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Original Research Paper

Surgery

STUDY OF SURGICAL OUTCOME IN CONGENITAL TRACHEOESOPHAGEAL FISTULA

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ABSTRACT

Background: Tracheoesphageal fistula is one of the commonest congenital anomaly. This study was conducted for assessment of outcome of surgery in congenital tracheoesophageal fistula patients after provision of available expert surgical intervention and perioperative care.

Methods: In this hospital based observational study, 36 eligible cases of tracheoesophageal fistula were thoroughly evaluated during enrollment. Either a transpleural approach or extrapleural approach through 4th intercostal space was adopted for surgery.

Results: Maximum babies (17, 46.33%) were diagnosed with the condition within 6-24 hours after birth and majority (23, 63.88%) underwent surgery after more than 48 hours of diagnosis. Type 1 anomaly was the predominant variety (31, 86.31%). Seventeen (47.33%) patients survived and 19 (52.67%) died after surgery. Out of total 19 deaths, 9 (47.36%) happened within 48 hours of surgery. Thirteen (36.11%) patients underwent surgery by transplural approach, out of which 5 (38.46%) survived. And out of 23 (63.88%) patients who underwent surgery by extraplural approach, 12 (52.17%) patients survived.

Conclusion: The overall survival was 47.33% in our study, which is satisfactory when we keep in mind the lack of facilities and the general unavailability of expert paramedical staff.

KEYWORDS : Tracheoesphageal fistula, surgical outcome

INTRODUCTION:

Tracheoesphageal fistula is one of the commonest congenital anomaly. It occurs in one out of about every 3,500 live births[1]. It needs good perioperative care and early expert surgical management. But the expertise so needed isn't all pervasive and quality & availability/affordability remains an issue.

The credit for the very first description of TEFs goes to Thomas Gibson, who, in 1697, reported a case of an infant with esophageal atresia and a TEF. In 1839, Thomas Hill recounted the symptoms of another infant with a TEF and an associated imperforate anus. In 1888, Charles Steels, a London surgeon, became the first surgeon to operate on esophageal atresia. In the 19th century, innovative work by many surgeons ultimately led to Cameron Haight's successful primary repair in 1941[2]. With the advent of newer surgical techniques and expertise on board, the overall survival now has been shown to be exceeding 90% in dedicated centres[3]. But the generalisability of this high a success rate is questionable, especially in resource poor settings.

This study was conducted with the objective of assessing outcome of surgery in congenital tracheoesophageal fistula patients after provision of available expert surgical intervention and periope rative care at our centre.

METHODLOGY:

Type of study- Hospital based observational study
Study setting- Department of Surgery, Government Medical College & Hospital, Nagpur
Study duration- Two years & 3 months
Sample Size- 36 eligible cases (consecutively sampled)

Selection criteria-

- All patients clinic-radiologically diagnosed as tracheoes ophageal fistula during study period
- Willingness for consent by parent(s)

All the enrolled patients were thoroughly evaluated with utmost care, considering seriousness of the entity in mind. Investigations included haemoglobin percentage, blood grouping, upper pouch study by catheter and dye, complete babygram to include chest and abdomen and x-ray for vertebral anomalies. The clinical examination was detailed and included actively looking out for other congenital anomalies. Attempts were made to provide good perioperative care, although there was some lack of nursing expertise in the intensive care unit and lack of pediatric artificial ventilator support, which was required for some patients perioperatively.

The operative procedures were selected with due consideration to the length of upper pouch and general condition of the patient and the type of anamoly i.e. Tracheoesophageal Fistula (TOF) or Esophageal Atresia (EA). In some cases, a transpleural approach and in some cases extrapleural approach through 4th intercostal space was adopted and a single layer suturing over infant feeding tube no.6 by 4-0 round body silk or 5-0 round body vicryl was performed. In cases of EA, gastrostomy with cervical esphagostomy or Kemura's esphagostomy was performed.

The study was initiated after approval from the Institutional Ethics Committee. The data were analysed using SPSS (Version 18).

RESULTS:

In this study of 36 patients of tracheoesophageal fistula, 20 (55.56%) were males and 16 (44.44%) were females, denoting slight female preponderance. Twenty-five (69.44%) babies were hospital born while 11 (30.56%) were delivered at home.

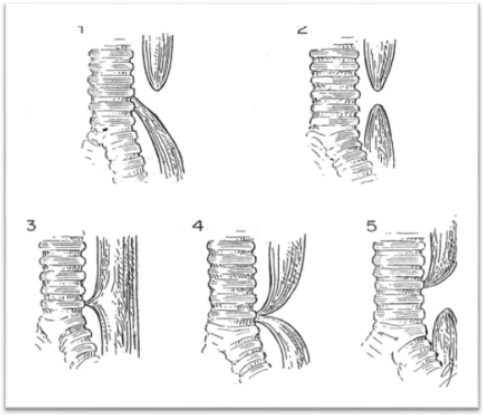
With respect to delay in diagnosis, maximum babies (17, 46.33%) were diagnosed with the condition within 6-24 hours after birth, followed by 7 (19.44%) diagnosed on the 2nd day, 5 (13.89%) diagnosed within first 6 hours, 3 (8.33%) diagnosed on the third day and 4 (11.11%) diagnosed after third day. And when it came to timing of surgery after diagnosis, majority (23, 63.88%) patients underwent surgery after more than 48 hours of diagnosis. Remaining had their surgery in 6-48 hours after diagnosis (6, 16.67%) and within 6 hours of diagnosis (7, 19.44%).

Table 1 describes the types of tracheoesophageal anomalies observed. Type 1 anomaly (i.e. upper blind pouch of esophagus and lower end communicating with trachea) was the predominant variety (31, 86.31%) with type 2 anomaly (i.e. isolated esophageal atresia) constituting remaining cases (5, 13.69%). **(Figure 1)**

Table 1- Types of Tracheoesopahgeal anomalies observed in the study

Sr No.	Type of anomaly	Number of cases (n)	Percentage (%)
1	Type I	31	86.31
2	Type II	5	13.69
3	Type III	0	0
4	Type IV	0	0
5	Type V	0	0
	Total	36	100

Figure 1- Artistic illustration of various types of tracheoe sophageal anomalies



Seventeen (47.33%) patients survived and 19 (52.67%) died after surgery. Out of total 19 deaths, 9 (47.36%) happened within 48 hours of surgery. Seven (36.73%) and 3 (15.78%) patients died between 2-8 days and more than 8 days after surgery respectively.

Eighteen (50%) babies were having at least one more congenital anomaly, with the other half having none. Amongst the types of comorbid congenital anomalies, cardiac anomalies were the commonest (15, 41.66%), followed by intestinal & hind gut anomalies (3, 8.33%). Renal, vertebral and limb anomalies were present in one patient each. **(Table 2)**

Table 2- Types of associated congenital anomalies amongst study patients

Sr No.	Type of Congenital anomaly	Number (n)	Percentage (%)
1	Cardiac	15	41.66
2	Intestinal and hind gut	3	8.33%
3	Vertebral	1	2.66%
4	Renal	1	2.66%
5	Limb	1	2.66%
6	Other	1	2.66%

As of surgical approach, it was noted that 13 (36.11%) patients underwent surgery by transplural approach, out of which 5 (38.46%) patients survived. And out of 23 (63.88%) patients who underwent surgery by extraplural approach, 12 (52.17%) patients survived.

Shock (hypovolemic/septic) and pulmonary complications (8, 22.22% each) were the most common postoperative complications. Septicemia occurred in 4 (11.11%) patients. Esophago-esophageal anastomotic leak was found in 2 (5.55%) patients. Stricture at anastomotic site was found in 1 (2.77%); while other complications like necrotizing enterocolitis, dislodgement of gastrotomy tube and physiologic jaundice were found in 3 (8.33%) cases.

DISCUSSION-

The present study, 36 patients with tracheoesphageal fistula were assessed in detail. Twenty-five (69.44%) babies were hospital born while 11 (30.56%) were reportedly delivered at home. In India, home deliveries still outnumber hospital deliveries, but most of the home delivered babies don't reach the hospital due to various factors like poverty, illiteracy, lack of transport facilities etc. Whereas, those delivered in hospitals are more likely to get immediate medical attention.

In our study, close to 60% cases were diagnosed within 24 hours of birth whereas remaining ~40% were diagnosed from 2nd day onwards. The probable reasons for the delay are home deliveries conducted by untrained persons, hospital deliveries attended by medics not anticipating the condition etc. When it came to timing of surgery after diagnosis, majority (23, 63.88%) patients underwent surgery after more than 48 hours of diagnosis. With the resources & infrastructures available, it took time for us to stabilize and prepare the baby for surgery.

Type 1 anomaly (i.e. upper blind pouch of esophagus and lower end communicating with trachea) was the predominant variety (31, 86.31%), which is in agreement with the available literature which quotes the incidence of type 1 at ~85%.[4,5]

As for congenital anomalies, we reported one out of 36 case of cases of VACTRAL association of congenital anomalies. Fifty percent had at least one associated congenital anomaly. Greenwood and Rosenthal[6] reported cardiovascular and gastrointestinal anomalies to be most common associated congenital anomalies. In our study, 41.66% patients had cardiac and 8.33% patients had intestinal and hind gut anomalies. We reported one patient of penile hypospadias, which is very rarely found associated with tracheoesophageal fistula.

The overall survival was 47.33% in our study, which is satisfactory when we look at facilities and the level of nursing care available. Out of 5 cases of isolated esophageal atresia who underwent cervical esophagostomy and gastrostomy, only 1 survived. The survival is reportedly low for esophageal atresia[7,8] than tracheoesophageal fistula, due to low birth weight and more association of congenital anomalies, which was confirmed in our study. It was observed that more than half (52.17%) of the patients approached extrapleurally survived, as compared to 38.46% survival in transpleural approach. Advantages of extrapleural approach is less trauma to lung and pleura and less chances of pulmonary infection. Hays et al[9] found better survival rates with extrapleural approach and Ashkraft and Holder[10] reported less percentage of leak and mortality with extrapleural approach, which is consistent with what we observed. The finding of overall survival rate (47.33%) is a little higher than what was observed by Sogani et al[11] (20%) in a similar study.

Reluctance of parents for surgery and general unavailability of expert paramedical staff were the notable limitations which affected the outcome adversely and the observations should be seen with that perspective in mind.

DECLARATIONS:

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