

Novel use of flexible video ureteroscope in airway management: A case series

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ABSTRACT

Fibreoptic bronchoscopes are vital for difficult airway management. However, many a times, it is not available. Also, the correct size may not be available, especially for use in paediatrics and neonates. We describe the use of a flexible fibreoptic video ureteroscope, as an alternative to a bronchoscope, for airway management. We include five cases of airway management using a 2.8 mm fibreoptic video ureteroscope. The use of a flexible video ureteroscope was successful in all the five cases, and all the patients tolerated the procedure well. No complications were encountered. We conclude that a video ureteroscope can be used for both elective and rescue airway management in small children as well as in adult patients.

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Key words: Airway management, bronchoscope, ureteroscope

INTRODUCTION

Flexible endoscopes have carved a niche for themselves in the armoury of the anaesthesiologist's difficult airway cart. Fibreoptic bronchoscopes (FOBs) are available in several adult and paediatric sizes. The smallest size currently available is a 2.8 mm outer diameter (OD) which can be utilised in preterm and small-sized neonates.^[1] Inaccessibility to a small-sized airway endoscope can be a nightmare, even for an experienced anaesthesiologist. Therefore, in this case series, we describe the novel use of a video ureteroscope (Olympus URF-V2) as an airway endoscope. A video ureteroscope is primarily used in urology for the removal of kidney stones. It is longer as compared to the FOB and provides a better field of vision. A size as small as 1.8 mm in outer OD is currently available. It provides an angulation of 275 degrees up and down, as compared to a FOB, which provides only 160 degrees up and 90 degrees down.^[2] The literature on video ureteroscopes for airway endoscopy is scarce and limited to occasional case reports. Our objective is to share our experience

with the novel use of this device. We routinely utilise video endoscopes for airway management, as a part of the standard institutional protocol. However, the non-availability of a 2.8 mm video endoscope due to equipment malfunction and unsuccessful use of Ambuscope were the primary reasons for employing a video ureteroscope for airway management.

CASE SERIES

Case 1

A 50-day-old female child with Pierre Robin syndrome (PRS) weighing 3300 gm with severe micrognathia, retrognathia, glossoptosis and cleft palate was planned for correction of the mandible with

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mandibular distraction osteogenesis under general anaesthesia (GA). Anaesthesia was induced using 4% sevoflurane and spontaneous respiration was maintained. After the failed attempt of conventional laryngoscopic intubation, fibreoptic intubation was tried using a 3.6 mm Olympus FOB. The epiglottis was lying on the posterior pharynx, which could not be manoeuvred beneath. Due to repeated attempts, the patient developed laryngospasm, and her oxygen saturation measured by pulse oximetry (SpO₂) reduced to 70%. Anaesthetic depth was increased with sevoflurane and SpO₂ improved to 94%. Once the laryngospasm settled, a 2.8 mm OD video ureteroscope was introduced through the oral cavity. Glottis was visualised but the endotracheal tube (ETT) could not be negotiated into the trachea. Following jaw thrust and slight pulling of the tongue with Magill's forceps, a 150 cm long and 0.035-inch diameter atraumatic, Roadrunner® hydrophilic Polyurethane Coated (PC) guidewire was introduced through the working channel of the video ureteroscope into the trachea under vision [Figure 1] and a 3.5 mm internal diameter ETT was successfully railroaded over it.

Case 2

A 14-month-old male child with no known comorbidities weighing 11 kg presented with the aspiration of a foreign body (FB). Computerised tomography of the chest suggested the presence of a FB of 6.3 mm size in the left main bronchus about 2.8 cm from the carina with hyperinflation of the left lung. The patient was planned for endoscopic removal of the FB. The patient was induced with inhalational anaesthesia with 4% sevoflurane in oxygen. The rigid bronchoscope could not be negotiated till the FB. After three attempts,



Figure 1: PTFE-coated video ureteroscope guidewire entering the trachea and reaching up to the carina

desaturation followed, and the decision to use the size 2.8 mm video ureteroscope was made. The video ureteroscope was introduced inside the left main bronchus and a 1 x 1 cm sized whitish friable organic FB was removed by using the basket removal method.

Case 3

A 35-year-old male was admitted for video-assisted thoracoscopic surgery under GA with one-lung ventilation. The trachea was intubated with a left-sided 39 French double lumen tube in a single attempt. The correct placement was confirmed by auscultation and using Ambu® aScope™ 3 Video. Right lung collapse was achieved but after some time, peak airway pressures started rising from 26 cm H₂O to 48 cm H₂O and the patient started desaturating to a SpO₂ of 84%. We used a 2.8 mm video ureteroscope through the bronchial lumen and found that the bronchial end was inside and abutting the secondary bronchiole. At this juncture, both cuffs were deflated, the tube was withdrawn by 1 cm under vision using the video ureteroscope, and the cuff was reinflated. Subsequently, the peak pressures reduced to 25 cm H₂O and the SpO₂ rose to 95%.

Cases 4 and 5

Two cases of severe restriction of mouth opening resulting from ankylosis of temporo-mandibular joint (TMJ) presented to our hospital. The first case was a 28-year-old male with a history of maxillofacial trauma three years ago. He had presented with a mouth opening of less than 1 cm with unilateral right-sided TMJ ankylosis. He was planned for surgery with gap arthroplasty. The second case was a 56-year-old lady with severe rheumatoid arthritis posted for laparotomy under GA. She was diagnosed to have duodenal perforation with features of early peritonitis. Sprays of 10% lidocaine were applied onto the base of the tongue and lateral pharyngeal walls. Topical anaesthesia of the trachea, larynx, and hypopharynx was obtained by intra-tracheal injection of 3 mL of 4% lidocaine using a 25-gauge needle. A video-ureteroscope was inserted through the nose and once the epiglottis and vocal cords were seen, 2 ml of 4% lignocaine was sprayed over the cords, and the 2.8 mm video ureteroscope was advanced into the larynx. An appropriate-sized ETT was rail-roaded over it.

DISCUSSION

This unplanned retrospective case series was carried out in a tertiary care hospital between January 21

and June 21. Various instruments like Ambuscope, FOB and video laryngoscopes are utilised by the anaesthesiologist in challenging cases of airway management. The use of FOB with the railroad technique has been described in difficult airway cases of PRS.^[3] The most critical consideration is choosing the precise size of the bronchoscope in small children due to their narrow airways. As the patient has to breathe around the flexible bronchoscope, the size of the bronchoscope should be less than two-thirds of the diameter of the trachea. The smallest size available should be used in neonates, infants, and young children to reduce obstruction of the airway lumen by the bronchoscope during the procedure and to reduce mucosal injury.^[4] Thus, flexible bronchoscopes with an OD of 2.8 mm, 3.6 mm, and 4.8 mm are used for neonates, infants and young children and older children respectively. Flexible ureteroscopes are currently available in various sizes with a distal tip diameter ranging from 5.3 French to 8.7 French.^[5] We used a 2.8 mm (8.4 French) video ureteroscope with a working channel of 1.2 mm to pass the guidewire into the trachea. These guidewires used through a working channel of the ureteroscope are coated with a hydrophilic polymer like Polytetrafluoroethylene (PTFE) and have a distal atraumatic tip useful for negotiating a difficult ureter.^[6,7] In one of the cases, ureteroscopic stone basket was used to remove an FB after the rigid bronchoscope failed to reach the site of the FB impaction. It is noteworthy to mention that due to the difference in angular movements of a ureteroscope as compared to a FOB, we had difficulty placing it into the left main bronchus, but once it was correctly placed, we were able to remove the FB without difficulty. We used a 2.8 mm video ureteroscope through the bronchial lumen of a 39 Fr Left-sided DLT in our third case. It is empirical to note that a 2.4 mm OD bronchoscope is required to negotiate through the bronchial lumen of small-sized 26 Fr and 28 Fr DLT whereas a 3.1 mm OD bronchoscope is required for a 32Fr DLT. Video ureteroscope was also utilised in two cases of TMJ ankylosis as FOB was not available. The use of a fiberoptic cystoscope has been described earlier for TMJ ankylosis surgery.^[8] It is similar to a

ureteroscope but with a shorter length and a wider OD.

CONCLUSION

A bronchoscope is a device most commonly used for airway endoscopy but a video ureteroscope can help manage difficult airways when a bronchoscope is either not available or in selected cases as highlighted in this case series.

Declaration of patient consent

The authors declare that they have obtained consent from patients. Patients have given their consent for their images and other clinical information to be reported in the journal. Patients understand that their names will not be published and due efforts will be made to conceal their identity but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest

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