CASE REPORT

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# Fibreoptic intubation under conscious sevoflurane sedation in anticipated difficult intubation cases with unfavorable conventional airway preparation

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## ABSTRACT

Airway management in maxillofacial and head and neck cancer patients has remained a challenge even after significant development towards difficult airway management. When such patients have multiple difficult intubation predictors, management becomes more thought-provoking. Mucosal preparation and sedation play a vital role in producing co-operative patient and successful procedure but is not always feasible. On the other hand, intravenous sedation lacks titratability and reversibility. We describe awake fiberoptic intubation in three adult patients having multiple difficult intubation predictors whose airway preparation was not feasible due to obscured surface anatomy and nil mouth opening. The cases were done under titrated conscious sevoflurane sedation of MACage 0.4-0.6 using nasopharyngeal airway and closed circuit. This report highlights that Sevoflurane based conscious sedation is a feasible alternative for awake fiberoptic intubation in patients whose airway anesthesia and blocks are not possible.

**Keywords:** intubation, bronchoscopy, airway, temporomandibular joint, conscious sedation

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## INTRODUCTION

Awake fibreoptic intubation is one of the most essential and practical techniques in the management of the difficult airway. Patients with head and neck cancer often have limited neck access, limited jaw movement, mouth opening, etc. Temporomandibular joint (TMJ) ankylosis has remained a challenge throughout for the anesthesiologist.

Awake fiberoptic intubation (AFOI) is a suitable option for anticipated difficult intubation. However, the success and comfort of AFOI depend a lot on airway anesthesia.[1] Sedation is invariably required although it is a double-edged sword in this scenario. We present here our experience of few cases having head and neck pathologies with predicted difficult intubation, where airway anesthesia and mucosal preparation was not well possible and was intubated under sevoflurane sedation through the nasopharyngeal airway to avoid some of the untoward effects of inadequate airway anesthesia.

## CASE SERIES

A total of seven cases were done by the primary investigator. One case had an only traumatic fracture-related trismus, and three cases did not consent the publication of images.

Of the remaining three cases, the first patient was a 38-year-old male, weighing 38 kg, non-obese; a diagnosed case of grade IV right and grade I left TMJ ankylosis for right gap arthroplasty, condylectomy, and bilateral coronoidectomy. He was suffering from the same from eight years of age and also having upper thoracic kyphoscoliosis along with hypoplastic and retrognathia. The anterior part of the neck landmark was not well palpable due to slight enlargement of the thyroid. The airway assessment showed Mallampati class 4 with nil inter-incisor gap (Figure 1).

The second case was a 48-year-old non-obese gentleman, weighing 66 kg, a previously operated case of wide local excision, neck dissection and pectoralis major myocutaneous flap reconstruction for oral carcinoma cavity; presented with carcinoma of the parotid gland with the involvement of TMJ was posted for segmental mandibulectomy, condylectomy, local excision, neck dissection and reconstruction (Figure 1). The airway assessment showed Mallampati class 4 with nil inter-incisor gap. Neck extension was slightly restricted. Surface anatomy of the anterior part of the neck was improper due to distorted postoperative anatomy.

The third patient was a 35-year-old female, 45 kg, a case of post-ankylotic facial deformity. She is the twice postoperative case for TMJ ankylosis and receding mandible, post genioplasty, and was

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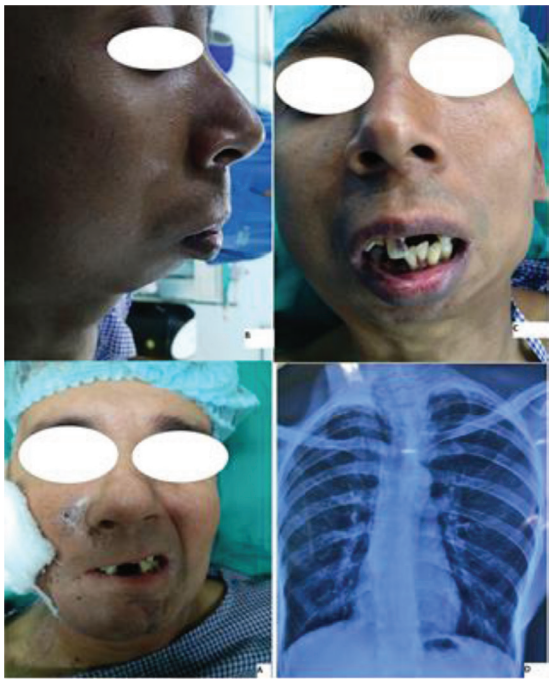


**Figure 1** Anatomical deformities and mouth openings of the patients related to the airway (A- Carcinoma parotid patient, B, C- Patient with TMJ ankylosis, hypoplastic mandible and retrognathia, D- x-ray showing kyphoscoliosis)

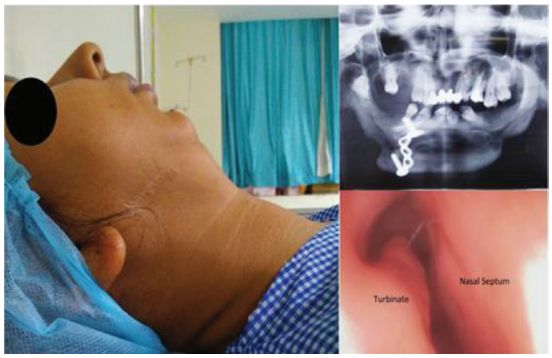
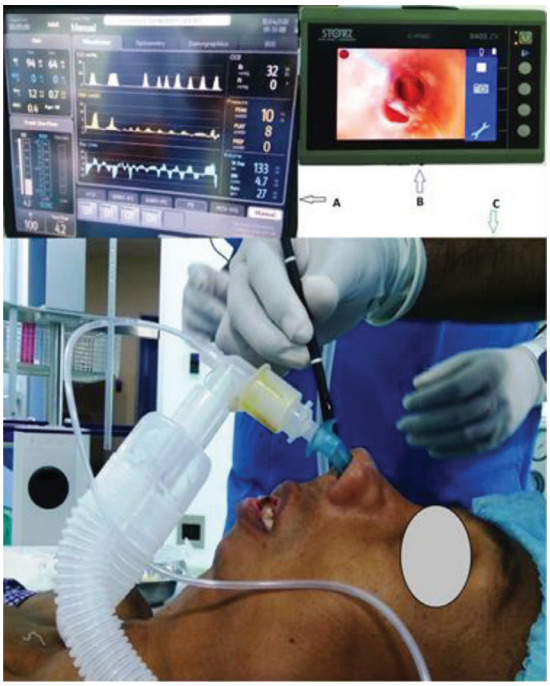



**Figure 2** External anatomical deformity, X-ray showing genioplasty, receding mandible, and scopy snapshot showing nearly blocked left nostril

posted bilateral mandible distraction placement. The airway assessment showed Mallampati class 4 with a mouth opening of 1 cm and had limited neck extension. The thyromental distance was 2.5 cm with the grossly receding mandible. There was slightly distorted surface anatomy of the area between hyoid and mandibular angle bilaterally due to previous surgeries. She also has hypertrophied turbinate with a slight deviated nasal septum in the left side (Figure 2).

Emergency airway cart with cricothyrotomy and tracheostomy set were kept ready. After taking



informed consent, patients were premedicated with 0.2 mg of glycopyrrolate and 0.1 mg/kg of nalbuphine IV, respectively. Patients were nebulized with 3 ml of 2% xylocaine over five minutes, followed by nasal preparation with xylometazoline 0.1% drops and 2% xylocaine with adrenalin soaked beaks were done. Standard monitorings were attached. The superior laryngeal nerve block was not possible because of deformed anatomy in all three cases. 10% xylocaine spray at the base of the tongue and superior laryngeal nerves block was not possible due to no/or limited inter-incisor gap and obscure anterior of the neck anatomy. Two ml of 2% xylocaine was sprayed in the trachea via transtracheal route. A size 7.5 mm nasopharyngeal airway was placed in the left nostril and connected to the closed-circuit through an endotracheal tube connector in the first two cases. After that, Sevoflurane was titrated to MACage 0.4 - 0.6 (Figure 3), with 100% Oxygen at 4-6 L/min.

In the third case, the same nostril was used for sevoflurane sedation, and once a MACage 0.5 was achieved, the nasopharyngeal airway was taken out, and scopy was done. Intravenous propofol 20-30 mg was administered once the fiber passed the vocal cords. Spontaneous breathing was still preserved, but respiration depth was slightly shallow. The minute ventilation was maintained with slightly raised respiratory rates (Figure 3). The trachea was intubated using a flexomatelic endotracheal tube (ET) which was rail-loaded earlier, a position confirmed, fixed and connected to the already in use the closed circuit. The assistant injected injection Midazolam 1 mg as soon as the ET was inside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the trachea, and further anesthetic drugs were administered. All the patients were comfortable during the procedure except for mild coughing on railroading the tube in one case. Oxygen saturation and end-tidal carbon-di-oxide remained 100% and between 32-34 mmHg without much fluctuation of hemodynamics.

## DISCUSSION

Direct or indirect visualization of the glottis is impossible by laryngoscopy in patients with TMJ ankylosis with no mouth opening at all. In such cases, elective tracheal intubation option remains limited to blind nasal intubation, retrograde intubation and awake fibreoptic other than elective tracheostomy. However, AFOI remains the safest and gold standard approach to secure the airway in such an anticipated situation.[1,2] One of the objectives of the procedure is to have a co-operative patient along with pleasant experience to the patient. Sedation plays a vital role in producing a comfortable, anxiety-free and more hemodynamic stable patient.[3]

Moreover, AFOI with airway anesthesia, but, without sedation is associated with multiple adverse events.[4] On the other hand, one should be more careful about the protection of airway from excessive sedation. Under deep sedation, the patient loses the muscle tone, which poses difficulty with scope negotiations as well as lead to loss of airway and hypoxia. Therefore, conscious sedation is one of the most sought after sedative state. Conscious sedation provides a co-operative patient yet without anxiety and pain. Sedatives like midazolam, Propofol, dexmedetomidine are used to maintain sedation. Slight over-dose in these drugs can lead to desaturation and hemodynamic variability, which makes the whole situation chaotic.

On the other hand, patients' response to such medications are only evaluated clinically; objective measurements are used rarely in clinical practice. In the present cases, we have administered incremental Sevoflurane with 100% oxygen, which produced an adequate level of sedation, and the depth was also objectively monitored with MACage monitoring. All three patients maintained airway without much hemodynamic disturbance, and later on, their interview revealed no unpleasant recall of the procedure.

A recent meta-analysis also indicates and supports that Sevoflurane based procedure was associated with a significantly less apnoea.[5] Furthermore, Sevoflurane produces mild pulmonary vasodilation, which helps in the patients having sleep apnoea and right heart overload. Rapid onset and reversibility, easy titratability for controlled effect, amnesic feature, and some protection from respiratory depression, are added advantages.[6] Whereas intravenous sedatives are not having all these features up to the desired precision level. Sevoflurane-induced apnea is usually transient and happens at very high anesthetic concentration.[7] Our hypothesis, i.e., Sevoflurane can be safely used for conscious sedation, is also supported by the fact that phasic inspiratory activity of genioglossus and palatoglossus muscle is well reported at 0.5 MAC of end-tidal Sevoflurane concentration.[8]

A nasopharyngeal airway in-situ, as used in our cases, also takes away the problem of upper airway obstruction due to tongue fall. With incremental, yet lower concentration sevoflurane induction up to 0.6 MACage is, therefore, unlikely to land up in cannot ventilate, cannot oxygenate situation too. None of our cases developed apnoea or airway obstruction during the procedure.

One study taking anticipated difficult airway cases from maxillofacial surgery compared Propofol and Sevoflurane and found that both the agent provide high success.[9] But, Propofol has been implicated in causing more fall in hemodynamics.[10] Although sevoflurane use for AFOI is not new, it is probably not well described in AFOI in adult patients with TMJ ankylosis with nil inter-incisor distance along with deformed anterolateral neck anatomy where conventional airway preparation is not feasible. Environmental contamination needs to be kept in mind, however, we feel that this technique can be advantageous if judiciously used in this subgroup of patients.

## CONCLUSION

Sevoflurane can be an appropriate choice for titratable sedation in awake fiber-optic intubation where airway preparation and block is not feasible due to deformed anterior neck anatomy.

## ACKNOWLEDGEMENT

The authors declare no conflict of interest.

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