



## Reoperation for anastomotic complications of esophageal atresia and tracheoesophageal fistula☆



Haitao Zhu<sup>1</sup>, Chun Shen<sup>1</sup>, Xianmin Xiao, Kuiran Dong, Shan Zheng\*

Department of Pediatric Surgery, Children's Hospital of Fudan University, Shanghai, China

### ARTICLE INFO

#### Article history:

Received 29 July 2015

Accepted 24 August 2015

#### Key words:

Esophageal atresia

Anastomotic strictures

Anastomotic leakage

Recurrent tracheoesophageal fistula

Endoscopy

Reoperation

### ABSTRACT

**Background/Purpose:** The purpose of the study was to review our experience in the re-operative management of anastomotic complications (ACs) following primary repair of esophageal atresia (EA) and tracheoesophageal fistula (TEF) and to assess the outcomes after reoperation.

**Methods:** We retrospectively reviewed 21 EA patients who underwent reoperation from 2005 to 2014. Clinical features, reasons for reoperation, diagnosis of ACs, re-operative procedures and outcomes, as well as long-term follow-up of reoperation were analyzed.

**Results:** Reoperation occurred in 16 recurrent TEF (RTEF) cases (76.2%), 4 severe anastomotic strictures (AS), and 1 anastomotic leakage (AL) cases (19% and 4.8%, respectively). All of AS and AL were confirmed by esophagography. RTEF were confirmed by esophagoscopy and bronchoscopy. All of the cases underwent reoperation successfully. The average operative time and length of post-operative hospital stay were  $2.7 \pm 0.8$  hours and  $15.4 \pm 3.3$  days, respectively. The mortality rate was 4.8%. All of the cases were followed up from 1 to 107 months after reoperation. No patients experienced respiratory or feeding issues. No severe postoperative complications were shown in all re-operative cases.

**Conclusions:** ACs including severe AS and AL as well as RTEF are the significant indications for reoperation after EA repair. The reoperation was effective to treat multiple anastomotic complications.

© 2015 Elsevier Inc. All rights reserved.

During the neonatal period, esophageal atresia (EA), with or without tracheoesophageal fistula (TEF), is a relatively common congenital anomaly occurring in 1/2500–1/4500 live births [1,2]. Remarkable improvements in neonatal intensive care and anesthesia, as well as surgical techniques, have contributed to the high survival rate of patients with EA over the last two decades [3–5]. However, with the increase in the number of operative cases, postoperative complications continue to threaten the recovery of EA patients [4,6]. Anastomotic complications (ACs), including anastomotic strictures and leakage, as well as recurrent TEF (RTEF), are the most frequent complications following surgical repair, occurring in 6%–10% of cases [7,8]. Most of these cases require further re-operative management that is complex and continues to be a great challenge to pediatric surgeons.

In current study, we retrospectively reviewed our experience with reoperations for EA patients with anastomotic complications (ACs) and we evaluated outcomes after reoperation in our institution between 2005 and 2014.

### 1. Materials and methods

A retrospective review was performed of EA patients who underwent reoperation for ACs in the Department of Pediatric Surgery,

☆ Financial disclosures: No financial affiliations to disclose.

\* Corresponding author at: Department of Pediatric Surgery, Children's Hospital of Fudan University, 399 Wanyuan Road, Shanghai 201102, P.R. China. Tel.: +86 2164931212; fax: +86 2164931901.

E-mail address: [szheng@shmu.edu.cn](mailto:szheng@shmu.edu.cn) (S. Zheng).

<sup>1</sup> These authors contributed equally to this manuscript.

Children's Hospital of Fudan University, between January 2005 and December 2014. Ethical approval was obtained from the Ethics Board of the Children's Hospital of Fudan University. For each patient, we recorded data, including demographics, primary Gross type of EA, the approach of the original repair, types of ACs, clinical symptoms, the method of diagnosis of ACs, age and weight at re-operative surgery, re-operative duration, length of hospital stay, and prognosis after reoperation. ACs were identified as anastomotic strictures (AS), anastomotic leakage (AL) and recurrent tracheoesophageal fistula (RTEF). Reoperations were defined as revisions of one-stage primary operations for EA patients, including primary esophageal anastomotic resection and re-anastomosis with or without TEF re-ligation. In all of the cases, reoperation was performed 3–6 months after the initial surgical repair. The diagnosis of ACs was dependent on clinical symptoms, esophagography, CT scans, esophagoscopy and bronchoscopy. Follow-up data were collected from our outpatient and inpatient records, as well as via follow-up by telephone communication or questionnaire.

### 2. Results

#### 2.1. Clinical features

A total of 21 EA patients with postoperative ACs underwent reoperation from January 2005 to December 2014. The male to female ratio was 2.5:1. The age of the patients who underwent reoperation ranged from 4 months to 4 years old, with an average of 15.5 months old. Weights

**Table 1**

Types of anastomotic complications in re-operative patients.

Complication	Cases, n	Associated complications, n (type)	Recurrent TEF location (distance to the primary anastomotic site)		
			Proximal site	Anastomotic site	Distal site
AS	4	0	NA	NA	NA
AL	1	0	NA	NA	NA
RTEF	16	12 (AS)	2	5	9

AS: anastomotic stricture; AL: anastomotic leakage; RTEF: recurrent tracheoesophageal fistula.

at reoperation ranged from 4.5 to 14 kg, with an average of 7.9 kg. Among these cases, 20 (95.2%) had EA of Gross type III, and only 1 (4.8%) case was EA of Gross type I. All of the patients with Gross type III underwent one-stage primary operations (tracheoesophageal fistula ligation and a single-layer end-to-end esophageal anastomosis), and the Gross type I patient received a two-step initial surgical intervention (feeding gastrostomy and esophageal anastomosis). Furthermore, secondary ligation of RTEF was performed in 2 (9.5%) of the type III patients. The primary operations were performed via thoracoscopic (n=5, 23.8%) or open (n=16, 76.2%) approaches. Three (14.3%) of these cases were initially repaired in Children's Hospital of Fudan University and 18 (85.7%) at outside institutions throughout China. Congenital heart disease was present in one (4.8%) patient, and polydactyly in another patient (4.8%).

## 2.2. Types of ACs in re-operative patients

ACs in re-operative cases included anastomotic strictures (AS, n=4, 19.0%), anastomotic leakage (AL, n=1, 4.8%) and recurrent tracheoesophageal fistula (RTEF, n=16, 76.2%). All RTEF cases underwent reoperation 6 months later after primary surgery for TEF resection and esophageal anastomosis. Among AS cases, one patient failed to be treated with endoscopic esophageal dilatation but symptoms of stenosis were not released in the other AS patients who had received regular endoscopic esophageal dilatation for more than 6 months after primary esophageal repairs. An AL case failed to experience relief of symptoms with multiple conservative treatments for more than 3 months after initial repairs. Among these cases, 9 (42.9%) of these patients had one AC, and 12 (57.1%) had two ACs (Table 1). No other ACs occurred in all of AS and AL cases. However, anastomotic strictures occurred in 12 RTEF cases (Table 1). Among 16 RTEF cases, the location of the recurrent fistula was distal to the primary anastomotic site in 9

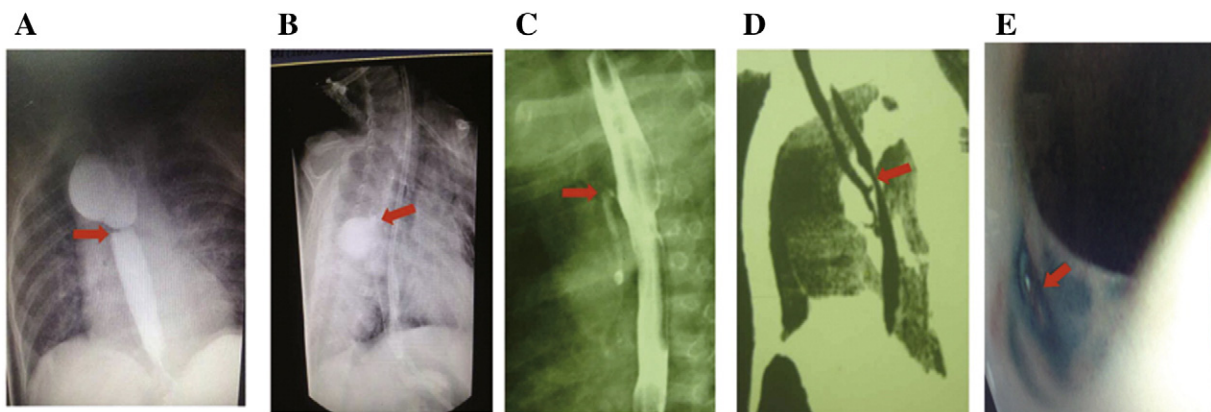
(56.3%) cases, at the anastomotic site in 5 (31.2%) cases and proximal to the primary anastomotic site in 2 (12.5%) cases (Table 1). In addition, TEF was only ligated but not resected in 9 (56.3%) RTEF cases during their primary repairs in other hospitals. Severe adhesion and inflammation were also identified in all re-operative cases.

## 2.3. Diagnostic investigations for re-operative patients with ACs

In our series, all of the patients receiving reoperation had respiratory and/or feeding problems, leading to the diagnosis of ACs. The symptoms were respiratory problems only in 4 (19%) cases, feeding issues also in 4 (19%) cases, and a combination of respiratory symptoms and feeding issues in 13 (62%) cases (Table 3). A contrast esophagography was applied to diagnose AS and AL, as well as RTEF. Furthermore, chest CT scan with 3D reconstruction, esophagoscopy and bronchoscopy were used for the diagnosis of RTEF during reoperation (Fig. 1). All of the AS and AL cases were confirmed by the esophagography with omnipaque (Fig. 1A, 1B). However, the contrast esophagography only delineated RTEF in 7 cases (43.8%), but it did not reveal it in 9 cases (Fig. 1C, Table 2). Only 2 RTEF cases (12.5%) were identified by chest CT scan (Fig. 1D, Table 2). Before reoperation, endoscopy was performed using esophagoscopy or bronchoscopy, combined with dye injection that was used to confirm the diagnosis of RTEF and left in place to assist in finding the exact location of fistulas intraoperatively [9]. Methylene blue (1:10 dilution, 0.5–1 ml) was dropped into the endotracheal tube, while the gastroscope was placed in the esophagus. When the patient was mechanically ventilated, findings of blue dye in the esophagus contributed to the diagnosis of RTEF (Fig. 1E). The 16 RTEF cases were all confirmed by esophagoscopy combined with dye injection (Table 2). Furthermore, 4 of these RTEF cases also underwent bronchoscopy, and all of the cases were thus revealed (Table 2).

## 2.4. Reoperation for postoperative ACs

All of the patients with postoperative ACs underwent esophageal reoperation via right-side thoracotomy. A modified surgical procedure, based on a method previously described by Koivusalo and Coran, was performed [8,9]. Briefly, the patient was administered general orotracheal anesthesia in the left side position, and a curved incision was made below the inferior angle of the scapula, extending from the mid-axillary line to the paravertebral region posteriorly. First, the esophageal wall proximal to the primary anastomotic site was identified. After the esophageal wall opposite the trachea was opened longitudinally from the proximal to the distal segment, the primary anastomotic site and the distal esophagus were exposed. For RTEF



**Fig. 1.** Diagnosis of anastomotic complications. A. Esophagogram showing an anastomotic stricture (red arrowhead). B. Esophagogram showing an anastomotic leakage (red arrowhead). C. Esophagogram showing a recurrent tracheoesophageal fistula (red arrowhead). D. Three-dimensional reconstruction of chest CT, revealing a recurrent tracheoesophageal fistula (red arrowhead). E. Esophagoscopy revealing a recurrent tracheoesophageal fistula dyed by methylene blue (red arrowhead).

Download English Version:

<https://daneshyari.com/en/article/6216693>

Download Persian Version:

<https://daneshyari.com/article/6216693>

[Daneshyari.com](https://daneshyari.com)