Introduction

Thoracic surgery is commonly carried out using equipment which enables isolation of each lung. Before the advent of double lumen tracheobronchial tubes, isolation was achieved using endobronchial blockers and single lumen endobronchial tubes. Endobronchial blockers are quite commonly used even now, especially in paediatric age group where double lumen tubes may not be available. Fogarty catheters are now the most easily available pieces of apparatus for blocking techniques.\(^1,2\) Their inflated balloon diameter ranges from 5 mm to 14 mm and they are therefore suitable for both paediatric work and blocking of individual segments in adults. We present a case of a 9 year old child with bronchial tear in whom lung separation was achieved using a Fogarty’s catheter. Lung separation was maintained till the bronchial tear was sutured, after which the catheter was withdrawn.

Case Report

A 9 year old male child was brought by parents in emergency hours with history of vehicular accident one day prior. Details of the accident were not known. Patient was previously admitted to a private hospital and now was referred to our institute. Patient complained of chest pain and breathlessness. There was no history of unconsciousness, convulsion, ENT bleed, abdominal pain or haematuria.

On physical examination: patient was in ICU in semi propped up position, crying with pain. Pulse rate: 160/min, blood pressure: 110/90 mmHg and respiratory rate: 40/min. Right sided ICD column showed significant bubbling of air as well as draining of blood. The column was moving well with respiration. There was subcutaneous emphysema on the right side extending from just below clavicle up to mid abdomen. Breath sounds on the right side were grossly reduced with coarse crepitations and adequately heard on the left side. X-ray chest PA view showed right sided pneumothorax with lung collapse. A major airway leak was strongly suspected and patient was taken up for urgent thoracotomy.

Investigations available on emergency basis were:

- BUN: 6 mg%, serum Na: 140 Meq/L, serum K: 3.6 Meq/L
- ABG: pH 7.32, pO\(_2\): 31.8, HCO\(_3\): 22.3, SBE: -1.5

Patient was premedicated with injection Deriphyline and Glycopyrolate intravenously and preoxygenated for 7-8 minutes. He was induced with Ketamine 2 mg/kg and Succinyl choline 2 mg/kg. Analgesia and sedation were given in the form of injection Pentazocine and Midazolam.

Other medications given were hydrocortisone,
Laryngoscopy revealed oedematous cords and surrounding cord oedema. Patient intubated with 5.5 uncuffed portex endotracheal tube. There was minimal leak around the tube. 3 Fr. Fogarty’s embolectomy catheter was passed by the side of the tube into the right main bronchus. Position of the catheter was confirmed by using fibreoptic bronchoscope which was passed through the tube while simultaneously ventilating the patient. This also revealed tear in the right main bronchus. The balloon of the Fogarty’s was placed just above the level of the tear. Patient was ventilated with FIO₂ of 1.0. Thoracotomy was done through right fifth intercostal space and suturing of the bronchial tear and pulmonary contusion was done. Fogarty catheter was withdrawn and right lung ventilated. Air leak ruled out, closure was done after putting an ICD.

Post operative patient had breathing attempts. He was reversed using glycopyrolate and neostigmine. After confirming good tone and power patient was extubated. Immediate post-op bubbling through ICD reduced. ICD was removed on tenth day after confirming complete expansion of the right lung. Patient was discharged on fifteenth post-operative day.

Discussion

The trachea extends from lower border of cricoid cartilage at the level of sixth cervical vertebra to its bifurcation at the main carina into right and left main bronchi, opposite the manubriosternal joint and upper border of fifth thoracic vertebra. At 6 to 8 years it is about 5.5 cm in length, 10 mm in sagittal diameter and 11 mm in coronal diameter. The larynx is opposite the fifth cervical vertebra at six years of age and achieves adult position by age 13.

In general three types of devices are available for providing one lung ventilation: double lumen endotracheal tube (DLT), bronchial blockers and endobronchial tubes. Fogarty’s catheter was invented by Thomas Fogarty in the late 1940s. It is an effective bronchial blocker used in adults as well as children. In paediatric age group it is commonly used as DLTs are too large and the smallest DLT available is a left sided 26 French tube, which may be used in patients 8 to 12 years old and weighing 25 to 35 kg. Fogarty’s catheter is very useful as it is technically faster than DLT insertion, tracheal size is never a problem, it can be repositioned under direct vision, is inexpensive and reusable. In adults a Fogarty’s catheter with a 3 ml balloon is used most often, 0.5 ml balloon capacity is used in very small children (10 kg or less). Our patient had airway oedema, hence a 5.5 portex uncuffed endotracheal tube was passed and advanced into the left bronchus. The Fogarty’s catheter was passed alongside the indwelling endotracheal tube. A catheter mount was placed between the tube and paediatric circuit. Fibreoptic paediatric bronchoscope was passed through the elbow connector of the catheter mount, with the help of which the Fogarty’s was appropriately placed just above the tear in the right bronchus. Thus one lung ventilation was achieved. Catheter mount was removed after the use of fibreoptic bronchoscope. The balloon of the Fogarty’s catheter was inflated under vision just above the tear. Selective left lung ventilation was maintained till the tear was sutured. Towards the end of surgery bilateral ventilation was established to check for any air leaks. Cardioscope and pulse oximetry monitoring was continuously done. The patient had an uneventful recovery.

References