RIGHT DIAPHRAGMATIC PARALYSIS POST TRACHEOESOPHAGEAL FISTULA REPAIR- NON OPERATIVE MANAGEMENT

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Introduction

Phrenic nerve injury after tracheoesophageal fistula (TOF) repair has been rarely reported in the literature. We present a case of a newborn patient who required 5 weeks of ventilatory support for a reversible phrenic nerve injury that occurred after the surgery

Case Presentation

A female neonate born prematurely at 34weeks of gestation with birth weight 1890g, was diagnosed with tracheoesophageal fistula in the early postnatal period. She developed respiratory distress and required endotracheal intubation at 3 hours of life. She underwent immediate right posterolateral thoracotomy and extra-pleural approach of tracheoesophageal fistula ligation and primary anastomosis of esophagus. Intraoperative findings revealed Type C tracheoesophageal fistula with small gap between the proximal and distal esophageal pouch. Chest tube was inserted intraoperatively. Fluoroscopy study was performed at post operative day 7 showed intact anastomosis, no leakage and no evidence of recurrent fistula, hence chest tube was removed. Feeding was initiated after the fluoroscopy and gradually increased.The patient failed several attempts of extubation during postoperative period and serial chest radiograph reveal persistent right diaphragmatic elevation. Sonography revealed absent of right diaphragmatic excursion. Echocardiogram revealed no major cardiac anomaly. The patient required 3 weeks of invasive ventilatory support and 2 weeks non-invasive ventilatory support in total.

Images

FIGURE 1: Chest radiograph revealed coiling of nasogastric tube

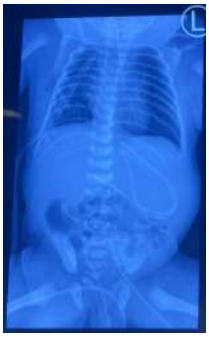

FIGURE 2: Post-operative chest radiograph revealed no elevation

FIGURE 3: Post-operative day 5 chest radiograph revealed right hemidiaphragm elevation

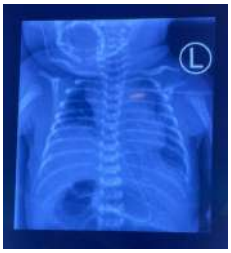

FIGURE 4: Post-operative day 19 chest radiograph revealed persistent right hemidiaphragm elevation

Discussion

Phrenic nerve paralysis commonly presents as respiratory failure or failure of weaning from ventilator. It is diagnosed by persistent hemidiaphramatic elevation and paradoxical movement of the diaphragm on the ultrasound (4). The injury to the phrenic nerve frequently reported as complication of cardiac surgery (6). There are also case reports of complication related to venous catheterization of the internal jugular and subclavian veins, chest tube placement, neck dissection, lung transplantation, and vaginal birth. From literature review, most author advocates on ventilatory support. However, some authors recommending early diaphragmatic plication to prevent morbidity and reduce the need for prolonged ventilatory support, hence reducing the hospital stay (5).

Phrenic nerve injury after TEF repair, however, is rare due to the postero-lateral location of the thoracotomy incision and, therefore, there has not been many cases reported in the literature. Man et al (1) and Henderson et al (3) reported a similar case of right hemidiaphragm paralysis after TEF repair that ultimately resolved with 5 wks of ventilatory support. Haller et al (2) noted diaphragmatic paralysis after TEF repair in one of the 15 cases of phrenic nerve injury in their review.

In case of wide gap esophageal atresia, the dissection during cervical esophagostomy might cause direct injury to the phrenic nerve. The anatomical location of the incision and operation performed in this case was such that direct injury to the phrenic nerve was unlikely to happen. Injury can range from complete, irreversible transection of the nerve to neuropraxia with temporary nerve dysfunction. It is proposed that this rare complication occurred as as result of indirect traction.

The treatment recommendation for prolonged diaphragmatic paralysis (more than 2-3weeks) is diaphragmatic plication (5). There are reports (7) in the literature that advocate nonoperative management in those patients who seem to be regaining function slowly. In our patient he managed the baby non-operatively and the baby had benefited from early withdrawal of ventilatory support. We must weigh the benefit of early removal of ventilatory support against complication and morbidity associated with plication such as postoperative pain, winged scapula or chest wall deformities. The reversibility of the injury was confirmed by subsequent chest radiograph and the ability to wean off from ventilatory support. Important point to note is that non-operative management is more likely to be successful in those patient that the cause of diaphragmatic paralysis is form indirect injury. In those patients who have complete nerve division and/or substantial respiratory insufficiency, however, the chances of spontaneous recovery are significantly lower, and therefore early plication would be more appropriately considered.

Finally, it should be noted that, in the future, as thoracoscopic procedures become more frequently performed in neonatal patients, it is possible that minimally invasive surgical approaches may allow the patient to benefit from diaphragmatic plication without the morbidity associated with open thoracotomy.

Conclusion

Phrenic nerve injury with diaphragmatic paralysis should be suspected when the patient cannot be weaned of the ventilator following tracheooesophageal repair, after exclusion of obvious cardiac or pulmonary pathologies. Patient should receive initial non-operative management with diaphragmatic plication is reserved for those patients who fail to regain diaphragmatic function after 4 to 6 weeks.

References

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