

Intercostal Drainage in Congenital Diaphragmatic Hernia Repair- Utility or Futility?

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Abstract: In congenital diaphragmatic hernia (CDH), chest tube insertion at repair could determine rapid over- expansion of hypoplastic lungs , increasing the risk of pneumothorax. Therefore in our institution no chest tube drainage at CDH repair was inserted in patients of 2 out of 4 PSU to allow to expand of lungs at their own pace, making it possible to estimate their degree of hypoplasia on post-operative CXR. Afterwards few patients needed chest tube drainage for cardiopulmonary distress due to pleural effusion (PE) during post-operative course. The aims of this study are to establish the incidence of pleural effusion requiring drainage for cardiopulmonary distress during post-operative course in CDH and to compare effective outcome in patients of CDH , repaired with and without chest tube drainage. further more etiology and treatment of pleural effusion are highlighted. Records of high risk CDH operated on from aug 2013 to april 2016 were reviewed. No chest tube was inserted at repair in group A . Drainage was accomplished post-operatively if a cardiopulmonary distress due to pleural effusion occurred while in other patients of group B chest tube was inserted at repair. Both these groups were compared on gender , gestational age, birth weight and side of hernia. Overall mortality rate was recorded, out of 107 patients , 39 operated with out chest tube drainage at CDH repair. Pleural effusion occurred in 8 out of 39 patients. Birth weight was significantly lower, pleural effusion rate was significantly higher in these patients. pleural drainage yielded improvement of ventilatory and respiratory parameters in all cases. Overall mortality rate was 16 and 38. the incidence of pleural effusion was 8 patients in group A. the increased mortality rate in patients with pleural effusion causing cardiopulmonary distress warrants chest tube drainage before instability occurs.

Keywords: Congenital diaphragmatic hernia, pleural effusion, intercostal drainage.

I. Introduction

CDH in infants was generally considered a fatal disease through the early 20th century. The report by Ladd and Gross (1) demonstrated that repair could be undertaken successfully in an infant was a landmark in surgical management of this disease. They proposed that a policy of waiting for infants to grow was inadvisable and suggested urgent correction. CDH is a disease with wide range of severity . In CDH chest drain inserted at repair could cause undue stretch and distension of lung contralateral to defect (2). In previous clinical observations , we found that lung over expansion is a chief cause of morbidity and death in these infants and we stopped inserting ipsilateral underwater chest drain after reduction of herniated contents (3,4). Several investigators found that pneumothorax due to a rapid overexpansion of hypoplastic lungs , was the principle cause of morbidity and death in CDH (5). Post-operatively air must be kept inside the thoracic cavity to prevent rapid overexpansion of these hypoplastic lungs , and defect in diaphragm are too large for a primary closure, we now insert prosthesis which are impervious to air at normal pressure (6). This allows both the lungs to expand at their own pace, making possible to measure their degree of hypoplasia on first post-operative CXR. Overdistension of lungs in babies with CDH can exacerbate arteriolar vascular resistance, causing pulmonary hypertension and also result in lung injury caused by barotrauma (7,8). There in our institute, no chest drain at CDH repair was inserted in CDH infants of 2 PSU. Afterwards it observed that few patients needed chest tube drainage for cardiopulmonary distress due to pleural effusion , during the post-operative course. The records of high risk CDH neonates operated on from 2013 to april 2016 were reviewed furthermore, the etiology and treatment of pleural effusion were highlighted and discussed.

II. Materials and Methods

The records of high risk CDH neonates operated on from aug 2013 to april 2016 at a tertiary care centre with out ECMO facility for CDH were reviewed. Diaphragmatic repair was performed in stabilized patients (9). The patients were divided into two chronological groups for comparison. Group A is comprised of 39 infants in which no chest tube was routinely inserted at repair to avoid over expansion of hypoplastic lungs. In case of pleural effusion associated with cardiopulmonary distress, not explained by any other underlying

pathology such as sepsis , heart failure or pulmonary disease , thoracentesis was performed to yield improvement of respiratory status. Cardiopulmonary distress was defined as a status in which mediastinal shift on CXR , was associated with respiratory acidosis, increased ventilatory parameters or oxygen requirement and difficult extubation or need for reintubation. At first needle thoracentesis were carried out to drain pleural effusion. Because of the constant symptomatic recurrence (100 % of the patients) of pleural effusion after needle aspiration, this procedure was replaced by chest tube insertion. Chest tube was removed at least 48 hours after the pleural effusion had disappeared.

Group B included 68 infants who underwent chest tube drainage at the time of CDH repair. Further more over all mortality rate was recorded.

III. Results

107 infants were operated on, CDH repaired with chest tube drainage was performed in 68 out of 107 infants and 39 infants were repaired with out tube drainage. Pleural effusion occurred in 08 out of 39 infants, pleural drainage yielded improvement of ventilatory and respiratory parameters in all cases. In 03 infants needle aspiration was performed and recurrence of pleural effusion occurred in 02 cases. The two groups were comparable with all clinical findings. Right sided 04 and left sided 103.

Sex ratio male-76; female-31

The age of presentation in 49 cases was in the first day of life .among rest, 15 cases were 2 days old and 14 cases were 3 days. Rest were older.

- Overall mortality rate=46/107
- Group A= 16/39
- Group B =38/68
- 08 out of 39 developed pleural effusion, 03 infants underwent needle aspiration (01 infant relieved and 02 infants again developed P.E) for that total 07 patients required chest tube drainage.

IV. Discussion

Congenital diaphragmatic hernia is a relatively common admitted patient to the neonatal surgical emergency. The management has always been surgical and controversy exists with regards to the use of intercostal drains. Different schools of thought exist. Several investigators found that pneumothorax due to a rapid overexpansion of hypoplastic lungs , was the principle cause of morbidity and death in CDH (5). Post-operatively air must be kept inside the thoracic cavity to prevent rapid overexpansion of these hypoplastic lungs , and defect in diaphragm are too large for a primary closure, we now insert prosthesis which are impervious to air at normal pressure (6). This allows both the lungs to expand at their own pace, making possible to measure their degree of hypoplasia on first post-operative CXR. Overdistension of lungs in babies with CDH can exacerbate arteriolar vascular resistance, causing pulmonary hypertension and also result in lung injury caused by barotrauma (7,8). There in our institute, no chest drain at CDH repair was inserted in CDH infants of 2 PSU. Afterwards it observed that few patients needed chest tube drainage for cardiopulmonary distress due to pleural effusion , during the post-operative course. The records of high risk CDH neonates operated on from 2013 to april 2016 were reviewed furthermore, the etiology and treatment of pleural effusion were highlighted and discussed. As shown in results, intercostal tube drainage is not advisable in the patients undergoing surgical repair. The harm or futility outweighs the utility in these cases.

V. Conclusion

Intercostal drainage is not advisable in patients undergoing surgical repair of congenital diaphragmatic hernia. It is also emphasized that mortality goes higher in the group having a drain inserted. In our group, the group having tube inserted had 60 % mortality as compared to 41 % in the other group.

Key

Figure 1- preoperative photoradiograph

Figure 2- postoperative photoradiograph

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