International Journal of Pediatric Otorhinolaryngology 90 (2016) 54–57

Contents lists available at ScienceDirect

International Journal of Pediatric Otorhinolaryngology

journal homepage: http://www.ijporlonline.com/

Case Report

Successful conservative management of a rare complication of tracheostomy; extensive posterior tracheal false pouch

Jennifer F. Ha [a,*], Waseem Ostwani [b], Glenn Green [a]

[a] University of Michigan Health System, Division of Pediatric Otolaryngology, Department of Otolaryngology-Head and Neck Surgery, Ann Arbor, MI, United States
[b] University of Michigan Health System, Division of Critical Care Medicine, Department of Paediatrics and Communicable Diseases, Ann Arbor, MI, United States

ARTICLE INFO

Article history:
Received 26 May 2016
Received in revised form
24 August 2016
Accepted 25 August 2016
Available online 27 August 2016

Keywords:
Tracheostomy
Tracheal false pouch
Complications
Airway
Erosion
Conservative management

ABSTRACT

Introduction: With the advent of improved neonatal and pediatric intensive care management, tracheostomy is increasingly performed in children requiring prolonged ventilation. Even though tracheostomy is generally a safe procedure, there remains mortality and morbidity associated with it.
Objective: We report a rare complication of a tracheostomy tube resulting in extensive erosion and posterior tracheal false pouch secondary to a large tracheostomy tube and high positive end expiratory pressure in a 12-month-old infant. This was managed successfully with conservative treatment.
Results: A former 34-week premature infant was transferred to our pediatrics intensive care unit (PICU) with recurrent episodes of cardiopulmonary arrests due to suspected severe tracheobronchomalacia. The patient has bronchopulomonary dysplasia, severe restrictive lung disease and thoracic insufficiency from skeletal dysplasia requiring tracheostomy tube (TT) at two-month-old and mechanical ventilation. The 3.5 NEO TT was gradually upsized to a 5. The PEEP setting at transfer was 18cmH2O.
The direct laryngoscopy and bronchoscopy showed moderate tracheomalacia at the innominate artery with a false pouch in the posterior tracheal wall that was 1.1cm below the tracheostomy stoma. A multidisciplinary discussion including otolaryngology, PICU, Pulmonary Medicine, and Pediatric Surgery decided on conservative management. The false pouch healed and she was transferred back to referring PICU after a 46-day.
Conclusion: Tracheal wall erosion resulting in a pouch formation is a rare complication, but it should be considered in patients with long term tracheostomy with difficulty ventilation and oxygenation with positional change. DLB is a useful tool in its diagnosis and conservative management can be successful.

1. Introduction

Since Armand Trousseau popularized tracheostomy during the Diptheria epidemic as a life-saving procedure, it is now a commonly performed procedure worldwide [1,2]. In the pediatric population, the main indications are upper airway obstruction and prolonged ventilation [1–3]. There is an increase incidence with the latter indication with the advent of improved neonatal and pediatric intensive care management in those with complex medical conditions [1,4,5]. Even though tracheostomy is generally a safe procedure, there remains mortality and morbidity associated with it. The complications have been reported to occur in 13%–88% [2,4]. Short term complications include infection, bleeding, subcutaneous emphysema [3]. Long term complications include infection, tracheal granulation, mucous plug, accidental decannulation, tracheocutaneous fistula, stomal collapse or narrowing [3]. Mortality rate is reported to be approximately 3%–19% due to tracheostomy plugging, false passage cannulation and innominate artery erosion [2,3,6,7].

We report a rare complication of a tracheostomy tube resulting in extensive erosion and posterior tracheal false pouch in a 12-month-old infant. This was managed successfully with conservative treatment.

* Corresponding author. Division of Pediatric Otorhinolaryngology Head & Neck Surgery, University of Michigan Health System, 1540 E Hospital Drive, SPC 4241, Ann Arbor, MI, 48109-4241, United States.
E-mail address: drjennha@yahoo.com.au (J.F. Ha).

http://dx.doi.org/10.1016/j.ijporl.2016.08.023
0165-5876/

2. Case report

A 12-month-old was transferred to our pediatrics intensive care unit (PICU) as an ICU to ICU transfer with recurrent episodes of cardiopulmonary arrests due to suspected severe tracheobronchomalacia.

The patient was a former 34-week premature infant with bronchopulomonary dysplasia with severe restrictive lung disease and thoracic insufficiency due to skeletal dysplasia requiring tracheostomy tube (TT) and mechanical ventilation.

Patient had a surgical tracheostomy with a 3.5 NEO bivona at two months of age. The direct laryngoscopy and bronchoscopy (DLB) showed normal anatomy. At three months old, she had an emergent flexible bronchoscopy (FB) due to desaturations and difficulty ventilation. Granulation tissue was found distal to the TT associated with partial occlusion when her neck was in extension. Mild right main stem bronchomalacia was documented. A 3.5 PED Bivona TT was placed and a repeat scope in neutral, flexed and extended position appeared normal.

At five months of age, she had another FB due to difficulty ventilation and tracheomalacia was documented. This occurred again at six months of age, and the FB was performed through her 4 PED cuffed TT. It was changed to a 4.5 cuffed PED TT as there appears to be distal obstruction again.

She had chest computed tomography (CT) at 8 months old to investigate the effect of different ventilation setting due to repeated issues with ventilation. Airway measurements were made at positive end expiratory pressure (PEEP) settings of 30, 18 and 10 mmHg. The trachea was reported to be widely patent with a PEEP of 30 and 18, and some redundancy was observed at 10.

She had another episode of difficulty ventilation at 10 months old and the TT was noted to be abutting the tracheal wall. Ventilation improved with slight retraction of the tube. It was documented that there was no significant bronchomalacia at the time. TT was upsized to a size 5 PED TT.

Two episodes of cardiopulmonary arrests were precipitated by bearing down requiring deep sedation and neuromuscular blockade, patient was then transferred to our PICU with PEEP of 18 cmH2O.

On day 3 of admission, CT Chest showed severe dilatation of trachea at the level of TT (Fig. 1). Initial DLB was difficult due to significant amount of secretions but repeated DLB showed moderate tracheomalacia at the level of the innominate artery with a false pouch in the posterior tracheal wall (Fig. 2) that was 1.1cm below the tracheostomy stoma. It measured 2.8cm long, with 1cm of clearance from the carina. There was no fistulisation with the oesophagus. It is believed that her frequent desaturations with bradycardia and subsequent cardiac arrests were due to the TT displacements into this false pouch with positional change, resulting in difficulty with ventilation. She had a dynamic PEEP study showing normal oxygenation with a PEEP of 0 intra-operatively.

A multi-disciplinary discussion including otolaryngology, Pediatric Intensive Care, Pulmonary Medicine, and Pediatric Surgery planned a conservative management as the course of action. Patient was maintained deeply sedated with chemical paralysis with slow weaning of PEEP down to 8 cmH2O. At day 24 of admission, a custom 53mm long 5–0 PED Bivona Flextend uncuffed TT was placed with direct visualization to bypass the pouch and allow healing. Intraoperative FB assured that custom TT does not fall into the false pouch with various positions. A modified minerva brace was used to optimise the position of the TT to allow for healing. The patient was taken off neuromuscular blockade with weaning sedation medications.

She remained well but desaturated when placed in the right decubitus position. Her follow up DLB on day 35 showed collapse of her right main bronchus in the right decubitus position. This was prevented with a PEEP of 8. The false pouch appeared to be healing well (Fig. 3) with complete recovery on day 44 (Fig. 4). Patient was transferred back to referring PICU at day 46 of admission and was discharged home at fifteen months old.

3. Discussion

Pediatric tracheostomy procedure is associated with a higher morbidity and mortality compared to the adult population [4]. They often have multiple predisposing factors and medical co-morbidities. The intra-operative complications are reported as 3%,

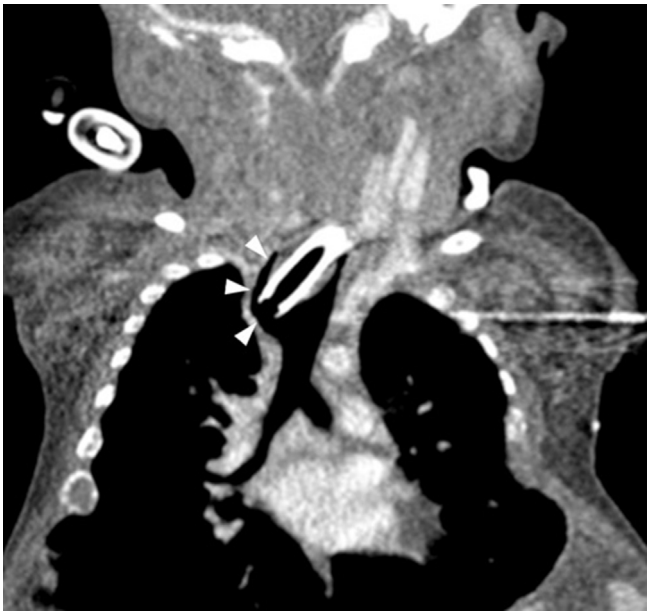

Fig. 1. Coronal chest CT demonstrating dilatation of the trachea at the level of the tracheostomy tube.

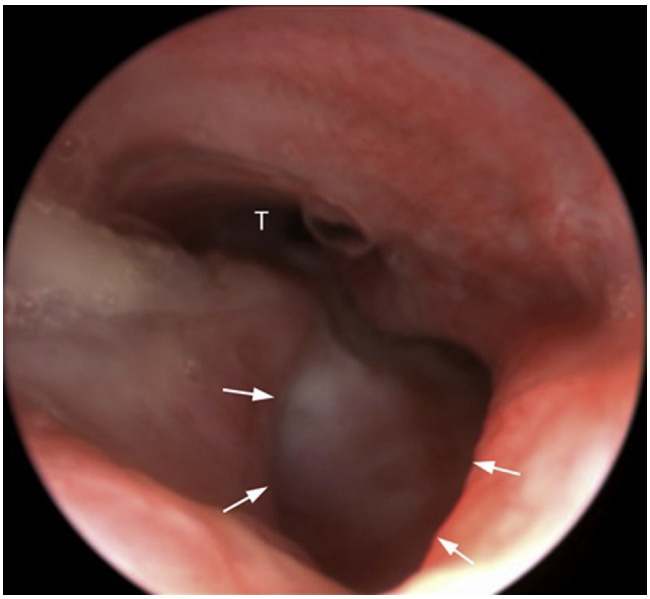

Fig. 2. False pouch seen on direct laryngoscopy and bronchoscopy. T, trachea.