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Case Report

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Stiff Spine; Critical Airway: Navigating the Airway while Maintaining a Delicate Balance

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ABSTRACT

Ankylosing spondylitis is a chronic inflammatory disease that leads to ossification of spinal ligaments, causing a 'bamboo spine' and making the cervical spine highly prone to fractures, even with minor trauma. Airway management in such cases is particularly challenging, especially when cervical spine injury is present, as improper handling can exacerbate spinal damage. This case report highlights the complexities of managing a difficult airway in a patient with ankylosing spondylitis and a cervical spine injury. The patient developed respiratory distress following a trauma-induced cervical injury, necessitating emergency intubation. Imaging later revealed an iatrogenic fracture of the C7 vertebra, emphasizing the importance of cautious airway handling in such patients. This report emphasizes the need for a multidisciplinary approach, careful planning, and cervical spine immobilization when managing the airway of patients with ankylosing spondylitis and cervical spine injury.

Keywords: Ankylosing spondylitis, Spine, Iatrogenic injury, Airway management, Endotracheal intubation

INTRODUCTION

Ankylosing spondylitis is an inflammatory condition associated with ankylosis of apophyseal joints and sacroiliitis. There is ossification of the ligaments, resulting in a bamboo spine, thus making it susceptible to fracture.¹ In such patients, even minor trauma can result in a fracture of the cervical spine, which, if not treated promptly, can cause neuromotor deficit. Patients with injury to the cervical spine may require securing of the airway either as part of initial resuscitation in the emergency wards or before surgical management of spine stabilization after admission. Meta-analysis has found that the rate of spinal cord injury following airway manipulation during surgical management is <1%.² No one technique of securing the airway has been found to be better than others. We present a unique case of a patient with ankylosing spondylitis with cervical spine injury following trauma, who later developed an iatrogenic fracture of the C7 vertebra. This case report highlights the nuances of airway management in a predisposed difficult airway with cervical spine injury.

CASE REPORT

A 46-year-old male known case of ankylosing spondylitis presented to the Emergency department (ED) of a tertiary trauma center with a history of fall on level ground, following which he was unable to move his upper and lower limbs with acute pain in the neck and complete loss of sensation. While performing the primary survey in the ED, a semi-rigid

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cervical collar was applied. Computed tomography (CT) of the spine showed diffuse idiopathic skeletal hyperostosis and ossification of the posterior longitudinal ligament of the cervical spine at C3-C6 level with central cord syndrome [Figure 1]. Clinical evaluation revealed an American Spinal Injury Association impairment scale of grade A. The patient showed signs of acute respiratory distress after a few hours in the ED. The airway was secured with a size 8 endotracheal tube after applying manual inline stabilization of the spine and the patient was shifted to the intensive care unit (ICU) with the cervical collar for mechanical ventilation. The next day, the patient was shifted for magnetic resonance imaging (MRI). In the MRI images, in addition to the CT findings, it was revealed that the patient had also sustained a fracture of the C7 vertebra, which was not present before endotracheal intubation [Figure 2]. This fracture of vertebrae was a new development that was not present during the initial



Figure 1: Computed tomography image showing the intact C7 vertebra marked with an arrow. FLP: Feet left posterior.



Figure 2: Magnetic resonance imaging image showing the fractured C7 vertebra marked with an arrow. HR: Head Right, FL: Feet left.

CT scan images. The patient was scheduled for posterior decompression, posterior instrumentation and C3–T1 fixation in the prone position. The surgery was uneventful, and he was shifted back to ICU for elective mechanical ventilation. After 7 days, a tracheostomy was performed, and the patient was shifted out to the ward after weaning from the ventilator.

DISCUSSION

Fractures of the cervical vertebrae can occur with abnormal movements such as hyperflexion, hyperextension, rotation, lateral bending, or a combination of such movements.³ The most common mechanism of injury causing cervical spine injury is hyperextension. Even basic airway management procedures such as jaw thrust and chin lift cause some displacement of the cervical spine.⁴ Studies have reported that much of the movement of the cervical spine occurs in its uppermost vertebrae during direct laryngoscopy and there is minimal movement beyond C3. In patients with ankylosing spondylitis, hyperflexion, or hyperextension movement of the neck, the spine has to bear a greater load than normal which predisposes it to fracture easily. Hence, one must be extremely cautious and vigilant while managing the airway of a patient with ankylosing spondylitis with suspected cervical spine injury.

In this index case, the entire airway handling, from shifting of the patient to intubation and transfer to the ICU was disconcerting for many reasons. Since this case involved an anticipated difficult airway with a cervical spine injury, awake tracheal intubation using fiberoptic bronchoscopy should have been the preferred method.⁵ However, at times outside operation theaters, a controlled environment may not be possible for awake intubation. The patient might not be cooperative, there may be blood and secretions and if the patient has respiratory distress, the situation becomes even more challenging. ED physicians are more conversant with laryngoscopy than awake fiberoptic intubation. After the patient experienced respiratory distress, this was likely the case, so the patient was promptly intubated using a direct laryngoscope in the ED.

No single airway management approach has been found to be consistently effective to date, and coupled with the lack of high-quality evidence, the optimal technique that minimizes cervical spine movement remains controversial. A recent guideline recommends that video laryngoscopy with cervical spine immobilization should be used for tracheal intubation in suspected or confirmed cervical spine injury.⁶ This guideline also emphasizes multidisciplinary planning, preparation, and optimization of human factors before endeavoring to secure the airway in such high-risk scenarios. Airway managers should undergo routine training and simulation, keeping such scenarios under consideration. Although intubation is unlikely to be the sole cause of spinal cord injury in this case, it is important to emphasize the need for caution when performing the procedure on such patients. The same level of vigilance should be maintained while shifting the patient from the trolley to the bed and a spine board with manual in-line stabilization or semi-rigid cervical collar should always be used.

CONCLUSION

Managing the airway in patients with ankylosing spondylitis and cervical spine injury presents significant challenges. While no single technique has proven superior, a cautious and wellcoordinated approach with cervical spine immobilization is essential. Multidisciplinary planning and proper training are critical to minimize further spinal damage and thus ensure patient safety.

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