Extraluminal FOGARTY® in congenital lobar emphysema: Maneuvering the odds

Congenital lobar emphysema (CLE) is a rare developmental anomaly secondary to dysplastic bronchial cartilages or diffuse bronchial abnormalities.[1] These abnormalities usually affect a particular lobe leading to a ball valve effect, predisposing to progressive lobar hyperinflation, causing compression atelectasis of residual lung and mediastinal shifting.[1] Positive pressure ventilation can aggravate lobar hyperinflation leading to significant cardiorespiratory deterioration. Consequently, extraluminal lung separation devices are ideal since, while preventing lobar hyperinflation, they allow unobstructed ventilation through the patent endotracheal tube (ETT) and facilitate unimpeded lung ventilation in this multi-challenging scenario.[2,3]

A 3-month, 4.5 kg female infant presented with respiratory distress (RR 68-74/min) for 20 days. Examination revealed subcostal retractions, bilaterally reduced breath sounds (left > right) on auscultation, and Sp02 94%-96% on room air. Computed tomography (CT) images of the chest confirmed left upper lobe (LUL) hyperinflation consistent with CLE [Figure 1]. We planned on maintaining spontaneous breathing until left lung isolation using an extraluminal Fogarty® arterial embolectomy catheter, followed by flexible fiberoptic bronchoscopy and subsequent lobectomy. Pre-procedure bronchoscopy was requested by surgeons to rule out intraluminal pathology, due to suspicious changes noted in the right middle lobe on CT imaging [Figure 1]. After confirming parental informed consent, the infant was wheeled into the operating room (OR) with surgeons scrubbed and ready in the event of sudden deterioration. After attaching standard American Society of Anesthesiologists monitors, intravenous glycopyrrolate 4 mcg/kg and ketamine 1 mg/kg were given, followed by incremental sevoflurane induction. 3F Fogarty® was passed beyond the cords using C-MAC® video laryngoscopy (Karl Storz, Tüttlingen, Germany). With the head turned right, the Fogarty® was advanced to the left. A 3.5 mm ETT preloaded on 8F Frova® intubating introducer (Cook Medical, Bloomington, USA) was then passed beyond the cords with the same laryngoscopic view maintained. Bronchoscopy was performed using a 2.8 mm flexible scope (FB-8V Pentax, Hoya Corporation, Tokyo, Japan) through the bronchoscopic port of the Arndt

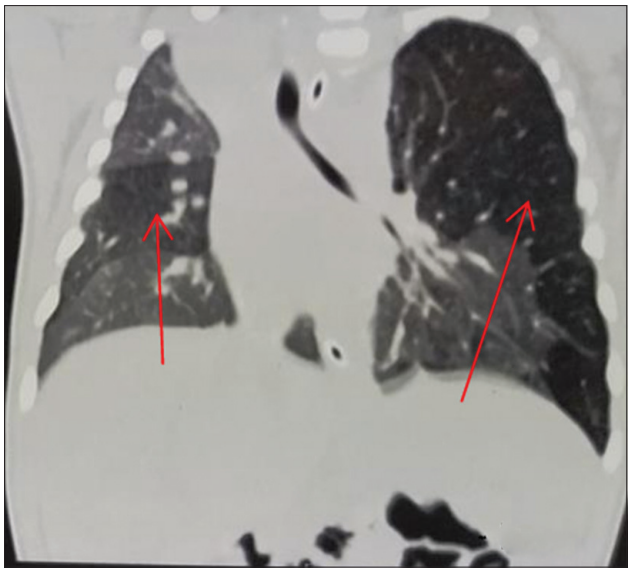

Figure 1: Left arrow indicates uncertain changes in the right middle lobe and the right arrow indicates an emphysematous left upper lobe

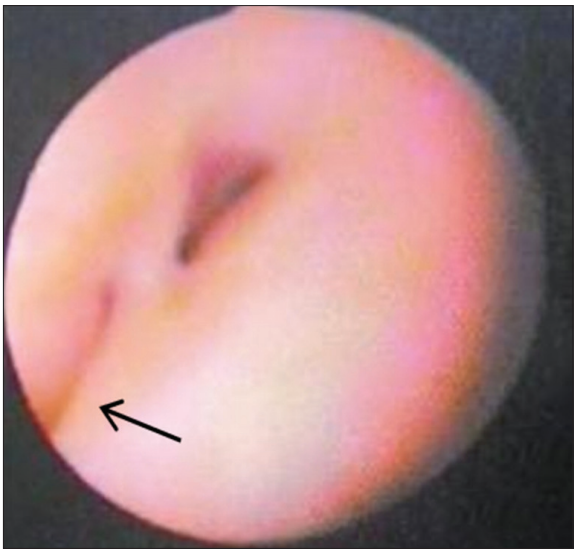

Figure 2: Solid black arrow indicating collapsed left upper lobe bronchus

multiport adaptor. The Fogarty® was visualized deep within the left bronchus and withdrawn to locate within the left mainstem bronchus and graded inflation was conducted. On confirming isolation, 0.2 mg/kg of cisatracurium was administered and right-sided bronchoscopy was performed, revealing no apparent pathology. Left-sided bronchoscopy revealed collapsed LUL bronchus [Figure 2]. The infant was desaturated to a nadir of 83% as the scope was now withdrawn and ventilation reinstituted. Intraoperatively, transient hypotension necessitated dopamine infusion, which was gradually tapered and stopped. The surgery was uneventful, the infant extubated and postoperative analgesia continued with continuous thoracic epidural infusion.

Although extraluminal lung isolation is a known modality of pediatric lung isolation, performing the same, at the outset, in an infant with CLE has not been described before.[4,5] We opted to first isolate the left lung, anticipating a prolonged interval from induction to thoracotomy, secondary to significant hyperinflation of the LUL coupled with the requirement of pre-surgical bronchoscopy. The first step was formulating a plan for pre-surgical bronchoscopy, the alternatives were rigid bronchoscopy or using a supraglottic device as a conduit for bronchoscopy. The following concern was accommodating the Fogarty® and ETT within the infant trachea. Although age-appropriate ETT would be 4 mm (OD 5.5 mm), we chose a 3.5 mm ETT (OD 4.9 mm) with an extraluminal 3F Fogarty® (OD 1 mm) keeping in mind the limitations of the infant trachea. Frova® intubating introducer was used to ease the negotiation of the ETT while allowing for continued oxygenation. To our fortune, the Fogarty® was in place in the left bronchus. Was it malpositioned to the right, withdrawing and redirecting the Fogarty® into the left bronchus would have been challenging as the 3F Fogarty® lacks a guidewire and hence the necessary stiffness to ease manipulation. Finally, to circumvent the high-pressure cuff of Fogarty®, graded visual inflation of Fogarty, prophylactic administration of dexamethasone, and preparation of nebulized epinephrine before extubation were performed. There was no stridor postoperatively and the overall course was uneventful.

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Conflicts of interest
There are no conflicts of interest.

Swarup Ray, Amrit Kaur, Raylene Dias, Uditi Parmar

Department of Paediatric Anaesthesia, Seth GS Medical College and KEM Hospital, Mumbai, Maharashtra, India

Address for correspondence: Dr. Amrit Kaur, Department of Paediatric Anaesthesia, Seth GS Medical College and KEM Hospital, Mumbai, Maharashtra - 400 012, India.
E-mail: kauramrita. 25@gmail.com

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