



Laryngeal Radiographic Imaging

Laryngeal endoscopy is the gold standard technique for mucosal pathologies. However, when the primary pathology involves tissue layers deep to the mucosa, laryngeal imaging is complementary and additive to endoscopy and can guide the physician in optimal management of the condition being assessed. Laryngeal imaging can be performed by a number of means as discussed below. All techniques have unique advantages and disadvantages and the method chosen should be tailored to the patient according to the information desired and pathologic condition being assessed. Plain X-ray imaging of the larynx is rarely used except occasionally in the pediatric population for the diagnosis of epiglottitis and laryngotracheobronchitis.

Cross sectional imaging (CSI)

- Laryngeal cross sectional imaging is useful to assess for staging malignancy, laryngeal framework assessment in trauma cases, and visualization of submucosal lesions not easily seen on endoscopy (e.g. saccular cysts, laryngoceles).
- CSI does not provide dynamic, real time images of the larynx, and thus detection of vocal fold paralysis and other laryngeal motion abnormalities is limited.
 - Radiographic signs of vocal cord paralysis, demonstratable with either CT or MRI, can include thyroarytenoid or posterior cricoarytenoid musculature atrophy, ipsilateral piriform fossa dilation and vocal fold bowing. These signs should always be correlated with clinical laryngeal examination findings.
 - A recent paper reports that the sensitivity and specificity for the detection of VFP by CT are 23% and 100%, respectively.¹
- In the setting of suspected laryngeal invasion by malignancy (laryngeal, pharyngeal, thyroid or other), the choice of CT versus MRI depends on multiple factors.^{2,3}
 - MRI with contrast is useful to evaluating areas where the superior soft tissue contrast resolution of MRI can be of benefit such as invasion of the esophagus, tracheal wall and neurovascular bundles supplying the larynx.
 - For tumoral invasion of laryngeal cartilages, CT and MRI offer complementary information
 - CT allows for detection of small laminar defects, and abnormal hyperdensity may indicate sclerosis from tumoral infiltration.³
 - MRI is sensitive to areas of abnormal marrow signal/enhancement within the cartilage however abnormal marrow signal in the thyroid cartilage may reflect fibrovascular proliferation reactive to adjacent tumor.^{2,3}
- When assessing laryngeal trauma, CT can diagnose laryngeal fractures and assist in planning the appropriate operative approach to reconstruction

Transcutaneous Laryngeal ultrasound (TLUS)

- Recently there has been growing interest in the use of TLUS for evaluation of vocal fold motion, lesions, invasive malignancies external to the thyroid cartilage, non-surgical



etiologies of vocal cord (VC) paralysis or dysphonia, immediate perioperative investigation of stridor, and prediction of post-extubation stridor secondary to airway edema.^{3,4}

- A linear transducer set to 7-10MHz is most often employed for TLUS. Higher frequencies are unable to adequately penetrate the thyroid cartilage to allow visualization of the necessary structures.
 - The true VCs are classically described as hypoechoic, although they are often distinguished in part by a fine hyperechoic line. The false cords are easily identified as triangular shaped hyperechoic areas. The arytenoids are visualized slightly posterior and lateral (Figure 1).
 - Although subtle VC abnormalities cannot be reliably appreciated with TLUS, specificity for detection of vocal fold paralysis VFP is comparable to FNE and the VC's are reportedly able to be visualized by TLUS 80-100% of the time.⁵
 - TLUS has less reliability in older and male patients due to thyroid cartilage calcification and subtle VC abnormalities such as sequelae of superior laryngeal nerve injuries and VC lesions and their composition (cystic versus solid), especially those < 3mm in size or those at the most anterior aspect of the VCs, are not well appreciated by TLUS.⁶⁻¹⁰

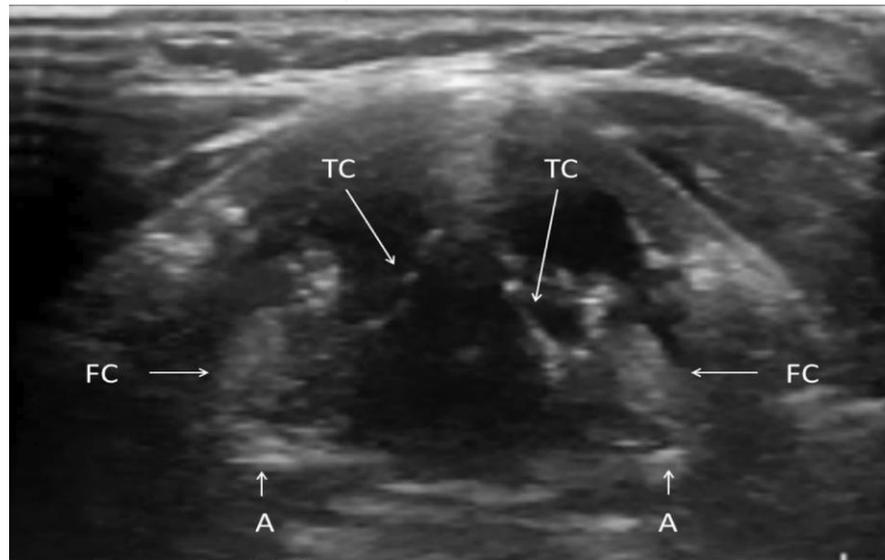


Figure 1: Laryngeal ultrasound.

TC True vocal folds, FC False vocal cords, A Arytenoid cartilage

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