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Case Report

Anaesthesia Section

Management of Difficult Airway in Mentally Challenged Patient with TAScope and Fiberoptic Intubation: A Case Report

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ABSTRACT

Managing a difficult airway is a very challenging task for practicing anaesthesiologists in day-to-day life. Addressing a difficult airway in patients with intellectual disabilities is even more challenging and requires a stepwise approach for management. The authors hereby report a case of a 26-year-old male patient, with intellectual disabilities who has a history of ankylosing spondylitis and was scheduled for an open gastrojejunostomy. The patient presented with a mouth opening of only 1.5 cm and grade IV extension, which restricted movements at the atlanto-occipital joint and resulted in a short neck. The most challenging aspect of the present case was the patient's intellectual disability, which made it difficult to employ awake intubation techniques. Video laryngoscopy was not feasible due to the limited mouth opening and retrognathia. The authors planned for tracheal intubation using The Anaesthetist Society Scope (TAScope) and considered fiberoptic intubation as a second option. After a failed attempt at intubation under Intravenous (i.v.) anaesthesia with TAScope, fiberoptic intubation was successfully performed, albeit with difficulty. In conclusion, fiberoptic intubation is considered the gold standard for managing difficult airways.

Keywords: Ankylosing spondylitis, Difficult intubation, Endoscopy, Mental retardation, Novel video laryngoscope, The anaesthetist society scope

CASE REPORT

A 26-year-old male patient presented with complaints of difficulty in swallowing for the past five years and a history of vomiting for the last month. He visited the Outpatient Department (OPD) of surgery. On examination, he appeared cachectic, weighing 40 kg and standing 150 centimeters tall.

He was mentally challenged, having delayed milestones but was oriented to time, place and person. The patient had a history of ankylosing spondylitis involving the cervical and temporomandibular joints. On airway examination, the patient's mouth opening was 1.5 cm [Table/Fig-1]. The Mallampati grade could not be assessed, and he exhibited grade IV atlanto-occipital joint extension (<12 degrees) [Table/Fig-2], along with a short neck. He had one missing lower incisor tooth.

[Table/Fig-1]: Preoperative assessment showing mouth opening 1.5 cm.

Special investigations, such as Ultrasonography (USG), showed changes consistent with enteritis. Upper Gastrointestinal (GI) scopy revealed a small hiatus hernia with food particles in the stomach, as well as, narrowing at the D1-D2 junction of the duodenum, with oedema of the mucosa. A further Contrast-enhanced Computed Tomography (CECT) of the abdomen was suggested, which revealed

[Table/Fig-2]: Neck extension grade IV (<12 degrees).

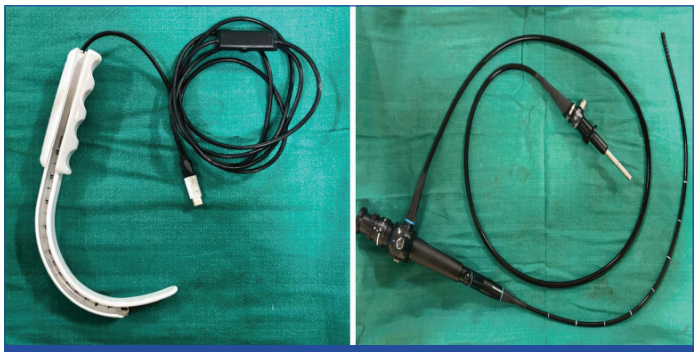
an oedematous pancreatic head with moderate atrophy of the distal body and tail of the pancreas, suggestive of chronic pancreatitis. There was significant luminal narrowing with proximal dilatation at the D1-D2 junction of the duodenum, which was confirmed with a barium swallow [Table/Fig-3].

His pulse rate was 90 beats per minute, with no radioradial or radiofemoral delay, and his blood pressure was 110/78 mmHg. Routine blood investigations were normal, with haemoglobin at 11.9 g/dL. Serum amylase was 126 U/L, and serum lipase was 32 U/L. Personal and family histories were not significant. Chest X-ray, electrocardiogram, and Two-dimensional Echocardiography (2D ECHO) were within normal limits.

The patient was electively posted for open gastrojejunostomy for gastric outlet obstruction with hiatus hernia repair under the American Society of Anaesthesiologists III (ASA-III) classification, following a thorough preanaesthetic assessment. All necessary informed consents for difficult intubation and Si Opus Sit (SOS) tracheostomy were obtained.

[Table/Fig-3]: Barium swallow showing crowding of cervical vertebra and luminal narrowing with proximal dilatation at D1-D2 junction of duodenum.

The patient was uneducated and had a language barrier, which made him uncooperative due to delayed milestones. A day before surgery, the patient was given a tablet of alprazolam (0.25 mg) orally to relieve his anxiety. He was kept on overnight fasting. On the day of surgery, two large-bore Intravenous (i.v.) cannulas were inserted. The anaesthetic plan was to administer general anaesthesia combined with regional anaesthesia for postoperative pain relief. It was decided to have two scopes ready for difficult intubation: TAScope and a fiberoptic bronchoscope [Table/Fig-4].



[Table/Fig-4]: TAScope and fiberoptic brochoscope for difficult intubation.

For airway preparations, the patient was nebulised with 3 mL of 4% lignocaine in the preoperative area 30 minutes before being shifted to the operating theatre. The patient was uncooperative with gargling 10% lignocaine viscous, so gargling was not possible. Nasal packing was done with cotton swabs soaked in 2% lignocaine and xylometazoline. Injection (inj.) glycopyrrolate (0.2 mg), inj. ondansetron (4 mg) and inj. tramadol (50 mg) were administered intravenously in the preoperative area to maximise their effects during intubation. Upon arrival at the operating theatre, a multipara monitor was attached. Under all aseptic precautions and local anaesthesia, epidural anaesthesia was attempted by two expert anaesthetists in three different intervertebral spaces. However, the epidural space could not be located due to spondylosis of the vertebra and the patient's lack of cooperation.

The patient was then allowed to lie down in a supine position, and an intravenous loading dose of dexmedetomidine (1 mcg/kg) was given over 10 minutes. The patient was not cooperative for airway blocks. He was preoxygenated with 100% oxygen for five minutes. Induction was performed with inj. propofol (2.5 mg/kg). After successful mask ventilation, inj. succinylcholine (2 mg/kg) was administered intravenously. Intubation was attempted using the TAScope. During laryngoscopy, only the arytenoids and the posterior part of the vocal cords were visible (Cormack-Lehane grade IIb). The bougie was successfully negotiated through the vocal cords, but the endotracheal tube could not be passed through it, even after using smaller-sized tubes and gentle manipulations.

After ventilating the patient for two minutes and administering inj. propofol (60 mg) intravenously, fiberoptic bronchoscopy was performed through the right nostril. The patient was successfully intubated with a 7 mm internal diameter cuffed reinforced armoured endotracheal tube [Table/Fig-5]. Manoeuvers for fiberoptic intubation were difficult due to tongue fall, which was rectified with a jaw thrust. Confirmation of tracheal placement was achieved through direct visualisation of the tracheal rings and the End-tidal Carbon Dioxide ($ETCO_2$) graph on the monitor. The tube was secured at 20 cm after confirming equal air entry bilaterally. Mechanical ventilation was maintained with oxygen (50%) and Nitrous Oxide (N_2O) (50%) along with isoflurane (1.0-1.5%). Inj. atracurium (0.5 mg/kg) was given as a loading dose, followed by a maintenance dose of 0.1 mg/kg intravenously.

[Table/Fig-5]: Fiberoptic intubation showing vocal cords and placement of endotracheal tube.

The patient was given 1 g of paracetamol intravenously during surgery for pain relief. Haemodynamic stability was maintained throughout the surgery with minimal blood loss. The neuromuscular blockade was reversed with 0.008 mg/kg of glycopyrrolate and 0.05 mg/kg of neostigmine intravenously. The patient was successfully extubated after confirming adequate respiratory efforts and the ability to lift the head for five seconds. The patient was then transferred to the intensive care unit for postoperative monitoring. On the third day, the patient was transferred to the ward and was discharged on the 10th day after surgery.

DISCUSSION

The term 'difficult airway' encompasses a wide range of problems, from ventilating a patient's lungs with a face mask or supraglottic airway to challenges in intubating a patient's trachea [1]. The management of a difficult airway is one of the most critical issues not only for anaesthesiologists but also for practicing emergency physicians and intensivists [1]. It often requires advanced techniques and expertise to use sophisticated devices. Difficult airway guidelines were published by the Difficult Airway Society in 2015 [2] and by the All India Difficult Airway Association in 2016 [3]. A prompt clinical examination of the patient before surgery, considering factors such as obesity, facial hair, decreased thyromental distance, neck extension, and heavy breasts, is required for successful management of the case [4].

Ankylosing spondylitis results in structural damage to the axial skeleton. Proinflammatory cytokines, such as Interleukin-17 (IL-17) and Tumour Necrosis Factor (TNF)-alpha, are released, activating cells that cause bony destruction. Another cytokine, IL-22, contributes to osteoproliferation. As a consequence of new bone growth, syndesmophytes develop within ligaments, which are considered a hallmark radiological feature of spondylitis. Gradually, this process can lead to the complete fusion of the axial skeleton [5,6].

There were many challenges in managing this patient. First, there was limited mouth opening of 1.5 cm. Singh N et al., intubated a similar case with restricted mouth opening using a novel video laryngoscope (TAScope) [7]. Its J-shaped curved blade has a uniform thickness of 1 cm throughout its length, whereas the Macintosh

blade has a gradually expanding blade toward its base, making entry difficult in cases of restricted mouth opening. The TAScope is also cost-effective (<8000 INR) compared to fiberoptic devices. There was no restriction in neck movement, and the patient did not have any mental impairment. However, the authors faced difficulties due to grade IV restriction in neck movement [7].

As the patient was mentally challenged, communication and cooperation from the patient were minimal. Fiberoptic bronchoscopy is typically preferred in an awake condition for difficult intubation; however, in the present case, the patient's cooperation was insufficient for awake intubation.

Michalek P et al., performed fiberoptic intubation in an intellectually disabled patient with a difficult airway using I-gel [8]. They first inserted the I-gel under general anaesthesia and then passed a fiberoptic bronchoscope through it. In the present case, the patient's mouth opening was restricted for I-gel insertion.

The patient had spondylitis of the temporomandibular joint and vertebrae, leading to restricted mouth opening and limited flexion-extension of the atlanto-occipital joint. A similar patient with ankylosing spondylitis and acute respiratory distress syndrome was successfully intubated using a video laryngoscope by Limalvin N et al., [9]. In that case, the patient was not mentally disabled. His mouth opening was less than three fingers, but the Mallampati score could be assessed. The video laryngoscope could be negotiated easily, resulting in successful intubation.

In the present mentally disabled patient, due to spondylitis, the mouth opening was less than 1.5 centimeters, and the Mallampati grade could not be assessed. Consequently, it was difficult to insert the video laryngoscope, so the authors planned to use the TAScope for the intubation. The TAScope is a novel video laryngoscope equipped with a borescope camera (5.5 mm diameter HD camera) that can be connected to a laptop or compatible mobile devices or tablets [10]. It does not require alignment of the axis to improve intubating conditions because the axis of the TAScope is curved, and the image is displayed on the screen [11]. The TAScope blade is made of food-grade Acrylonitrile Butadiene Styrene (ABC) plastic, and its 'J'-shaped blade can be easily negotiated in a mouth opening of less than two centimeters [12].

Raval C et al., intubated a similar case of spondylitis in a patient who was scheduled for correction of spine deformity using awake retrograde intubation due to the unavailability of a fiberoptic bronchoscope [13]. In the present case, the patient was not co-operative for awake intubation, and the availability of a fiberoptic bronchoscope at the institute excluded the authors' plan for retrograde intubation.

There was visualisation of the vocal cords and negotiation of the bougie through it with the TAScope, but the endotracheal tube could not be negotiated. Therefore, the plan was changed from the TAScope to the fiberoptic bronchoscope under the effect of the induction agent propofol. Fiberoptic intubation provides direct access and an excellent view of the glottis in awake patients, but it is expensive, cumbersome, difficult to assemble, and requires a longer learning curve and more expertise [7].

There was difficulty in passing the fiberoptic bronchoscope beyond the uvula due to tongue fall, which was rectified with a jaw thrust. Awake intubation was not preferred due to the patient's lack of cooperation, but mask ventilation was possible.

CONCLUSION(S)

The TAScope is cost-effective but provides only supraglottic vision, which can lead to difficulties in negotiating the tube. The fiberoptic bronchoscope offers a direct view beyond the glottic structures; however, it is costly and requires expertise. TAScope can be a better option for intubation in difficult cases with limited mouth opening, but the fiberoptic technique is considered the gold standard for managing difficult intubations. It is always advisable to keep a fiberoptic bronchoscope ready for suspected difficult intubation cases.

REFERENCES

[1] Heidegger T. Management of the difficult airway. N Engl J Med. 2021;384:1836-47. Doi: 10.1056/NEJMra1916801.
[2] Frerk C, Mitchell VS, McNarry AF, Mendonca C, Bhagrath R, Patel A, et al.; Difficult Airway Society intubation guidelines working group. Difficult Airway Society 2015 guidelines for management of unanticipated difficult intubation in adults. Br J Anaesth. 2015;115(6):827-48. Doi: 10.1093/bja/aev371.
[3] Myatra SN, Shah A, Kundra P, Patwa A, Ramkumar V, Divatia JV, et al. All India Difficult Airway Association 2016 guidelines for the management of unanticipated difficult tracheal intubation in adults. Indian J Anaesth. 2016;60:885-98.
[4] Crawley S, Dalton A. Predicting the difficult airway. BJA Educ. 2015;15:253-58. Available from: https://doi.org/10.1093/bjaceaccp/mku047.
[5] Taurog JD, Chhabra A, Colbert RA. Ankylosing spondylitis and axial spondyloarthritis. N Engl J Med. 2016;374(26):2563-74.
[6] Tan S, Wang R, Ward MM. Syndesmophyte growth in ankylosing spondylitis. Curr Opin Rheumatol. 2015;27(4):326-32.
[7] Singh N, Samagh N, Paliwal S, Sharma J. Use of a novel video laryngoscope (TASCOPE) for endotracheal intubation in a patient with restricted mouth opening: A case report. Airway. 2024;7:93-94.
[8] Michalek P, Hodgkinson P, Donaldson W. Fiberoptic intubation through an I-gel supraglottic airway in two patients with predicted difficult airway and intellectual disability. Anesth Analg. 2008;106(5):1501-04, table of contents. Doi: 10.1213/ane.0b013e31816f22f6.
[9] Limalvin NP, Kurniawan F. Difficult airway management in an ankylosing spondylitis case using video laryngoscope: A case report. Int J Res Med Sci. 2023;11:2279-83.
[10] Dave M. Tascope– innovative intubation aid. Journal of Anaesthesia and Critical Care Reports. 2018;4(3):09-10. Doi: 10.13107/jaccr.2018.v04i03.103.
[11] Patel J, Shah R, Jain A, Shah A, Chauhan D. A comparative study between McCoy laryngoscope versus the tascope in orotracheal intubation in adult surgical patients undergoing general anaesthesia. International Journal of Health Sciences. 2022;6(S2):2842-54. Available from: https://doi.org/10.53730/ijhs.v6nS2.5717.
[12] Kaur T, Kumar N. TAScope, an Indian jugad for difficult intubations in oral and maxillofacial surgical patients. J Maxillofac Oral Surg. 2022;21(4):1159-61. Doi: 10.1007/s12663-021-01586-1.
[13] Raval C, Patel H, Patel P, Kharod U. Retrograde intubation in a case of ankylosing spondylitis posted for correction of deformity of spine. Saudi J Anaesth. 2010;4(1):38-41. Doi: 10.4103/1658-354X.62616.

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