

**Supplementary Material 1.** A checklist for evaluating point-of-care ultrasound of the airway in image acquisition and identification

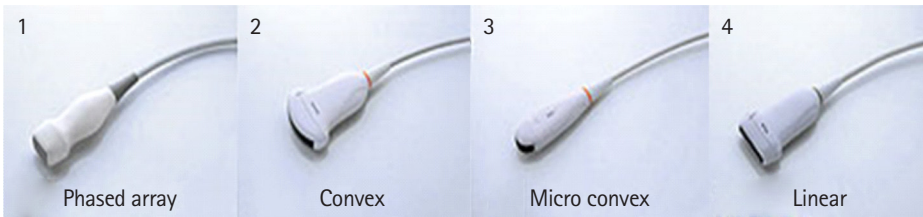
Ultrasound performance test			
Student Identification		Education data / group	

Transverse thyroid cartilage	S	F
Proper probe location – midline at the level of thyroid cartilage		
Proper probe direction – transverse and right-headed		
Image accuracy – arch of thyroid cartilage must be visible		
Transverse cricoid cartilage	S	F
Proper probe location – midline at the level of cricoid cartilage		
Proper probe direction – transverse and right-headed		
Image accuracy – arch of cricoid cartilage, reverberation of trachea must be visible		
Transverse below cricoid cartilage	S	F
Proper probe location – below cricoid cartilage and right-tilted		
Proper probe direction – transverse and right-headed		
Image accuracy – reverberation of trachea, concentric layers of esophagus must be visible		
Transverse above sternal notch	S	F
Proper probe location – above sternal notch and right-tilted		
Proper probe direction – transverse and right-headed		
Image accuracy – reverberation of trachea, concentric layers of esophagus must be visible		
Longitudinal CTM	S	F
Proper probe location – between the edge of thyroid cartilage and cricoid cartilage		
Proper probe direction – longitudinal and cephalad		
Image accuracy – thyroid cartilage and cricoid cartilage, hyperechoic CTM must be visible		
Longitudinal tracheal rings	S	F
Proper probe location – above sternal notch		
Proper probe direction – longitudinal and cephalad		
Image accuracy – “string of pearls” appearance of tracheal rings must be visible		

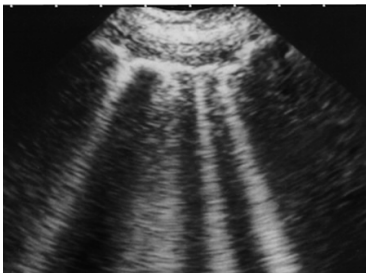
CTM, cricothyroid membrane; S, success; F, failure.

Supplementary Material 2. Questions for the pre- and post-test to assess cognitive skill

1. Which of following ultrasound transducers is the most commonly used for POCUS-A?



2. The following is a characteristic of the ultrasonic image caused by the difference in transmission of two adjacent media. What is the name of this phenomenon?



- 1) A-lines
- 2) Shred sign
- 3) Mirror image
- 4) Comet-tale sign

3. Which of the following ultrasound procedures is correct?

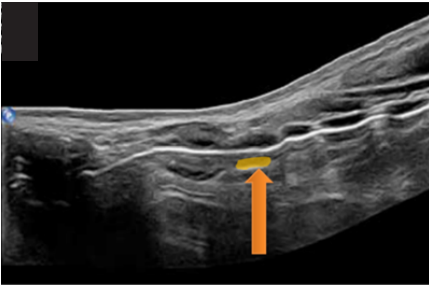
- 1) To identify the cricothyroid membrane, place a transducer on the jugular notch so that it is parallel to the clavicle.
- 2) To confirm the tracheal intubation, the transducer is placed in the center of the trachea parallel to the direction of trachea.
- 3) To confirm the tracheal intubation, place a transducer on the left side of the trachea vertical to the direction of trachea.
- 4) When an esophageal intubation is identified, fill the balloon of the endotracheal tube with water and confirm its depth with ultrasound.

4. What finding is seen on following video of ultrasound?



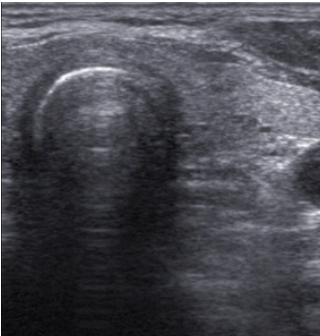
- 1) A successful intubation.
- 2) Pneumothorax is suspected.
- 3) The central vein catheter is inserted.
- 4) Esophageal intubation is suspected.

5. What structure or sign does the arrow point to?



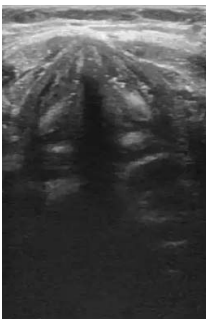
- 1) Ring down artifact
- 2) Side lobe artifact
- 3) Cricoid cartilage
- 4) Mirror image artifact

6. What would you do if you had seen the following video during tracheal intubation?



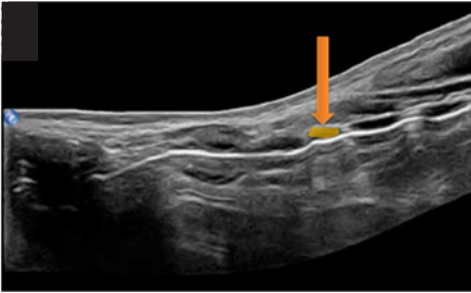
- 1) Fill the balloon of endotracheal tube with water and confirm its depth with ultrasound.
- 2) Remove the endotracheal tube and reattempt tracheal intubation.
- 3) Find the cricothyroid cartilage with a longitudinal view.
- 4) Consider chest tube insertion.

7. What would you do if you had seen the following image during tracheal intubation?



- 1) Slowly turn the transducer 90 degrees so that it is perpendicular to the direction of trachea.
- 2) Fill the balloon of the endotracheal tube due to successful intubation.
- 3) Move the transducer slowly toward the patient's chest.
- 4) Move the transducer slowly toward the patient's head.

8. What structure does the arrow point to?



- 1) Rib
- 2) Strap muscle
- 3) Cricoid cartilage
- 4) Tracheal ring

9. What structure does the arrow point to?

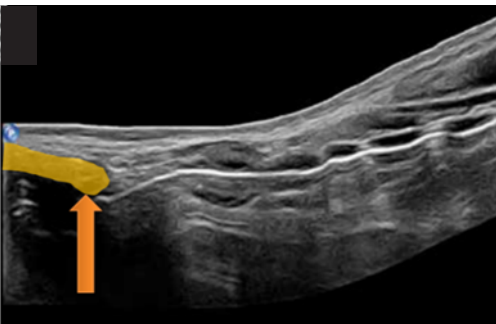


- 1) Anterior strap muscle
- 2) Vocal cord
- 3) Thyroid cartilage
- 4) Tracheal ring

10. What is the illusion that occurs between an object with a very strong acoustic reflection interface like the diaphragm, pleura, pelvic cavity and the actual mass?

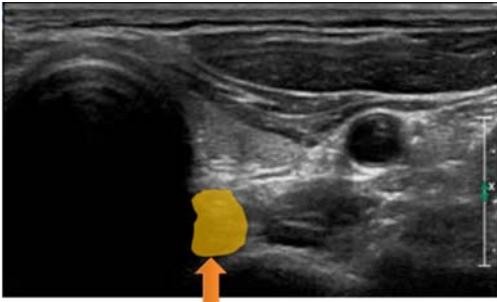
- 1) Mirror image artifact
- 2) Ring-down artifact
- 3) Beam thickness artifact
- 4) Side lobe artifact

11. What structure does the arrow point to?



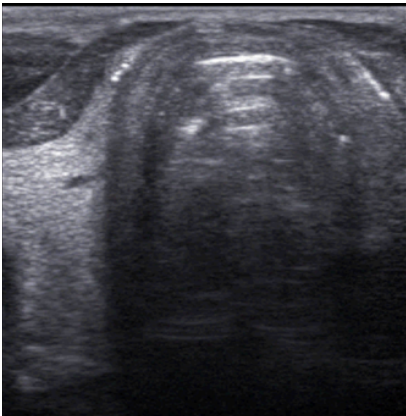
- 1) Mandible
- 2) Hyoid bone
- 3) Thyroid cartilage
- 4) Cricoid cartilage

12. What structure does the arrow point to?



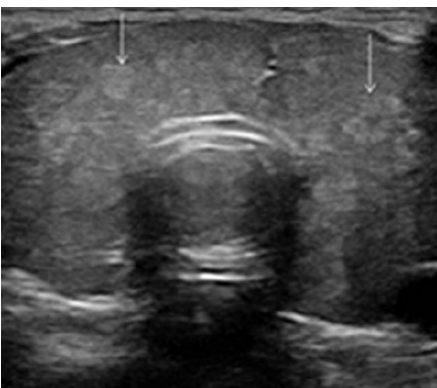
- 1) Carotid artery      2) Jugular vein      3) Esophagus      4) Mirror image artifact

13. What would you do if you had seen the following video during tracheal intubation?



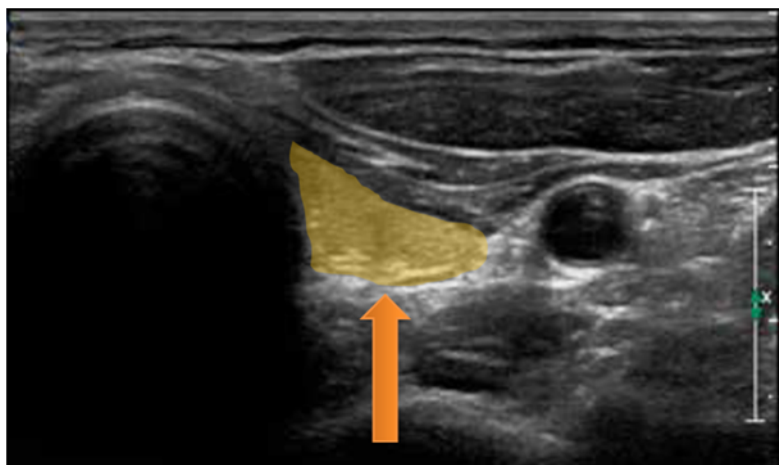
- 1) Fill the balloon of the endotracheal tube with water and confirm its depth with ultrasound.
- 2) Remove the endotracheal tube and reattempt tracheal intubation.
- 3) Find the cricothyroid cartilage with a longitudinal view.
- 4) Consider chest tube insertion.

14. What would you do if you had seen the following image during tracheal intubation in patients with dyspnea requiring tracheal intubation?



- 1) Carefully attempt an endotracheal intubation.
- 2) Consult an airway management specialist immediately.
- 3) Perform cricothyrotomy because endotracheal intubation is dangerous.
- 4) Observe with administering oxygen with facial mask because endotracheal intubation is dangerous.

15. What structure does the arrow point to?



- 1) Thymus      2) SCM muscle      3) Thyroid      4) Reflection artifact