Title	Single Lung Ventilation for Infants and Children Using a Pediatric Fiberoptic Brochoscope to Guide a Novel Endobronchial Blocker.
Authors	T. Kyle Harrison, MD; Luca Vricella, MD; Micheal Black, MD and Gregory B. Hammer, MD
Affiliation	Departments of Anesthesia and Cardiovascular Surgery : Stanford University

Introduction
We report a technique of placing a wire-guided endobronchial blocker through a single lumen endotracheal tube (ETT) utilizing a pediatric fiberoptic scope(FOB) and multiport ETT adapter to achieve single lung ventilation in a child undergoing thoracic surgery.

Case 1
A 4 year old, 16 kg female was scheduled to undergo left-sided video-assisted thorascopic surgery(VATS) for a patent ductus arteriosus. Following placement of routine monitors and IV induction, her trachea was intubated with an uncuffed 5.0mm ID endotracheal tube (ETT). The patient was maintained on an oxygen/air mixture and isoflurane. A 5Fr. 40 cm Cook endobronchial wire guided catheter with a distal 3cc balloon and a wire loop at the tip (Cook Critical Care, Bloomington, IN) was attached to a 2.2mm O.D. fiberoptic bronchosope (FOB)(ENT-2, Machida, Orangeburg, NY). A multi-port adapter (Cook Critical Care, Bloomington, IN) was attached to the proximal end of the ETT and the FOB and catheter were advanced into the left mainstem bronchus. The distal wire loop was released and the FOB was pulled back into the trachea. The balloon was visualized and inflated, blocking the left mainstem bronchus. The patient was placed in right lateral decubutis position and the balloon position was confirmed with the FOB. The surgery proceeded without difficulty. SpO2 remained 94-100% through out the procedure with ETCO2 in 35-40 mmHg. Upon completion of the surgery the balloon was deflated and the catheter was withdrawn from the multi-port adapter. The left lung was re-expanded, residual neuromuscular blockade was antagonized, and the trachea was extubated. The patient was transferred to the PICU in stable condition.

Discussion
Single lung ventilation (SLV) is commonly performed for thoracic surgery. While a variety of techniques for SLV in children have been described (1), there are several advantages to using a directed balloon tipped-end hole catheter for SLV. With the use of the FOB and multi-port adapter the catheter can be placed quickly and accurately under direct visualization. The FOB can be placed through the distal wire loop to guide the catheter into correct position Following proper placement of the catheter and removal of the FOB, the wire loop can be withdrawn, providing a channel to administer oxygen and continuous positive airway pressure (CPAP) in the event of oxygen desaturation. Utilizing the multi-port adapter oxygenation and ventilation can be maintained during placement of the catheter. The catheter is also easily repositioned intra-operatively if necessary without having to disconnect the anesthesia circuit.

Conclusion
We have described a new technique to provide single lung ventilation in children that offers significant advantages over previously described methods.

References
1. Hammer GB, Fitzmaurice BG, Brodsky JB. Methods for single-lung ventilation in pediatric patients. Anesth Analg 1999; 89: 1426-9.
2. Hammer GB, Manos SJ, Smith BM, Skarsgard ED, Brodsky JB. Single-lung ventilation in pediatric patients. Anesthesiology 1996; 84: 1503-1506.
3.Arndt GA, De Lessio ST, Kranner PW, Orzepowski W, Ceraski B, Valysson B. One lung ventilation when intubation is difficult-presentation of a new endobrochial blocker. Acta Anaesthesiol Scand 1999; 43: 356-8.
4.Cohen E, Eisenkraft JB, Thys DM, Kirschner PA, Kaplan JA. Oxygenation and hemodynamic changes during one lung anesthesia. J Cardiothoracic Anest 1088; 2: 34-40.