Single lung ventilation with Forgarty® catheter with a hollow center in pediatric patients

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Introduction: Video-assisted thoracoscopic surgery (VATS) has many advantages such as reduction of postoperative pain and less impairment of lung function, compared with thoracotomy (1). VATS in pediatric patients needs good surgical visualization. Thus, single lung ventilation is important in anesthetic management for VATS (1, 2). For many years, there had been no special device for single lung ventilation for pediatric patients. Many methods for lung separation were reported. Double lumen tube and Uni-vent® tube are standard methods for adult patients, but it is impossible to use them in small patients (3). Some substitutes for bronchial blocker were proposed. One of them is using Forgarty® catheter as a bronchial blocker. It had been used for many cases of pediatric one lung anesthesia for a long time. It is easy to insert and fix. However, the luck of hollow center makes it impossible to drainage the blocked lung or to administer oxygen through the blocker (2). We used Forgarty® catheter with a hollow center as a bronchial blocker in two cases of VATS in pediatric patients.

Case reports: Case 1; Six-year old boy (123cm, 23kg) with left pulmonary segmentation scheduled for video-assisted thoracoscopic left lower lobectomy. He had repeated pneumonia of left lung. To avoid contamination of infectious sputum to the dependent lung and to achieve good surgical visualization, we used a 4Fr Fogarty® catheter with a hollow center (Fogarty thru-lumen embolectomy®: Baxter) as a bronchial blocker for one-lung ventilation. Anesthesia was induced by thiamylal, and maintained by sevoflurane, fentanyl and ketamine. The Fogarty® catheter with guide-wire was advanced to the left mainstem bronchus through the 5.5 mmID standard tube under direct view with the fiberscope (Olimpas type XP 2.2mm OD). The course of one lung anesthesia was successfully performed. The patient was extubated in the operating room. Postoperative course was uneventful.

Case 2; Six-year old boy (128cm, 26kg) with eventration of diaphragm of left side scheduled for video-assisted thoracoscopic resection and suture of diaphragm. The method of lung separation was same as first case. And the course of one lung anesthesia and postoperative course was uneventful, too.

In both case, Fogarty® catheter could be passed through 5.5mmID standard tube under fiberoptic visualization easily. Lung collapse took only few minutes and we could suck blood and sputum from collapsed lung.

Discussion: For pediatric lung separation, some methods, for example bronchial intubation, using Forgarty® catheter, pulmonary artery catheter, Foley catheter, were reported (1,2,3). Advantages of using Forgarty® catheter were good controllability with use of a guide-wire, and variation of balloon size (2). But it was reported that the lack of a suction port made it impossible to deflate the blocked lung rapidly and to administer oxygen through the blocker (4). We used Fogarty® catheter with a hollow center for two cases of pediatric lung separation. Hollow center of this catheter was used to administer thrombolytic drugs to thrombus directly in embolectomy. Using this, we can easily deflate and drainage the blocked lung. If adequate oxygenation cannot be maintained, administration of oxygen through the hollow center will improve oxygenation (5). This catheter has variations of size from 3 to 7Fr, so it is useful in other cases, for example, adult case difficult to use double lumen or Univent® tube or smaller patient who needs inserting blocker through the endotracheal tube.

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