

## [ Orthopaedic Surgery ]

# Traumatic Laryngeal Fracture in a Collegiate Basketball Player

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Laryngotracheal trauma is a rare condition that accounts for less than 1% of blunt trauma. Laryngotracheal fractures are uncommon in sports, even in settings where athletes are more vulnerable, including football, basketball, and hockey. If a laryngeal injury is suspected, immediate evaluation is required to avoid a delay in the diagnosis of a potentially life-threatening injury. A collegiate basketball player sustained an unusual fracture involving the cricoid and thyroid cartilage during practice. This case illustrates the importance of rapid identification and early management of patients with blunt laryngotracheal trauma in sports.

**Keywords:** laryngeal fracture; cricoid cartilage fracture; thyroid cartilage fracture; laryngotracheal trauma

Laryngotracheal fractures are a rare condition that account for less than 1% of all blunt traumas.<sup>8</sup> Its incidence varies between 1 in every 30,000 to 137,000 inpatient visits and 1 to 6 patients among every 15,000 to 42,500 trauma victims.<sup>4,8</sup> Direct penetrating trauma and blunt trauma to the neck region are common causes.<sup>13</sup> Motor vehicle accidents are the most common cause of laryngotracheal injury, but it also occurs in violent sports, assaults, hanging, and strangulation.<sup>1,3,6,16</sup> Associated findings can include cartilage necrosis, voice alteration, cord paralysis, aspiration, and airway compromise.<sup>2,9</sup> Less than 50% of the fractures occur in the cricoid cartilage.<sup>12</sup>

Laryngotracheal fractures are uncommon events in athletics—even in football, hockey, and other settings where athletes are more vulnerable to neck trauma.<sup>1</sup> The combination of low prevalence and subtle initial symptoms generates a low index of clinical suspicion.<sup>1</sup> A delay in diagnosis may lead to life-threatening airway obstruction and hypoxia.<sup>11,14</sup> Once a laryngotracheal injury is suspected, immediate medical attention is prudent regardless of the severity of the presenting symptoms.<sup>1</sup>

## CASE REPORT

A 21-year-old male collegiate basketball player jumped for a rebound and, while descending, was struck in the larynx by a teammate's head. He had a brief episode of shortness of breath and then became dysphonic (hoarse) and developed hemoptysis (coughing up blood). He was evaluated by the athletic trainer

and given a dose of intramuscular methylprednisolone following consultation with the team physician. Breathing improved over the following hours, although his voice remained hoarse. He continued to produce blood-streaked sputum, had difficulty swallowing, and over the next few hours, experienced shortness of breath with mild stridor.

At the emergency room, he was found to have tenderness along the thyroid lamina and the anterior cricoid ring with subcutaneous emphysema (Figure 1). Fiberoptic evaluation demonstrated a normal superior glottis larynx without mucosal laceration. The left arytenoid was displaced anterior relative to the right. There was significant posterior cricoid edema and decreased mobility of the left vocal cord. He did not demonstrate cricotracheal separation on examination. Computed tomography of the neck showed a minimally displaced fracture of the left thyroid lamina (Figure 2). There was a fracture of the anterior thyroid cartilage just to the left of the commissure with subcutaneous air that tracked into the subcutaneous tissue. There was also a left lateral cricoid fracture with the posterior fragment rotated laterally. He was admitted to the intensive care unit for monitoring but did not require surgical airway management. He was discharged 5 days postinjury after passing a swallow study.

Repeat flexible laryngoscopy at 3 months showed decreased mobility of the left vocal fold but no airway limitations. He continued to have a persistent lower pitched voice but no airway compromise and was cleared to resume practice with the basketball team. At 15 months postinjury, his voice remained lower pitched.

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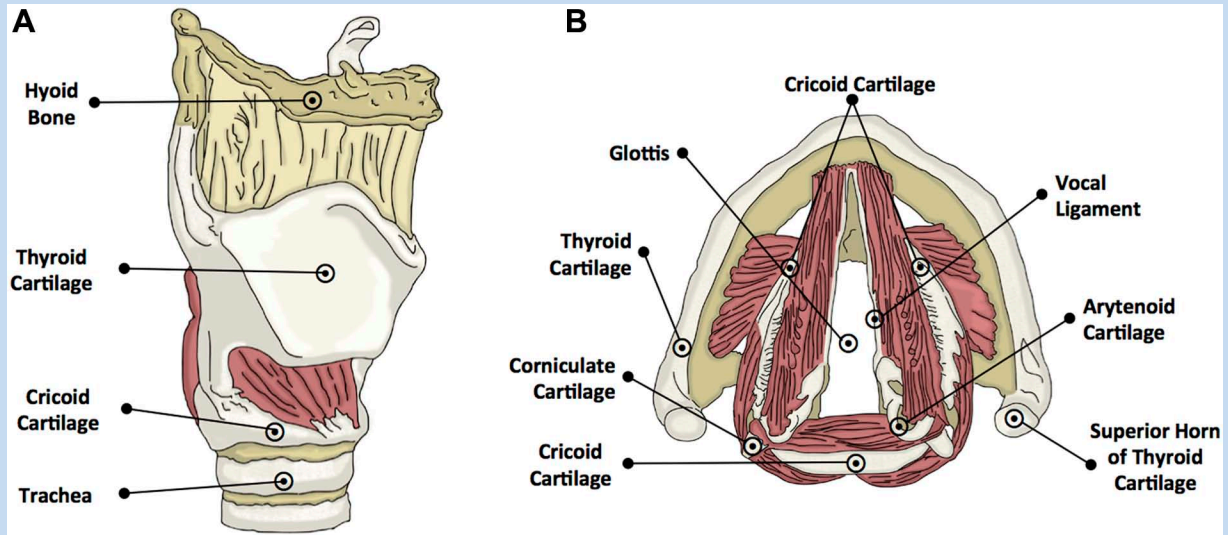


Figure 1. Pictorial view representing an (a) oblique and (b) axial view of the larynx.

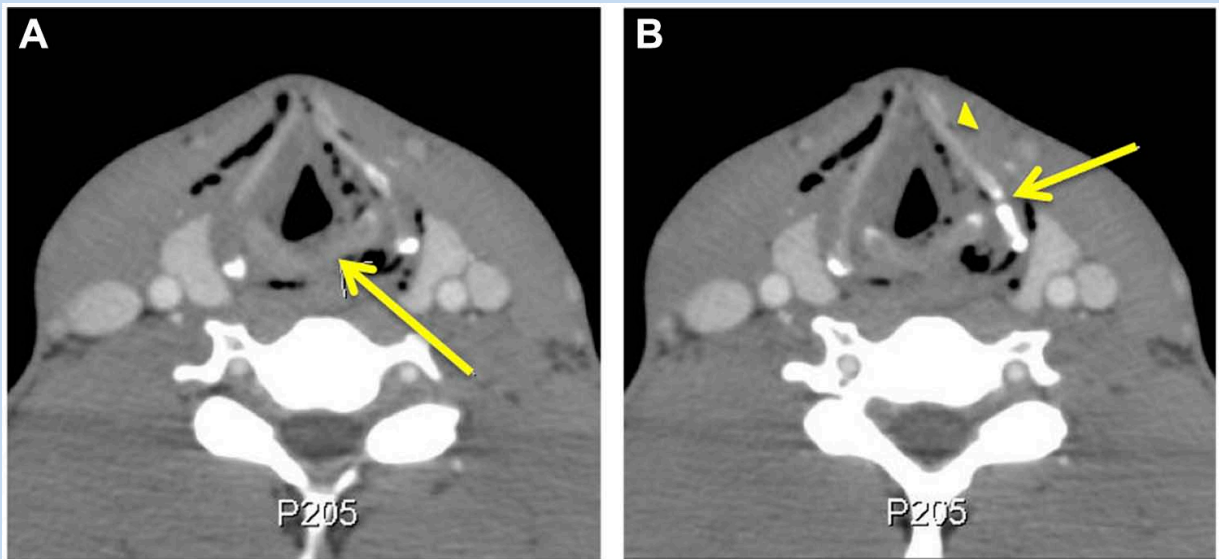


Figure 2. Two axial images from the patient's computed tomography scan of the neck. (a) The left posterior cricoid fracture (arrow) appears to be rotated laterally with the presence of submucosal and subcutaneous air present at the level of the larynx. (b) Double density along the anterior thyroid cartilage (arrowhead) and discontinuity more posteriorly (arrow) representing a thyroid cartilage fracture with the presence of subcutaneous air.

## DISCUSSION

Laryngotracheal injuries can be life-threatening owing to the potential for airway compromise.<sup>9</sup> A thorough physical examination is vital to the appropriate evaluation and management of a suspected laryngotracheal injury.<sup>2,9</sup> Once the diagnosis of laryngeal trauma is suspected, the patient should be stabilized and transferred to the nearest hospital for complete evaluation.<sup>10</sup>

Common presenting symptoms include respiratory distress, stridor, hemoptysis, voice changes, odynophagia, and dysphagia.<sup>2,9</sup> Signs include edema, hematoma, subcutaneous emphysema, ecchymosis, laryngeal tenderness, loss of thyroid cartilage prominence or anatomical landmarks, open neck wound, vocal cord immobility, and bony crepitus.<sup>2,9</sup> However, no single presenting symptom correlates well with the severity of the injury. Flexible fiberoptic laryngeal examination is generally used to assess the extent of the injury.<sup>2,18</sup> A computed tomography scan can evaluate the larynx and surrounding structures.

Surgical management should be considered if there is any concern for an unstable airway.<sup>2,7,9,17,18</sup> Early surgical exploration is recommended for displaced fractures, exposed cartilage, disruption of the anterior commissure, and vocal cord immobility.<sup>7</sup> Initial management of the airway may require emergent intubation, which can be difficult with a laryngeal fracture and is not generally recommended.<sup>2,9</sup> These patients can be emergently managed with local tracheotomies or cricothyroidotomies.<sup>2,9,10</sup> The nonsurgical management of this injury relies on close monitoring and timely intervention, if necessary, to protect the airway.<sup>2,9</sup>

Laryngeal fractures are not as common as they once were, given the use of 3-point restraining seatbelts and airbags in most motor vehicles, which limit direct blunt trauma to the neck.<sup>18</sup> The immediate evaluation by the medical staff and administration of intramuscular methylprednisolone may have had significant benefit in decreasing the edema, which could have resulted in airway compromise. Steroids may reduce the inflammatory response, resultant edema, and threat to airway compromise.<sup>5,15</sup> There have been no randomized studies completed proving the efficacy of steroid use in conservatively treated laryngeal injuries.<sup>5,15</sup>

Mild laryngeal traumas with minor edema or lacerations are commonly treated with steroids, antibiotics, and close

observation. For moderate-degree injuries, tracheotomy or cricothyroidotomy is typically recommended. Most important, prompt recognition and treatment in experienced hands will usually result in favorable outcomes.<sup>9</sup>

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