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Case Report

Isolated tracheal injury after whiplash

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Abstract

Whiplash, a sudden acceleration–deceleration movement that can cause diverse symptoms such as neck pain, cervicogenic headache, restricted neck movement, tingling of the arms (central cord syndrome), and dizziness. However, laryngotracheal injuries after whiplash are extremely rare. We report the case of a 25-year-old Taiwanese female who presented to the emergency department with severe posterior midline neck pain after a rear-end motorcycle collision. Her C-spine X-ray showed no definite fracture; furthermore, her neck noncontrast-enhanced CT scan revealed paratracheal free air. She was discharged uneventfully after a 12-h observation period. Laryngotracheal injuries after whiplash, a hyperextension–hyperflexion movement, are potentially life-threatening and could lead to airway obstruction. Such injuries should not be overlooked. To the best of our knowledge, this is the first case report of isolated laryngotracheal injury after whiplash.

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Keywords: laryngotracheal injuries; whiplash

1. Introduction

Laryngotracheal injuries usually develop after direct blunt or penetrating trauma to the neck and are rarely associated with whiplash. The clinical manifestations of airway injury can be deceptive and potentially life-threatening. However, early diagnosis is important for all the causes of laryngotracheal injuries to prevent immediate and delayed complications, which include airway compromise, stenosis of the airway, respiratory tract infection, and esophageal fistula.^{1–3} Whiplash usually occurs when an impact from the rear causes the body to be pushed forward with the head and neck lagging behind. Such hyperextension–hyperflexion injuries can cause significant stretching forces that result in the tearing of the muscles, ligaments, tendons, and possibly the trachea.^{4,5} Here we report the first case to our knowledge of laryngotracheal injury after whiplash.

2. Case report

A 25-year-old female suffered from severe posterior neck pain. She was presented to our emergency department from the motorcycle crash scene with a rigid neck collar in place. Her body temperature was 36.5°C, blood pressure was 102/70 mmHg, pulse rate was 67 beats per min, and respiratory rate was 16 breaths per min. She wore a full-face helmet at the time of the crash and experienced whiplash at the moment of impact. She did not show loss of consciousness, shortness of breath, cough, hemoptysis, weakness, or paresthesia. Her physical examination was unremarkable, except for posterior midline neck tenderness and minor bruising of the extremities. Moreover, stridor, abnormal breathing sounds, neck abrasions, neck swelling, palpable crepitus, and anterior neck tenderness were not present. The radiological investigations of the cervical spine showed no definite fracture (Fig. 1A and B). In addition, noncontrast-enhanced computed tomography was pursued due to the suspicion of an occult fracture. However, a small amount of free air located alongside the right lateral region of the upper trachea was accidentally discovered (Fig. 2A, B, and C). She was under close observation for the next 12 hours in the

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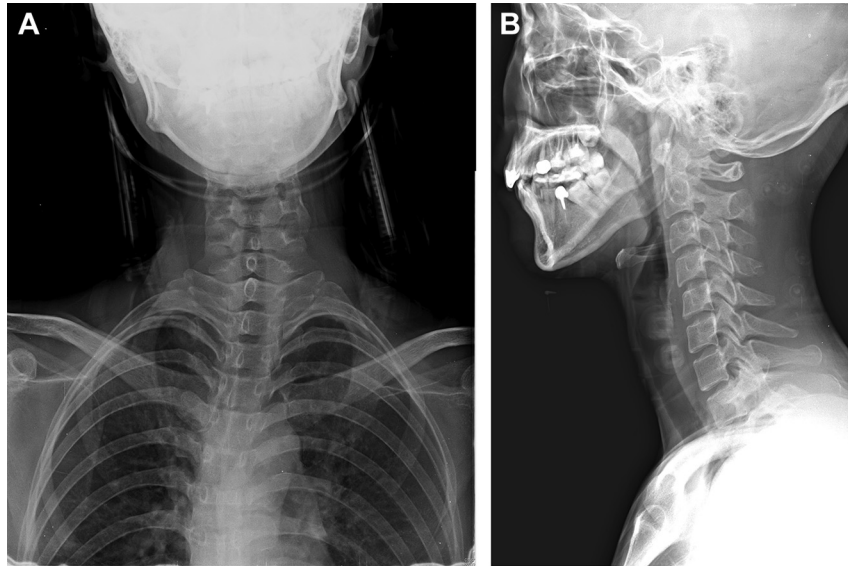


Fig. 1. Cervical X-ray showed no fractures and the cervical spine alignment is normal. The patient wore a semi-rigid neck collar. (A) Anteroposterior view; (B) lateral view.

emergency department and further was discharged uneventfully. No progressive neck swelling or dyspnea developed.

3. Discussion

The dominant cause of laryngotracheal injuries is blunt trauma. Its consequences are often life-threatening with

significant morbidity and mortality.¹ The early manifestations of airway injuries can be silent and progress dramatically.² A high index of suspicion is essential to avoid unexpected deterioration. Physical examination should be focused on the clinical evidence of aerodigestive injuries, including soft tissue swelling, hematoma, tracheal deviation, subcutaneous emphysema, hoarseness, cough, stridor, dyspnea,

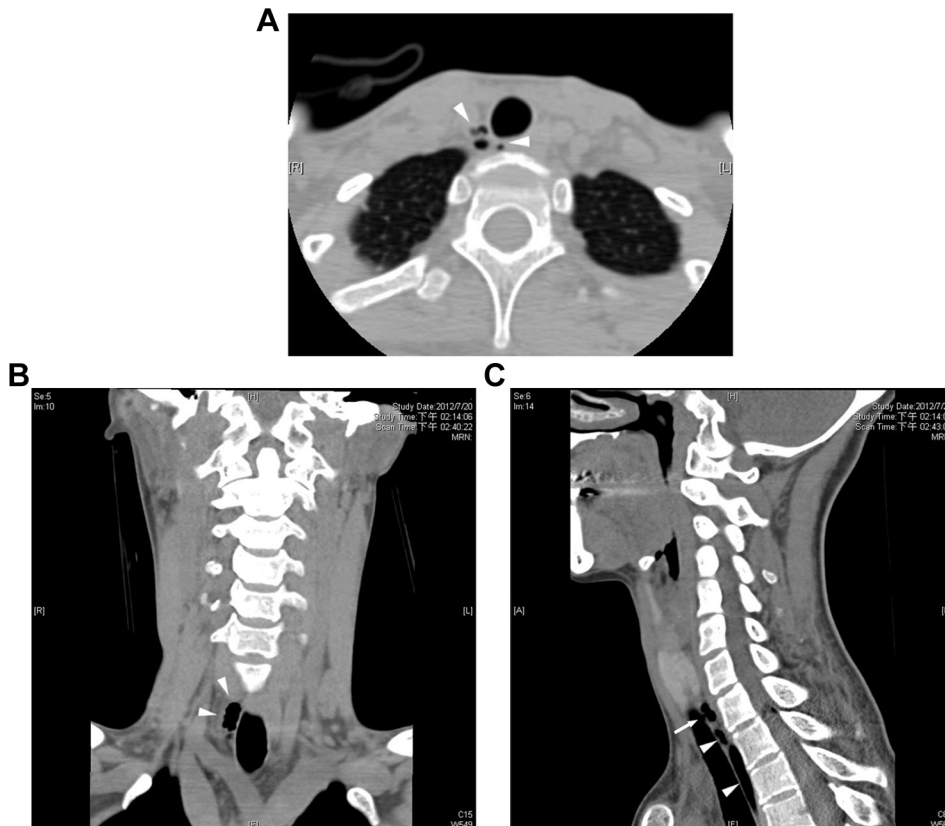


Fig. 2. Neck non-contrast-enhanced CT scan demonstrated free air (arrowheads) alongside the upper trachea. The prevertebral soft tissue was not swelling. (A) Transverse view; (B) coronal view; (C) sagittal view.

odynophagia, or dysphagia.^{1,2} In addition, concurrent injuries such as common carotid artery injury and intramural hemorrhage or esophageal rupture should also be fully assessed.

The diagnosis of laryngotracheal injuries can be challenging and is often delayed because these injuries are usually not obvious at the time of physical examination. Radiographic studies frequently are nonspecific and difficult to interpret when patients wear neck collars. Bronchoscopy with the direct examination of the visible airways is the traditional diagnostic standard for tracheal injuries. However, it may be too risky to perform a bronchoscopic examination in patients with respiratory insufficiency and hemodynamic instability. Computed tomography scans offer a clinical advantage in the emergency department environment and have a reported sensitivity of 85%.³

According to previous studies based on biomechanics, a whiplash occurs when an impact from the rear causes the torso to be pushed forward with the head and neck lagging behind. Two distinct kinematic phases of the cervical spine after whiplash were identified^{4,5}: (1) In the first phase, the C-spine forms an S-shape curve with the flexion of the upper vertebrae and extension of the lower vertebrae. (2) In the second phase, the extension force at the lower level gradually causes the upper vertebrae to extend until the neck is completely extended. The initial phase causes the largest elongation of the facet joint and capsular ligaments at the lower level of C-spine. Such tearing force potentially may also cause tracheal injuries. In the present case, paratracheal free air was discovered at the lower end of the cervical spine (C7-T3,

Fig. 2B and C). This finding was compatible with previous studies based on biomechanics.

Surgical interventions are usually indicated for most cases of laryngotracheal injuries; however, conservative treatment could be considered in selective patients without open tracheal wounds, associated esophageal injuries, mediastinal emphysema, progressive subcutaneous emphysema, sepsis, or unstable vital signs. The usage of broad-spectrum antibiotics is always recommended whether treatment is conservative or surgical^{1,2}.

In conclusion, whiplash can be accompanied by laryngotracheal injuries, and its early diagnosis is important to avoid unexpected deterioration. Although the tracheal tear may be self-limiting, thorough physical examination and sufficient observation are required.

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