Retropleural Drainage: Yes or No in Primary Repair of Esophageal Atresia with Tracheoesophageal Fistula

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ABSTRACT

Introduction: It has been noted that Retropleural drainage causes major complications in Esophageal Atresia (EA) with Tracheoesophageal Fistula (TEF). So the study was done to evaluate the role of retropleural drainage in all cases of EA with TEF with primary repair in terms of preventing complications and survival.

Material and methods: In our prospective study of 96 patients with age ranging from hours to 13 days with M: F 1.66:1 and weight ranging from 1.34 kg to 4.05 kg in between February 2008 to febuary2016, babies were randomly allocated to two Groups. Group A with retropleural drainage (n=69) and Group B without retropleural drainage (n=27). The two Groups were comparable in respect to age of the patients, weight, respiratory status and distance between the pouches after mobilization

Results: Major leak occurred in 7 cases associated with pneumothorax in 3 cases in Group A and 1 case in Group B despite the presence of retro pleural drain, all needed secondary intercostal tube drainage. Minor leak occurred in 3 cases of Group A and 1 case in Group B was managed with secondary drainage and conservative management.

Conclusion: Retropleural drainage is not necessary, following wide and tension free primary repair through extrapleural approach of EA with TEF because it does not appear to prevent pneumothorax and collection of saliva and pus after anastomotic leak which require placement of additional drain for proper drainage followed by revision surgery in major leak group. It acts a potential for infection because it acts as a foreign body leading to more exudates formation and causes postoperative pain leading to poor respiratory efforts because it impinges between the neurovascular bundles.

Keywords: Retropleural drainage, Esophageal atresia, Tracheoesophageal fistula, Anastomotic leak

INTRODUCTION

Thomas Gibson is credited with the first description of esophageal atresia with tracheoesophageal fistula in 1697,[1] it took more than two hundred years for the first two patients to survive a multiple-staged surgeries by Ladd[2] and Leven.[3] In 1943, Haight and Towsley[4] reported the first survivor following a primary definitive repair. Recently, significant advances have been made in the management of esophageal atresia.[5,6] This has resulted in a progressive decrease in mortality as a result of early diagnosis and improved neonatal intensive care and anesthesia. At present in the developed countries the presence of associated major congenital anomalies determines survival,[7] this is not true in developing countries, where many other factors continue to contribute to the high mortality.[8,9] It is a routine practice to keep the drain adjacent to the anastomosis to identify and treat any postoperative leak from the anastomotic site after primary repair.[10,11] But this is now becoming less important because of the improved survival of EA and TEF cases and lower postoperative complications[12,13] and a leak is not as devastating as with an extra pleural approach.[11,14] So this prospective study was conducted to evaluate the role of retropleural drainage in all cases of EA with TEF with primary repair in terms of preventing complications and survival.

MATERIAL AND METHODS

After taking informed consent of patients parents and ethical clearance from IRB, ninety six out of 117 neonates who underwent primary surgery for EA with TEF (figures 1-3) in the Department Of Pediatric Surgery at Career institute of medical sciences and hospital and various pediatric hospitals in Lucknow, India from February 2008 to february 2016 were included in the study. For confirming the diagnosis and preoperative assessment of gap was with Plain X-ray neck, chest and abdomen (PA and lateral view) with No. 8 Fr Red Rubber catheter). Actual measurement of gap was done intraoperatively and we classified patients according to gap length also. Waterston classification was used of survival. Our surgical technique included the right extrapleural approach with U type fistula ligation with adequate upper pouch mobilization followed by a single layer anastomosis with vicryl 5-0 with or without retropleural drainage. The babies were randomly allocated to two Groups, Group A with retropleural drainage (n=69) and Group B without retropleural drainage (n=27). The two Groups were comparable in respect to age of the patients, weight, respiratory status and distance between the pouches after mobilization. Both Groups received the same pre and post operative treatment. The incidence of anastomotic leak (incidence, diagnosis, and treatment), respiratory complications and management of complications were noted in two groups.

STATISTICAL ANALYSIS

Statistical analysis was done using the descriptive statistics. SPSS version 21 was used to make tables.

RESULTS

Sixty babies (62.5%) were males and 36 (37.5%) females.

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Figure-1: Operated case of EA with TEF without retropleural drainage.

Figure-2: Operated case of EA with TEF with retropleural drainage and on ventilator because of anastomotic tension.

Figure-3: Contrast esophagogram after 7 th day of primary repair with retropleural drainage.

	Major Leak ± Pneumo-thorax	Minor Leak	Mortality related to operative complications
Group A	7 ± 3	3	6
Group B	1± 1	1	1

Table-1: Incidence of Major and Minor leak, Pneumothorax and related mortality in both Groups

72 (75%) were full term and 24 (25%) preterm. The weight ranged from 1.34 kg to 4.05 kg with a median weight of 2.50 kg. Associated congenital anomalies were present in 25 (26%) patients. History of attempted feeding was present in 51 (53%). Respiratory distress was found in 84 (87%) of the babies. Short gap <1cm (<1 vertebral body) in54 cases (54%), intermediate gap 1-3 cm (1-3 vertebral bodies) 35 (36%) and long gap >3 cm (>3 vertebral bodies) were present in 7 (9%) of cases. In group A 28 (29%) patients, 49 (51%) were in group B and 19 (20%) were in group C. In group A major leak occurred in 7 cases in which 3 cases were associated with pneumothorax despite the presence of retro pleural drainage all needed secondary intercostal tube drainage (table-1). Minor leak was present in 3 cases. In group B major anastmotic leak with pneumothorax occurred in 1 patient and minor leak was present in one case which was diagnosed clinically and confirmed by chest radiograph and contrast esophagogram intercostal drain was put. All patients with minor leak were managed with drainage and conservative management. In our study 7 (7 %) cases were expired in early postoperative period (within 48 hrs of surgery) either because of life threatening congenital anomalies or anesthetic complication and aspiration so they are not including in surgical related mortality. Seven patients who had major leak associated with pneumonitis or septicemia were expired whether they have retropleural drain or not. The survival rate was 78 % in Group A and 85% in group B.

DISCUSSION

In the present study in Group A anastomotic leaks after primary repair were detected either by observing the saliva in retropleural drain or by contrast study of esophagus. Minor leaks were identified by appearance of frothy saliva in the retropleural drain with no accompanying deterioration in the general condition. An alternative method to confirm this was by giving oral methylene blue and then observing its appearance in the retropleural drain. Major leaks were clinically suspected by the contents draining with accompanying deterioration in general condition of the patient due to mediastinitis or pneumonitis and septicemia. In group B leaks were clinically suspected by increased respiratory distress, fever and sepsis or plain X-ray chest showing pneumothorax and pneumonitis and confirmed by contrast study of esophagus. Routine retro pleural drain placed near the anastomosis may not be necessary in all cases of EA with TEF after primary repair and good prognosis patients (Waterston class A and B) who undergo an uncomplicated extra pleural repair without undue tension do not appear to benefit from having a chest drain in place, and there is potential for complications.[15] Factors that contribute to anastomotic leaks include; excess tension at the site of anastomosis inadequate approximation of mucosa, too tightly tied sutures, trauma and Ischemia of esophageal ends during mobilization, and the use of silk sutures for esophageal ananstomosis.[12-16] Anastomotic leaks were frequent and often fatal in the past.[17] Now with improved surgical technique and neonatal care, including nutritional and ventilatory support if anastomosis is under tension because of long gap or associated severe pneumonitis this complication is seen less frequently and leads to death.[12,13,18] With the use of an extra pleural approach the consequences of a leak are diminished even further.[14] Major leaks, usually detected within

the first 48 hours require re-exploration in most cases, but these account for only a small percentage of all leaks. In our study Amongst the 7 major leak patients 2 patients had leak on day two of surgery despite of no tension at the anastomotic site with proper esophageal anastomosis, on exploration drain was found at the anastomotic site seemed to be associated drain related injury in which revision anastomosis was done. Placement of a drain close to the anastomosis was a standard part of operation for EA with TEF in earlier operative textbooks and reviews.[10-18] However newer texts acknowledge that a retropleural drain may not be necessary in all cases of EA with TEF after primary definitive repair and its use should be left to the discretion of the pediatric surgeons.[10,12,16,19] A retropleural drain does not always function when there is an anastomotic leak may be because of blockage due to excessive exudates. Further a retro pleural chest drain acts as a potential for infection because it acts as a foreign body leads to more exudates formation and local pleural irritation causing pleural thickening and reaction and may lead to postoperative pain because it impinges between the intercostal neurovascular bundle and delayed scoliosis. So we recommended that a retro pleural drain is not necessary in every case of EA with TEF after primary repair when the distance is less then 3 cm (intermediate gap) between the upper and lower esophageal pouch. Gangopadhyay et al[20] also recommended that retropleural drainage is not necessary in all cases of EA and TEF especially when the distance between the two esophageal pouches is within 2.5 cm. When a wide and tension free esophago-esophageal anastomosis has been performed in a single layer using absorbable suture by a retropleural approach, there is no need of putting a chest drain, to avoid drain associated complications Routine use of retro pleural following primary repair of EA with TEF does not appear to prevent pneumothorax and collection of saliva and pus after anastomotic leak which require placement of additional drain for proper drainage for minor leak and if there is major leak we should go for revision surgery as early as possible either in the form of repeat primary repair or palliative procedures like cervical esophagostomy and abdominoesophagostomy or gastrostomy and feeding jejunostomy, because it is associated with high mortality rate. Definitive procedure for esophageal replacement may be done later in life. So patients of EA and TEF with good prognostic factor after primary definitive repair can be safely managed by without retro pleural drain.

CONCLUSION

Retropleural drainage is not necessary in primary repair of EA with TEF with an extrapleural approach because it does not prevent surgical related complications and acts a potential for infection and causes postoperative pain leading to poor respiratory efforts because it impinges between the neurovascular bundles.

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