

“Saber-Sheath” Appearance of the Trachea

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Abstract

A 60-year-old man with a history of methamphetamine and tobacco dependence was evaluated for COPD, found to have a saber-sheath appearance of the trachea based on CT imaging findings.

Keywords

Saber-sheath trachea, COPD, Tracheal index

Case

A 60-year-old man with a history of methamphetamine and tobacco dependence was seen in the pulmonology clinic for evaluation of COPD and possible obstructive sleep apnea (OSA). His only complaint was dyspnea. Pulmonary function testing was normal. The epworth sleepiness scale was 11, and the STOP-bang score was 5, indicating a high probability of moderate-to-severe OSA. CT scan of the neck with IV contrast showed a mild-to-moderate tracheal narrowing and sheath-like morphology beginning at C7 down to the carina, measuring approximately 6.5 mm in the shortest transverse dimension, consistent with a saber-sheath trachea (SST). This phenomenon was first studied by Green and Lechner in 1975 and can be described by a widened anteroposterior diameter and a distinctly narrowed transverse plane across the intrathoracic trachea [1]. A tracheal index (ratio between the coronal to the sagittal diameter of the trachea at the same level) of less than 2/3 (or 0.67), as seen in our patient (Figures 1-3), has a 92.9% specificity to diagnose severe COPD [2]. The mechanism of this abnormality in COPD is poorly understood; a postulated theory is from degeneration, vascularization, and subsequent ossification of the anterior trachea resulting in remodeling and a fixed shaped trachea [1]. Another suggested explanation suspects the elevation in intrathoracic pressures from severe COPD induces chronic remodeling and bending of tracheal cartilage rings, without causing mucosal damage [3]. Although typically associated with COPD, SST has been seen with tracheomalacia and post lung transplant bronchiolitis obliterans.

SST is a radiological anomaly that can be seen in patients with severe COPD. Knowledge of this deformity can prove to be critical during intubation, as a smaller tube is often required. Furthermore, being aware of possible air leak around the inflated endotracheal tube balloon can lead to the rapid response of life-sustaining measures in the event of impending respiratory failure. Currently, no treatment exists for this deformity.



Figure 1: Cross sectional CT chest with contrast showing "saber-sheath" intrathoracic narrowing of the trachea. The coronal diameter is less than 2/3 or 66% of the sagittal diameter.



Figure 2: Coronal CT chest with contrast showing narrow trachea.



Figure 3: Sagittal CT chest with contrast showing widened diameter of trachea.

Conflict of Interest

The authors have no conflict of interest.

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