



Post-operative management of esophageal atresia–tracheoesophageal fistula and gastroesophageal reflux: A Canadian Association of Pediatric Surgeons annual meeting survey



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ABSTRACT

Background: Esophageal atresia (EA), with or without tracheoesophageal fistula (TEF), is commonly associated with gastroesophageal reflux (GER) after surgical repair. One risk factor for anastomotic stricture is post-operative GER. This survey assessed practice patterns among attendees at the Canadian Association of Pediatric Surgeons (CAPS) annual meeting with respect to management of GER post EA-TEF repair.

Methods: A pre-piloted survey was handed out and collected at the 2012 CAPS annual meeting. Data were entered and coded, and descriptive statistics were calculated.

Results: We distributed 70 surveys, and 57 (81.4%) surveys were returned. On average, the incidence of EA-TEF is 8–10 cases per institution, per year. Anti-reflux medication is started immediately post-operatively in 74% of patients at institution of feeds (11%), or if symptoms of reflux develop (14%). Proton pump inhibitors and H₂-receptor antagonists are used in approximately equal proportion. Patients are typically kept on anti-reflux medication for 3–6 months (37%) or 6–12 months (35%).

Conclusions: Most CAPS attendees treat postoperative GER prophylactically. However, there is no consistency in management strategy regarding which anti-reflux agent to use or for how long. A multi-centered study is required to establish a standardized protocol for the post-operative management of EA-TEF to prevent reflux and its effect on anastomotic strictures.

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Esophageal atresia (EA) with or without tracheoesophageal fistula (TEF) is known to be associated with a high incidence of post-operative gastroesophageal reflux (GER). The presence of GER may be due to an inherent dysmotility of the esophagus [1–6], a patulous lower esophageal sphincter [1,3,4,6], a foreshortened intra-abdominal esophagus [2], damage to the vagus nerve during surgery [5,6], or may be secondary to anatomic changes created at anastomosis, such as a change in the angle of His [7]. The incidence of GER in post-repair EA-TEF patients is variable with previous published estimates ranging from 27% to 75% [3,8,9].

GER may lead to complications such as respiratory distress or apparent life-threatening events (ALTE), recurrent pneumonias, or failure to thrive [10,11]. Post-operative GER may also exacerbate anastomotic strictures [12–16].

Post anastomotic strictures are a common complication of repaired EA-TEF, occurring in 18% to 50% of patients [17,18]. Other risk factors for stricture development include a long gap, post-operative leaks, tension on the anastomosis, and tissue ischemia to the esophageal ends [13,17,19–21]. Reflux of gastric contents can cause mucosal irritation,

which in turn can lead to peptic strictures, or exacerbate inflammatory changes already present at anastomosis [13,17,20,22,23].

The post-operative management of GER in repaired EA-TEF patients varies widely. There is no consensus in the literature on either the use of or the duration of anti-reflux medication and no guidelines are currently available regarding the type of agent or the timing and duration of medical treatment. Other post-operative management strategies remain surgeon- or institution-dependent, including leaving a chest tube, placing a trans-anastomotic feeding tube, if/when to perform a contrast study or if/when to perform endoscopy [15,18,24–27].

The objective of this study was to survey physicians at the Canadian Association of Pediatric Surgeons (CAPS) annual meeting with respect to their post-operative management of EA-TEF patients and focussing on the management of GER in order to assess current practices among CAPS attendees and to determine if clinical equipoise exists. A collaborative effort on future research focused on establishing evidence-informed clinical practice guidelines could lead to more uniform care of infants with these complex conditions.

1. Methods

We conducted a cross-sectional multinational survey of physicians at the CAPS annual meeting to assess the current practice variation in

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the use of investigational modalities and anti-reflux medications in post-surgical repair EA-TEF patients.

1.1. Sampling Frame

Our survey was designed to identify certain attributes of an active pediatric surgeon cohort. All physicians in attendance at the 2012 annual meeting were invited to participate. We selected this cohort as the annual CAPS meeting includes a representative sample of pediatric surgeons from across Canada.

1.2. Survey Development

A cross-sectional survey was developed through a series of expert consultations at McMaster Children's Hospital in August 2012, after a review of existing literature. The initial survey consisted of fifteen questions including years of experience, location of training, location of current practice, average number of EA-TEF cases per institution and post-operative management of these patients. After review and pilot testing the survey was reduced to eleven questions with categorical response options and open text fields where appropriate to improve clarity while maintaining comprehensiveness.

1.3. Survey Administration

In September 2012, we invited participants to complete the paper-based survey during a break in the conference's scientific program. Participation was anonymous and voluntary and all surveys were collected by an independent research coordinator before the start of the next session. Permission to distribute the survey was obtained from the Program Committee Chair of CAPS prior to the annual meeting.

1.4. Statistical Analysis

All data were coded and entered into a spreadsheet using data validation and analysed using SPSS Version 18.0 [28]. Data were descriptively explored for trends. Counts, percentages, means and standard deviations were calculated where appropriate.

2. Results

In total, 70 surveys were handed out and 57 (81.4%) surveys were completed. On average, EA-TEF occurs at the rate of 8 to 10 cases per institution per year (Table 1).

The majority of respondents use anti-reflux medications in the postoperative period. There was heterogeneity regarding when to start anti-reflux medication in the post-operative period: 74% of respondents initiate anti-reflux treatment immediately post operatively. A further 11% start medications at the initiation of feeds while 14% use anti-reflux medications only if symptoms develop (Table 2). Proton pump inhibitors and H2-receptor antagonists are used in approximately equal proportion. Patients are kept on anti-reflux medication for a variable length of time: 3 to 6 months (37%), or 6 to 12 months (35%).

Less practice divergence was seen amongst other post-operative interventions associated with post EA-TEF repair. Seventy percent of respondents stated that they routinely leave a chest tube post TEF ligation and EA anastomosis, while 85% routinely leave a trans-anastomotic feeding tube (TAFT). Seventy percent of respondents perform routine follow-up contrast studies post TEF ligation and EA anastomosis, of which 83% perform the contrast study on post-operative day 5 to 7. Twelve percent of respondents perform endoscopy routinely as part of a follow-up plan (Table 3).

Table 1
Respondent demographics.

	n = 57
	n (%)
Years in Practice ^a	
<5	10 (17)
6–10	11 (19)
11–20	21 (37)
>20	14 (3)
TEF/EA cases per year ^b	
<5	15 (26)
6–10	12 (21)
>10	11 (19)
Country of training:	
Canada	45 (79)
USA	5 (9)
Australia	2 (4)
South Africa	1 (2)
Netherlands	1 (2)
India/UK/USA	1 (2)
Italy/USA	1 (2)
USA/Canada	1 (2)
Country of practice:	
Canada	34 (37)
USA	21 (60)
Saudi Arabia	1 (2)
Italy	1 (2)

^a 1 respondent did not state his number of years in practice.

^b 19 respondents did not state the average number of TEF/EA seen per year.

3. Discussion

This survey of CAPS attendees highlights the diversity among pediatric surgeons regarding the post-operative management of infants with EA-TEF. The responses varied for all questions and highlighted the lack of uniformity of management strategies employed, from anti-reflux medications (type, time of initiation and length of therapy) to chest-tube and TAFT placement.

Our results are reflections of the published literature on the post-operative management of EA-TEF and GER. There are many different recommendations in the literature; most are based on expert opinions and no randomized controlled trials have been conducted in this area. Some centers recommend routine endoscopic follow-up and base their management of GER on more objective findings such as regular pH probes [26,27,29]. Some centers prefer to start infants on empiric anti-reflux medication [30–33]. Few centers follow their patients long term [25,29]. Additionally, the quality of documentation in the

Table 2
Post-operative treatment for patients after TEF ligation and EA anastomosis.

	n = 57
	n (%)
Anti-reflux medication started:	
Immediately post-operatively	42 (74)
At institution of feeds	6 (11)
Only if reflux symptoms develop	8 (14)
At discharge	1 (2)
Anti-reflux medication used ^a :	
H2 antagonist	24 (42)
Proton pump inhibitor	32 (56)
Duration of anti-reflux medication (months) ^b :	
<3	3 (5)
3–6	21 (37)
6–12	20 (35)
>12	10 (17)
Chest tube placed during operation	40 (70)
Trans-anastomotic feeding tube placed during operation	47 (85)

^a 1 respondent did not report the type of agent used.

^b 3 respondents did not report the duration of anti-reflux medication.

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