Home high-flow nasal cannulae as a treatment for extensive tracheomalacia

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Case

- 39-week gestational age male infant was noted to have thick secretions, stridor and difficulty breathing at birth. Orogastric tube insertion was unsuccessful and a chest x-ray suggested esophageal atresia.
- Esophageal atresia type C was confirmed upon surgery (day 1). Ligation of the fistula and end to end oesophagus anastomosis were performed without complication.
- He was extubated within 24h and maintained on Bipap.
- Esophageal impendancemetry revealed severe gastro-esophageal reflux (GERD). The patient underwent a gastrostomy and Nissen fundoplication at 2 months of age.
- At 2 months, he was switched to high-flow nasal cannulae (HFNC) at 7 LPM with room air. Attempts to decreased HFNC below 5 LPM failed, with increased stridor, SaO₂<90% and PCO₂>65 mmHg.
- Chest CT scan showed absence of vascular ring.
- Bronchoscopy repeated at 4 months showed left main bronchomalacia and severe tracheomalacia with involvement from the cervical trachea to the carina.
- The weight gain was sufficient over the next month and the patient remained stable on continuous HFNC.

Severe tracheomalacia with bulging of the posterior membranous tracheal wall at 4 months

Discussion

- Severe tracheomalacia, defined as a near collapse of the airway or coaptation of the tracheal walls, is a life threatening condition whose management is challenging.
- Aortopexy, tracheostomy and tracheal reconstruction are the established treatments for tracheomalacia. Symptom improvement at follow-up have been reported in more than 80% with aortopexy in patients with variable degree of tracheomalacia. A more novel surgical approach to aortopexy had shown technical advantages in a recent publication.
- However, no study has systematically reported on severe extensive tracheomalacia.
- We have 4 patients with severe extensive tracheomalacia with or without bronchomalacia treated with HFNC. Two have associated esophageal atresia.
- In all four patients, HFNC was started based on chronic respiratory distress (hypoxemia, respiratory indrawing and tachypnea). Duration of follow up ranges from 5 to 18 months and favorable outcomes were noted in all four.
- Other therapeutic options have been discussed in multidisciplinary meetings and have been ruled out based mainly on the generalized involvement of the trachea and the favorable evolution of these patients under HFNC.
- Most patients with tracheomalacia outgrow the condition by the age of 2 years. Similarly, we have been able to wean or discontinue HFNC between the age of 12 and 24 months.
- Three out of the four patients were able to return home with HFNC and the fourth is awaiting control bronchoscopy before discharge.
- Parental satisfaction so far has been positive.

Conclusions

- This is the first report of successful treatment of severe tracheomalacia in a patient with esophageal atresia using HFNC.
- We believe HFNC may be considered as a therapeutic option in specific cases of extensive tracheomalacia. However further studies and follow-up are required before conclusive recommendations can be made.

References
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