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### Airway and Lung Ultrasound

Airway evaluation has included technology and tools to improve the success rate on intubation and reduce airway complications. Utilization of upper airway point of care ultrasound (POCUS) assessment has distinct advantages. It is non-invasive, rapid, simple and providers can reliably, identify the vocal cords, the thyroid cartilage, epiglottis, cricoid cartilage, cricothyroid membrane, tracheal cartilage and the depth of these structures from the skin, can aide in routine and difficult intubations. External ultrasound evaluation can provide measurements such as 1.) Ultrasound distance from skin to the tongue base (which correlate with increasing Mallampati score<sub>1</sub>), 2.) Degree of glottic visualization and percentage of glottic, 3.) Ultrasound distance skin to cricoid cartilage, 4.) Hyoid -mental distance (<1.09 was a predictor of difficult intubation p value< 0.012). In addition, there is increasing appreciation for ultrasound utilization with invasive airway technique such as cricothyroidotomy, tracheostomy and retrograde tracheal techniques.

Lung and diaphragm POCUS assessment has been used to assess lung structure and function and to help navigate clinical decision making. While there are a wide range of pulmonary ultrasound evaluations, the core surveillance should include identification of landmarks and diagnostic finding such as the following: the pleural line, the bat sign, lung sliding , pneumothorax (seashore finding and lung point) , pleural effusion, normal lung parenchyma, lung consolidation, A-lines and B-lines and the diaphragm.

Understanding the benefits and limitations of lung ultrasound is essential. Realizing that lung ultrasound cannot exclude pulmonary pathology that does not extend to the pleural, it is diagnostic in some scenarios and contributory in others.

### References

1. Francesco, A, Giuseppe, A et.al., Ultrasound as a new tool in the assessment of airway difficulties: An Observational Study, European Journal of Anesthesiology (EJA) July 2019- Volume 36, Issue 7, pp509-515
2. Abraham, S, Himarani, S, et.al., Ultrasound as an Assessment Method in Predicting Difficult Intubation: A Prospective Clinical Study, Journal of Maxillofacial and Oral Surgery, December 2018, Vol 17, pp563-569
3. Gargani, L, Volpicicelli, How I do it: Lung Ultrasound, Cardiovascular Ultrasound 204, 12:25 <http://www.cardiovascularultrasound.com/content/12/1/25>