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CASE REPORT

AWAKE FIBEROPTIC GUIDED NASOTRACHEAL INTUBATION AND AWAKE ASSISTED PRONING IN CERVICAL SPINE FRACTURE- A CASE REPORT

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ABSTRACT

Patients with cervical cord trauma are at risk of having an unstable cervical spine and any movement of the neck can cause further damage. Therefore, the primary goal of airway management is to minimize neck movement while securing the airway. Cervical spine movement during intubation with direct laryngoscopy can predispose to new-onset neurological deficits in patients with cervical spine instability, awake fiberoptic guided intubation (FGI) is mostly preferred to eschew any further injury⁽¹⁾. Airway management and positioning of patients with unstable cervical spine are the two major challenges faced by anaesthesiologists. During the initial evaluation, the focus is on head positioning and stabilization. Any airway maneuver undertaken in such patients has the potential to cause damage and result in unforeseen neurological sequelae. Overall, managing a difficult airway in a patient with cervical spine injury requires careful planning, a team-based approach, and an awareness of the potential risks and complications associated with airway management in this patient population.

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INTRODUCTION

A cervical spine injury refers to damage or trauma to the vertebrae, discs, ligaments, or nerves in the neck region of the spine. The cervical spine is made up of seven vertebrae, labeled C1 to C7, and it is responsible for supporting the head and allowing it to move. Cervical spine injuries can result from a variety of causes, including car accidents, falls, sports injuries, and violence. The severity of the injury can range from mild to severe and can have long-lasting effects. Common symptoms of cervical spine injury include neck pain, stiffness, numbness, tingling, weakness in the arms or legs, difficulty walking, and loss of bladder or bowel control. Managing a difficult airway in a patient with cervical spine injury requires careful planning and coordination between the medical team to minimize the risk of worsening the injury and to ensure adequate ventilation and oxygenation. In this case report we have discussed two interesting cases. First case of an 83-year-old who presented with a recent history of fall due to giddiness and pain in the occipital region.

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She was evaluated and found to have an unstable C2 fracture (Fig. 1), without any neurological deficit and no pre-existing co-morbid conditions, and was in need of urgent cervical spine fixation. Second case of 47-year-old with an alleged history of fall from height, causing a previous cervical C1 implant fracture (Fig. 2) resulting in quadriparesis. The patient presented with chronic weakness along with paresthesia in all four limbs. Patient was planned for implant removal with redo cervical fixation. After a detailed discussion with the surgical team, plan of anaesthesia was formulated. Plan A- awake fiberoptic-guided nasotracheal intubation with awake-assisted prone positioning. Plan B- manual in-line cervical spine stabilisation with C-MAC video laryngoscope-guided intubation and subsequent prone positioning after general anaesthesia. The patient and relatives were thoroughly counselled regarding the need of cooperation during the airway management. Written informed consent was obtained from both patients pre-operatively. The first patient, was brought inside operating room on her bed, with Mayfield's cervical traction in situ. The patient was reassured and educated regarding assisted prone positioning. After attaching all standard ASA monitors, pre-oxygenation was started through the nasal prongs at 6 L/min. A wide-bore peripheral

IV line was secured. For conscious sedation, injection dexmedetomidine was started as an infusion at the rate of 0.2 mcg/kg/hr. Simultaneously, airway preparation was started in a preselected nostril with oxymetazoline nasal drops and 2% lignocaine jelly which was followed by administration of trans-tracheal block by 5 ml of 2% lignocaine solution. While the patient was awake and the head was held in a neutral position aided by cervical traction, fiberoptic-guided nasotracheal intubation was carried out with a nasal RAE tube of 7 mm ID through the right nostril. After confirming the tube position with bilateral chest auscultation and end-tidal capnography, tube fixation was done. The patient was asked to lift all four limbs to check for any new-onset neurological deficits following intubation; no new deficits were noted, and the same was documented (Fig. 2)



Fig. 1. CT- scan film depicting first patient C2 fracture (on left)



Fig. 2 second patient cervical implant fracture (on right)

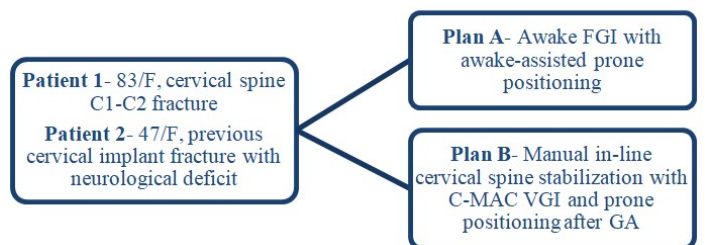
Subsequently, her eyes were closed and all pressure points were padded adequately. The patient was proned with assistance on the OT table with team effort and coordination. The surgical team held Mayfield's cervical traction and the anaesthesiologist handled the airway and ETT. Neurological status was assessed post-positioning and documented (Fig-3).

Following that, general anaesthesia was induced using aliquots of injection fentanyl, propofol based on her body weight. Adequate MAC and muscle relaxation was maintained with Desflurane mixed with oxygen and air and infusion of atracurium respectively. The intraoperative period was uneventful. Patient was extubated post-procedure and transferred to intensive care unit.

The second patient, was posted for cervical implant removal along with redo cervical spine fixation who had a fracture of a previously inserted cervical implant due to fall. The patient had a documented chronic bilateral upper and lower limb neurologic deficit with power grade 3/5 along with tingling and a fractured implant impinging on the cord prior to surgery. Plan A was selected to impede any movement at the cervical spine and to prevent further neurological deficits. The patient was wheeled inside the OT, on her bed. After attaching all ASA monitors and necessary airway preparation, awake fiberoptic guided nasotracheal intubation was done. North Pole tube (RAE tube) of 7 mm ID was used. With assistance, the patient was proned on the OT table. General anaesthesia was induced thereafter, and adequate MAC was maintained. Intra operative course was uneventful. Neurology was assessed at different times- post intubation, post-positioning, post-surgical fixation and post-extubation. No new neurological deficit was noted, power was same as preoperative grade 3/5 and the same was documented. After extubation the patient was shifted to ICU for close observation and monitoring.



Fig. 3 & Fig. 4. Confirmation of Neurological status post-intubation and post-proning



DISCUSSION

Instability of the cervicals pinedue to injury or disease putsthe cervicals pinalcordatrisk of damage and can lead to potentially harmful consequences. Secondaryinsults,suchas those caused by excessive movement of the cervicals spine, may worsen pre-existingnervedamage or lead to new-onsetinjury. Neurological damage might ensue with traditional tracheal intubation and subsequent proning of anaesthetised individuals with cervical

spine instability. Awake fiberoptic guided intubation and assisted prone positioning before administering general anaesthesia is a safer choice as it enables the surgeons and the anaesthesiologist to assess neurological function post-intubation and positioning.⁽³⁾ Previous studies have shown that direct laryngoscopy and endotracheal intubation lead to increased movement of the cervical spine relative to other techniques such as FGI, laryngeal mask assisted intubation⁽⁴⁾ McGrath and Bullard laryngoscopy.⁽¹⁾ Lei Heng et al suggested keeping in mind the comfort of the patient and minimal movement at the cervical spine, FGI is superior to other available methods.⁽²⁾ Kaustuv Dutta et al suggests that the change in angle at C1/C2 level was significantly greater during awake VGI (video laryngoscope-guided intubation) than during awake FGI in patients.⁽¹⁾ Different adjuncts to facilitate intubation in unstable cervical spine injury has been used like Airway Scope⁽⁶⁾ by Y. Hirabayashi et al and intubating LMA (i-LMA)⁽⁴⁾ by Jadhav T. et al. In both of our cases, considering the pre-existing neurological deficit, geriatric age group and the readiness of the patient for adequate cooperation, the decision in favour of awake FGI was taken for the least amount of movement during airway manipulation and most importantly documentation of neurological status at various points of time. In a review article by Sarah L. Boyle et al. suggested that if the patient is cooperative enough, awake self-positioning can be preferred over other available techniques of proning,⁽⁵⁾ and hence we preferred awake assisted proning to prevent any further neurological insult. Since, fiberoptic intubation requires expertise and practice, which may possess challenge while managing an unstable cervical spine injury, so presence of a skilled anaesthesiologist gives an upper hand in better management of these cases.

CONCLUSION

Difficult airway management in the context of cervical cord trauma can be challenging and requires a multidisciplinary approach involving anaesthesiologists, neurosurgeons, and critical care specialists. In cases of cervical cord trauma, the risk of further injury to the spinal cord during airway management must be minimized. The cervical spine must be immobilized before any airway intervention, and a team approach is recommended to ensure a safe and effective airway management plan. Success is patient and anaesthesiologist dependent.

The trifecta of in-depth patient counselling, team effort and patient cooperation plays a key role. Overall, managing the airway in patients with cervical cord trauma requires a careful and individualized approach, with attention to the patient's specific needs and the potential risks and benefits of each intervention.

Lacunae in literature: Studies and case reports specifically state the benefits and drawbacks of awake-assisted proning techniques in unstable cervical spine injuries.

Conflicts of interest: None.

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