BALKAN ORL-HNS

Non-Traumatic Cricoid Cartilage Fracture: An Unusual Presentation of a Case Report

CASE REPORT
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ABSTRACT

Cricoid cartilage fracture is a rare clinical entity, most commonly resulting from significant blunt neck trauma. Non-traumatic or spontaneous fracture of the cricoid cartilage is exceedingly rare, with only a single case reported in the literature to date. Typical clinical features include the sudden onset of continuous stridor, neck pain, and hoarseness of voice following trauma. The case of a male patient who presented with sudden onset stridor, change in voice, and neck pain following a bout of forceful coughing, without any history of external trauma is reported. Radiological evaluation confirmed the diagnosis of cricoid cartilage fracture. The patient underwent an emergency tracheostomy to secure the airway and was subsequently managed conservatively with intravenous antibiotics and tapering steroid therapy. He showed good clinical recovery and was successfully decannulated.

Keywords: Cricoid cartilage, non-traumatic, spontaneous fracture, tracheostomy

Introduction

Although trauma is the leading cause of laryngeal fractures (LF), with isolated thyroid cartilage fractures being the most frequent subtype, these injuries occur in fewer than 1% of blunt trauma cases.[1] Among these, cricoid fractures (CF) are particularly uncommon and are typically associated with severe neck trauma, most often resulting from high-velocity automobile accidents. Non-traumatic LF, although extremely rare, can occur due to a sudden and significant increase in intraluminal pressure against a closed glottis generating a pressure as high as 38 times the normal pressure.[2] Such events are triggered by forceful coughing, sneezing, or swallowing while the airway is closed. Three hallmark symptoms of CF are stridor, hoarseness, and odynophagia. On clinical examination, findings may include hematoma formation, mucosal ulceration, and laryngeal edema. A computed tomography (CT) scan of the neck is the imaging modality of choice to confirm the diagnosis of a laryngeal and cricoid cartilage fracture.

To date, only 14 cases of spontaneous thyroid cartilage fracture and only 1 case of spontaneous cricoid cartilage fracture have been reported in the literature.[2] This report presents an adult male who developed an isolated spontaneous fracture of the cricoid cartilage following a bout of forceful coughing. He presented with stridor, voice changes, and neck pain. Initial management involved an emergency tracheostomy, following which the patient was successfully decannulated.

Case Presentation

A 51-year-old male, with no previous co-morbidities, was referred to the emergency department with a history of sudden onset difficulty breathing, throat pain, and hoarseness for 6 hours. He had consumed alcohol the night before, and in the morning, he had a bout of vigorous coughing, followed by pain in the throat and difficulty breathing. He denied any history of a fall or trauma to the neck. On examination, his respiratory rate was 40 per minute, biphasic stridor was audible, and his oxygen saturation was 67% on room air. The oral cavity and oropharynx were normal; however, the laryngoscopic examination could not be performed

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as his saturation was rapidly falling despite oxygen supplementation of 10 liters/hour. Informed consent for the emergency tracheostomy was obtained. Under local anesthesia, an emergency tracheostomy was performed, and an 8-mm cuffed tracheostomy tube was placed. Immediately, the patient's condition stabilized, and his saturation increased to 98%. On fiberoptic laryngoscopy (FL), the vocal cords were normal and mobile; the subglottis appeared edematous, and no foreign body was visualized (Figure 1). He was admitted and started on intravenous dexamethasone 4 mg 3 times daily and ceftriaxone 2 g twice daily. A contrast-enhanced CT scan of the neck on bony window showed posterior lamina fractures of the cricoid cartilage, with anterior displacement of the fragments and asymmetrical airway narrowing, more marked on the left. (Figure 2) The patient's symptoms improved over the next week, and he was discharged with the tracheostomy tube in situ. A CT scan of the neck after 1 month showed a reduction in the subglottic edema with persistence of CF. (Figure 3) Following successful decannulation, the patient remained on follow-up with minimal hoarseness, without respiratory distress, and maintained normal daily functioning.

Discussion

Cricoid (Greek, Krikos meaning "ring-shaped") is a signet-shaped laryngeal cartilage with a narrow arch on its anterior aspect and a wide lamina on the posterior side. It is the only complete cartilage of the laryngeal framework and plays an important role in the integrity and stability of the airway. Its fracture, if displaced, as happened in this case, can cause sudden respiratory distress, especially if there is associated edema in the subglottic area.

For the non-traumatic fractures of the laryngeal cartilage, congenital defects, inflammatory processes, and neoplastic processes have been implicated as etiological factors.[3] The congenital defect theory was proposed by Quinlan in 1950,[4] in his case report of a spontaneous fracture of thyroid cartilage following a bout of sneezing. This is the second case report of non-traumatic cricoid cartilage fracture, and the clinical features, similarities, and differences of these 2 patients are described in Table 1.

Fenig et al proposed the biomechanics of the laryngeal airflow during coughing or sneezing as the likely cause of CF.[5] As per Bernoulli's principle, a narrowed airway leads to increased air velocity. Thus, when strong exhalation of air is combined with sudden and forceful closure of the glottis as happens during a bout of coughing and sneezing, a significant intra-luminal pressure is generated beneath the vocal cords, which can result in a non-traumatic LF. Similarly, the patient had a bout of coughing and then sudden onset of respiratory distress following the displaced fractures of the lamina cricoid cartilage. However, in contrast to the only reported case of non-traumatic cricoid fracture by Matsuo et al, in which the patient experienced intermittent stridor for 6 months prior to requiring a permanent tracheostomy,[3] the delayed and milder presentation of airway obstruction in that case may be attributed to an undisplaced fracture of the

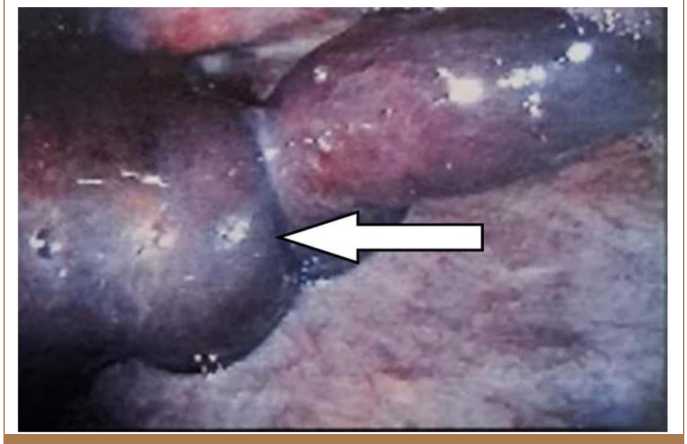

Figure 1. Endoscopic picture of bruised, congested bilateral arytenoids and inter-arytenoid area (open arrows).

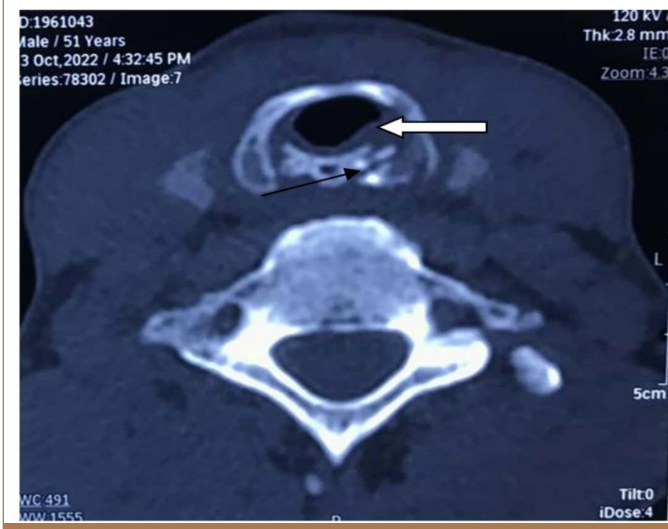

Figure 2. Computed tomography scan neck axial section, showing bilateral comminuted cricoid fracture in posterolateral aspect with anterior displacement of fragments (arrow), resulting in subglottic narrowing (open arrow).

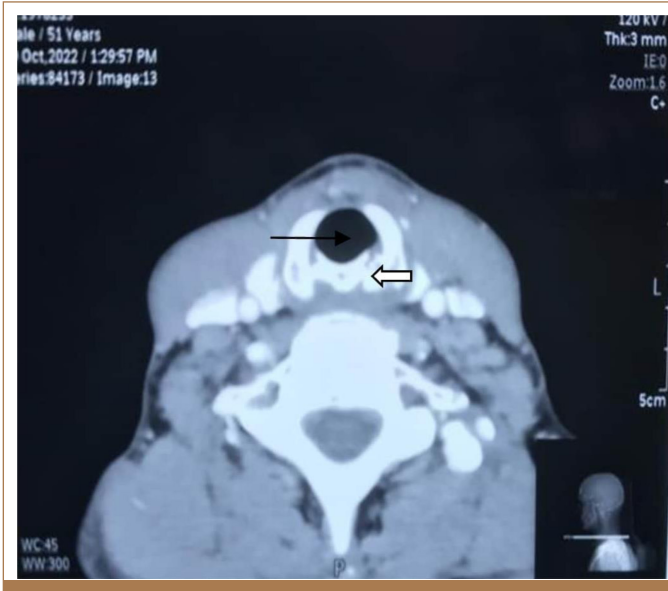

Figure 3. Computed tomography scan of the neck after 1 month of tracheostomy showing resolution of subglottic edema (arrow) and persistent fracture of posterior lamina of cricoid cartilage (open arrow).

Table 1. Comparisons of the Patient's Profiles with Non-traumatic Cricoid Cartilage Fracture

Profile	Patient 1 (Matsuo et al) 2019	Current Patient 2 (2023)
Age	69	51
Sex	Female	Male
Symptoms	Intermittent dyspnea for 6 months	Sudden onset dyspnea for 6 hours with throat pain and hoarseness of voice
Comorbidities	Type 2 diabetes mellitus, diabetic nephropathy	None
History of trauma	None	None
CT findings	Posterior lamina fracture	Comminuated fracture of lamina with anterior displacement and sub-glottic edema
Management	Oral intubation followed by permanent tracheostomy	Emergency tracheostomy, conservative treatment and de-cannulated successfully

CT, computed tomography; T2DM, type 2 diabetes mellitus.

cricoid lamina on CT imaging of the neck, resulting in relatively minimal airway compromise.

Due to the limited number of cases of non-traumatic LF, there are no established guidelines for optimal management; however, a high index of suspicion should be maintained in any patient presenting with sudden onset dyspnea, neck pain, and hoarseness of voice, even following minor events such as a bout of coughing. The primary objectives in such cases are airway protection and preservation of phonation and swallowing. In patients with mild airway compromise, conservative management with intravenous steroids, with or without antibiotics, is recommended. However, in the event of rapid desaturation and anticipated difficulty with intubation, an emergency tracheostomy may be required to protect the airway. A FL and a CT scan of the neck are essential to confirm the diagnosis of CF. Fiberoptic laryngoscopy in the case showed edematous, bruised bilateral arytenoid, inter-arytenoid area, and subglottic edema. Due to the paucity of knowledge of such cases, the management of CF is not standardized, but steroids and antibiotics play a role, especially if there is a displaced fracture accompanied by edema of the subglottic area.

Conclusion

A non-traumatic spontaneous cricoid fracture should be considered in the differential diagnosis when dyspnea, change in voice, and neck pain present suddenly following episodes of coughing or sneezing, despite its rarity and diagnostic challenge. Contrast-enhanced CT of the neck is essential for confirmation. Airway management, including endotracheal intubation or emergency tracheostomy, may be required to secure the airway. In cases with mild airway compromise, a conservative approach with antibiotics and steroids can lead to favorable outcomes and successful decannulation.

Data Availability Statement: *The data that support the findings of this study are available on request from the corresponding author.*

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Ethics Committee Approval: *Ethical committee approval was not required due to the case-study design.*

Informed Consent: *Written informed consent was obtained from the patient who agreed to take part in the study.*

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