Airway management using tube exchanger during laryngeal cleft repair on cardiopulmonary bypass

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Introduction
Occasionally airway surgery is undergone on cardiopulmonary bypass (CPB) because of its lesion. We discuss airway management of laryngeal cleft repair on CPB for a patient who underwent tetralogy of Fallot repair prior to this surgery.

Case report
This full term, 4kg babyboy with tetralogy of Fallot (TOF) s/p transannular patch repair, severe gastroesophageal reflux s/p Nissen fundoplication was transferred to our institution because of laryngeal cleft (type3) management which was discovered in the setting of several failed extubations at outside hospital. His vital sign was stable, he was ventilated with pressure support ventilation. He was easy to arouse on routine sedatives in ICU. He underwent direct laryngoscopy and bronchoscopy, open repair of type 3 laryngeal cleft on cardiopulmonary bypass (CPB). Anesthesia was induced with ketamine, and his spontaneous breathing was maintained. After trachea was extubated, quick direct laryngoscopy and bronchoscopy was done by ORL and then trachea was reintubated with endotracheal tube (ETT) without difficulty. Laryngeal cleft extending 2.5cm inferior to the inferior aspect of the cricoid was confirmed. Also severe global airway edema was noticed. He was placed on CPB, cannulating right common artery and right internal jugular vein to facilitate surgical exposure. ETT tube was withdrawn at this point. Cleft was repair using superficial temporalis fascia graft after opening anterior side of trachea through transverse cervical incision. Then infant size tube exchanger was inserted through trachea opening into the mouth in a retrograde fashion, and 3.0 cuffed ETT was inserted over it. After trachea was closed, he was weaned off CPB. He was kept intubated and transferred to ICU. Unfortunately he failed extubation trial later and tracheosotmy was placed.

Discussion
: We presented the case of airway management during airway surgery under CPB. Congenital laryngeal clefts are rare disorders that result from a failure in the normal development of the tracheoesophageal septum and posterior cricoid lamina (1). Laryngeal cleft was divided into 4 types by Benjamin and Inglis (2). Type 1 is a supraglottic interarytenoid cleft, type2 extends into but not through posterior cricoid lamina, type3 extends through the cricoid and could involve the cervical trachea, and type4 extends below the thoracic inlet. Type 3 laryngeal cleft may be repaired without CPB, but in this case, controlling cardiopulmonary status is important given his recent repair of tetralogy of Fallot with transannular patch and also the size of this patient.

The airway management of small infant who undergoes cardiopulmonary bypass poses a unique issue. Because of the patient’s size, the access to patient can be very limited under surgical drapes. So it is very important to have access to airway during surgery, especially during airway surgery. In this case, CPB was commenced through right neck to avoid redo sternotomy, so anesthesiologist’s meticulous attention is necessary to prevent accidental dislodge / kinking of cannula when the access to airway is necessary. Direct laryngoscopy can be very difficult in this situation. We used infant size tube exchanger to placed cuffed endotracheal tube to avoid manipulation around the neck by direct laryngoscope, mimicking “retrograde intubation”. We chose cuffed endotracheal tube because we wanted to optimize ventilation postoperatively even when airway edema subsided, considering free pulmonary regurgitation from transannular patch. Tube exchanger was passed to surgical field steriley and inserted into anterior opening of trachea. Distal end of tube exchanger was pulled from the mouth and cuffed endotracheal tube was placed through tube exchanger. The tube was easily placed. Other option would be fiberoptic intubation, but this may not be ideal, considering some blood tinged collection in the mouth from surgical field may obscure the view and airway edema may make the procedure difficult.

Reference