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Original Research Article

A prospective study in esophageal atresia with tracheoesophageal fistula: Oblique versus circular anastomosis

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ABSTRACT

Background: Congenital esophageal atresia with tracheo-esophageal fistula is a common congenital anomaly facing at our centre. There is various proposed anastomotic technique to avoid post-op stricture. In this study we compare outcome of oblique and circular anastomosis technique at our centre.
Methods: This study conducted in 60 cases of congenital esophageal atresia with tracheo-esophageal fistula, designed randomly in two groups. Oblique anastomosis in group A and Circular anastomosis in group B. The complications of anastomotic leaks, anastomotic narrowing with strictures and recurrent fistula were studied.
Results: Anastomotic leak rate in case oblique anastomosis was 6.7% as compared to circular anastomosis was 16.7%. Stricture formation in oblique anastomosis was 13.3% in comparison to circular anastomosis there was 43.3% stricture formation. None of the cases required re-exploration in Oblique anastomosis, whereas two (6.7%) cases required re-exploration in circular anastomosis.
Conclusions: Present study showed that oblique anastomotic technique is superior to circular anastomotic technique, in term of less stricture and leak rate.

Keywords: Anastomotic technique, Esophageal atresia, Esophageal stricture, Tracheo-esophageal fistula

INTRODUCTION

Esophageal atresia with tracheo-esophageal fistula is a common congenital anomaly at our center. Congenital tracheo-esophageal fistula can occurs due to non-fusion of the tracheo-esophageal ridges during embryological development.[1] Presenting symptoms are excessive frothing from mouth, chocking and cyanosis.[2] There are so many proposed classifications of esophageal atresia with tracheo-esophageal fistula like Vogt classification, gross classification and ladd classification. Other modified classifications are Waterson classification, holder classification, kluth classification etc.[3] We deal most common variety like, proximal esophageal atresia with distal tracheo-esophageal fistula.

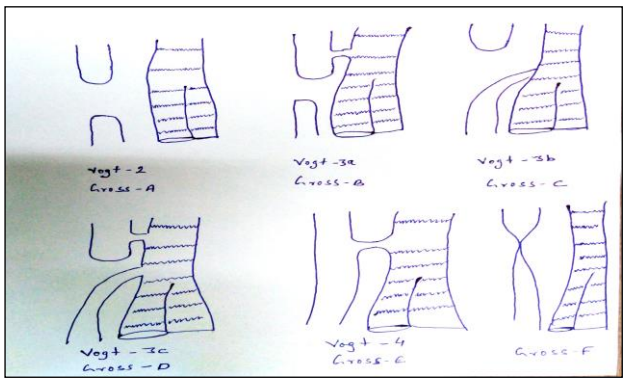

Figure 1: Diagrammatic presentation of vogt and gross classification.

According to Vogt classification, these are in 3B, gross classified it in type C. Post-op common complication of congenital esophageal atresia with tracheo-esophageal fistula is leak and stricture formation at anastomotic site. Anastomotic site stricture is a challenging post-operative complication. To avoid this complication various anastomotic technique proposed, like oblique anastomotic anastomosis, cross incision with zigzag anastomosis, smile incision etc.[4-6] End to end anastomosis is a commonly used anastomotic technique.[7]

METHODS

This study was carried out prospectively in Department of Pediatric Surgery SMS Medical College Jaipur, from 2016 to 2018. This study comprised of 60 consecutive patients of EA and distal TEF, diagnosed on clinical and radiological basis were selected and randomized into two groups. Oblique anastomosis in group A and circular anastomosis in group B. All patients were more than 2 kg in weight and operated within first two days of life after optimization. All the patients were operated by same surgical team. All the patients were operated by right posterolateral extrapleural thoracotomy.

After proper exposure, the fistula was identified and ligated using non-absorbable suture. After adequate mobilization of the upper and lower pouches, the upper pouch was opened by an oblique incision. The lower pouch was carefully held using stay sutures and a longitudinal incision made over the lateral border. Both ends were anastomosed with absorbable suture. The wound site closed in layers after insertion of inter costal tube drain.

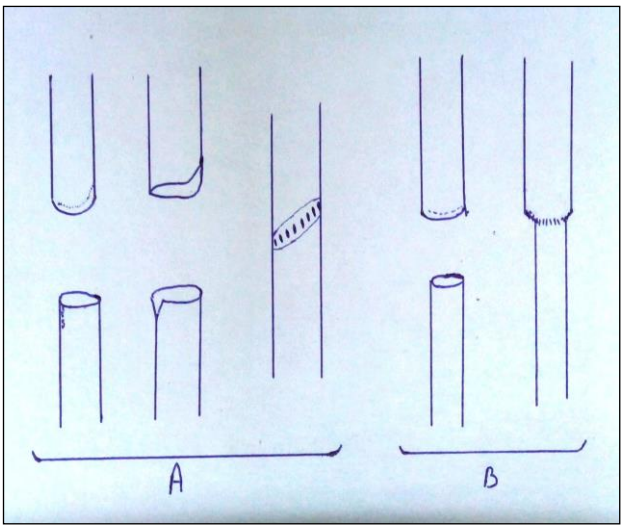

Figure 2: Diagrammatic presentation of (A) oblique anastomosis and (B) circular anastomosis.

A similar procedure was done in group B, except upper pouch was opened by transverse incision after pushing red rubber tube through the mouth. An interrupted single layer circular anastomosis was done using absorbable suture. All the patients were kept nil per mouth post operatively for a period of at least seven days. Total parenteral nutrition was given. Postoperative ventilation was used whenever indicated. A contrast esophagogram study was performed on the fifth postoperative day and the oral feeds commenced once a leak-free anastomosis of the esophagus was established. The patients were followed up with a contrast esophagogram study on two week and one month following surgery. The complications of anastomotic leaks, anastomotic narrowing with strictures and recurrent fistula were studied.

RESULTS

This study conducted in 60 patients of EA with TEF which include 36 males and 24 female patients. Majority of patients were operated on live day second. We include patients of more than 2 Kg weight. Most of the patients had 2-2.5 Kg weight (Table 1).

Table 1: Weight wise distribution of patients.

Birth weight (Kg)	No. of patients	Percentage
2- 2.5	39	65
≥2.5 - 3	16	26.6
≥3	5	8.3

The mean operating time was 60 minutes. Anastomotic leak rate in case oblique anastomosis was 6.7 % as compared to circular anastomosis was 16.7%. Stricture formation in oblique anastomosis was 13.3% in comparison to circular anastomosis there was 43.3 % stricture formation.

Table 2: Complication between oblique and circular anastomosis.

	Oblique Anastomosis n = 30	Circular Anastomosis n = 30	P value
Anastomotic leak	2 (6.7%)	5 (16.7%)	0.228
Stricture	4 (13.3%)	13 (43.3%)	0.01
Re-exploration	0 (0%)	2 (6.7%)	0.150
Mortality	2 (6.7%)	2 (6.7%)	1

None of the cases required re-exploration in Oblique anastomosis, whereas two (6.7%) cases required re-exploration in circular anastomosis. Two patients died in each due to pneumonia and septic shock (Table 2).

DISCUSSION

Congenital tracheo esophageal fistula is a relatively very common surgical entity in neonates at our center. Congenital TEF develop due to failure of fusion of tracheoesophageal ridges after the fourth week of gestation.[1] Post-operative stricture at anastomotic site is a

still challenging incidence of this surgery. Multiple risk factors are identified for Anastomotic stricture, such as long-gap EA with consequent anastomotic tension, postoperative anastomotic leak, gastro-esophageal reflux disease (GERD), general condition of the patient, the nature of suture material used, and type of anastomosis performed.[8-10] There are various anastomotic methods described to avoid or minimized this complication. The First anastomotic technique to prevent post-operative stricture given by Sulamaa et al in 1951.

They advised end to side anastomosis to prevent stricture.[11] Singh and shun did anastomosis, in which suture line present in different plane with wide anastomosis leads to prevent stricture.[5] Melek et al gave a zigzag anastomosis by giving plus shape incision in upper pouch that providing a large and wide anastomosis that is not restricted to one line and minimizes the formation of stricture.[4]

We did a comparative study between circular anastomosis and oblique anastomosis. We found that oblique anastomosis is better in term of less leak rate and stricture formation. Figure 2 showed that oblique anastomosis gives us a wide diameter at the site of anastomosis than circular anastomosis. Yurtcu M et al also suggested that oblique anastomosis is better anastomosis to prevent post-operative stricture. Because oblique anastomosis provides wider anastomosis with multiple plane suture line.[12]

Ghosh S et al also support that oblique anastomosis prevent post-operative stricture.[6] They found no anastomotic leaks, strictures or fistula recurrence in the early and delayed contrast esophagograms.

CONCLUSION

Oblique anastomosis is better anastomotic technique in case of tracheo esophageal fistula to prevent post-operative stricture.

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