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Ultrasound Identify Important Sonoanatomy of the Upper Airway

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Introduction

Ultrasound images of the infra-hyoid parameters correlate well with computed tomography scan. Hui demonstrated that the inability to visualize the hyoid bone using sublingual ultrasound predict di cult intubation with a high sensitivity and speci city. is method has a high-positive likelihood ratio of 21.6 and moderate negative likelihood ratio. Wotjzak found that the hyomental distance ratio in the morbidly obese patients can be a sensitive predictor of di cult laryngoscopy [1]. Patients with di cult intubation have shorter hyomental distance ratio of 1–1.05 as opposed to those belonging to the easy intubation group. Ezri showed that mean pre-tracheal tissue of 28 mm at the level of the vocal cords in obese patients indicate di cult laryngoscopy compared to 17.7 mm in easy ones. is technique is not reproducible by Komatsu et al. using similar methodology in di erent population [2]. Adhikari demonstrated in a pilot study that anterior neck thickness at the level of the hyoid bone and thyrohyoid membrane as compared to the vocal cords is a better predictor for di cult laryngoscopy. Pinto in a recent study found similar ndings using anterior neck thickness at the level of the thyrohyoid membrane [3]. Preliminary ndings showed promising results, but most of these studies were pilot studies and were limited by small study samples. More systematic studies and level one evidence are needed before this modality can be validated for routine screening [4]. Although many techniques have been recommended to verify endotracheal tube location, there is no single con rmatory method that is ideal in every situation [5]. Capnography is considered the standard of care for the primary veri cation of endotracheal tube location. Upper airway ultrasonography can also be advantageous in situations involving cardiovascular arrest, broncho-constrictions or circumstances in which capnography or end-tidal carbon dioxide measurement may be faulty. endotracheal tube position in trachea is seen as two hyperechoic lines which is described as double tract or double lumen sign. Chou utilizes a convex transducer in the suprasternal notch window, tracheal rapid ultrasound exam, for diagnosing esophageal intubation and demonstrated 98.9 % sensitivity and 94.1 % speci city for endotracheal tube utilizing this static transtracheal approach [6]. Adi showed that bedside upper airway ultrasound correlates well with waveform capnography. is research also shows very good agreement with kappa value of 0.85, between bedside upper airway ultrasound and waveform capnography, and a fast mean con rmation time of 16.4 s with a standard deviation of 7.3s [7]. Meta-analysis by Chou et al. suggested that in situations where capnography may be unreliable, ultrasonography can be a valuable adjunct in this aspect of airway assessment because ultrasonography has high diagnostic value for identifying esophageal intubation with optimal sensitivity and speci city [8]. Sitzwohl found that auscultation and chest rise during clinical assessment failed to detect up to 55 % of endobronchial intubations. A cadaver study by Uya showed that novice sonographers could accurately identify a saline in ated endotracheal tube cu at the level of the suprasternal notch [9]. Tessaro using tracheal rapid ultrasound saline test technique suggests that tracheal ultrasonography using a saline- lled endotracheal tube cu can accurately and rapidly distinguish between correct endotracheal versus endo-bronchial tracheal tube positions in children [10]. Wojtczak demonstrates that the replacement of air with saline in endotracheal tube, and the use of contrast agents enable detection of cu s in the airway. It also allows visualization of the surrounding structures and tissues as the ultrasound beam can be transmitted through the uid lled cu s without being re ected from air mucosal interface.

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Con ict of Interest

None

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