cyst. In addition, most patients requiring reoperation for both short-term and long-term complications occurred

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in this group. Though small, this study is the first to evaluate the complications after resecting esophageal duplication cysts. Our results suggest that closing the esophageal muscle layer after removal of an esophageal duplication cyst may be indicated to prevent both complications and the need for reoperations.

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Introduction

Enteric duplication cysts, along with bronchogenic and neurenteric cysts, belong to the clinical spectrum of foregut duplication cysts.¹ These rare congenital anomalies arise early in development from failure of recanalization of vacuoles during the seventh week of gestation.² Esophageal duplication cysts account for 15%-20% of enteric cysts,³ with complete surgical excision being the treatment of choice for both symptomatic and asymptomatic cysts. Observation of these lesions should be discouraged, as there are risks for infection, bleeding, cyst erosion with perforation into adjacent structures, and malignant transformation.⁴

With complete excision of an esophageal duplication cyst, a defect in the muscular layer of the esophagus is made due to the close relationship between the wall of the cyst and the lumen of the esophagus. There is a lack of consensus among surgeons regarding the importance of closing the muscular defect after excision. It has been suggested that closing the muscle layer can help prevent the development of a postoperative diverticulum.^{5,6} There have been anecdotal reports of surgical complications such as stricture formation leading many surgeons to leave the muscle layer open after cyst excision. However, there is no evidence in the literature to support these claims. Furthermore, there is currently no long-term follow-up data to corroborate either stance. The purpose of this study was to determine whether closure of the esophageal muscle layer following resection influences short-term or long-term outcomes. We hypothesized that patients who had their muscle layer closed after the resection of an esophageal duplication cyst would develop fewer short-term and long-term complications when compared to patients who had their muscle layer left open.

Material and methods

After institutional review board approval was obtained (Tufts Health Sciences Campus Institutional Review Board # 11004, Partners Healthcare Institutional Review Board # 2011P001210 and Boston Children's Hospital Institutional Review Board # 00001914), a retrospective cohort study at Boston Children's Hospital, Brigham and Women's Hospital, Massachusetts General Hospital, and the Floating Hospital for Children at Tufts Medical Center was conducted. Patients undergoing resection of esophageal duplication cysts at these institutions were classified according to whether the esophageal muscle layer was closed. Patients diagnosed with other foregut duplication cysts were excluded from the study.

Clinical variables

Demographic data, surgical technique, and both short-term (<30 d) and long-term (≥30 d) complication rates were abstracted over a 22-y span (1990-2012) from patient medical records. Other variables examined included gender, age at diagnosis, age at operation, preoperative and postoperative symptoms, cyst location, intraoperative complications, and incidence of readmissions. The mean length of follow-up was 1 y.

Statistical analysis

Demographic and clinical characteristics were summarized for the cohort using frequencies and proportions. Confidence intervals (95%) were estimated for the primary outcome of interest, which was the presence of a complication after the surgical excision of an esophageal duplication cyst. Statistical analyses were conducted using Microsoft Excel.

Results

Twenty-five patients undergoing resection of an esophageal duplication cyst and meeting inclusion and exclusion criteria were identified between 1990 and 2012. The median age of these patients was 15-y old (range: 2 mo to 68-y old). Eleven patients (44%) in our study had their esophageal muscle layer closed after surgical resection, whereas 14 patients (56%) had their muscle layer left open (Table 1). All pathologic specimens showed a foregut duplication cyst. Some results contained no additional details, whereas others were quite extensively characterized, such as extensive fibrosis and areas of smooth muscle proliferation with chronic inflammation. Review of operative details showed that the muscle layer was closed using interrupted sutures. Furthermore, we found five patients in both cohorts with extensive adhesions and inflammatory changes during operative dissection. Despite the inflammation, the cyst of each patient was fully dissected, and no remnant was left in place.

Sixty-eight percent of patients in both cohorts underwent thoroscopic resection of their duplication cysts. Ten patients in each cohort developed symptoms before their resection, with dysphagia being the most common symptom reported (Table 1). Patients whose muscle layer was left open after surgery were more likely to develop a short-term complication (21%, 95% CI: 8%, 48%) than patients whose muscle layer was closed at the time of excision (9%, 95% CI: 2%, 37%; Table 2). No patients in the closure group returned to the operating room within 30 d for a short-term complication (Table 3), and only one patient returned to the operating room

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