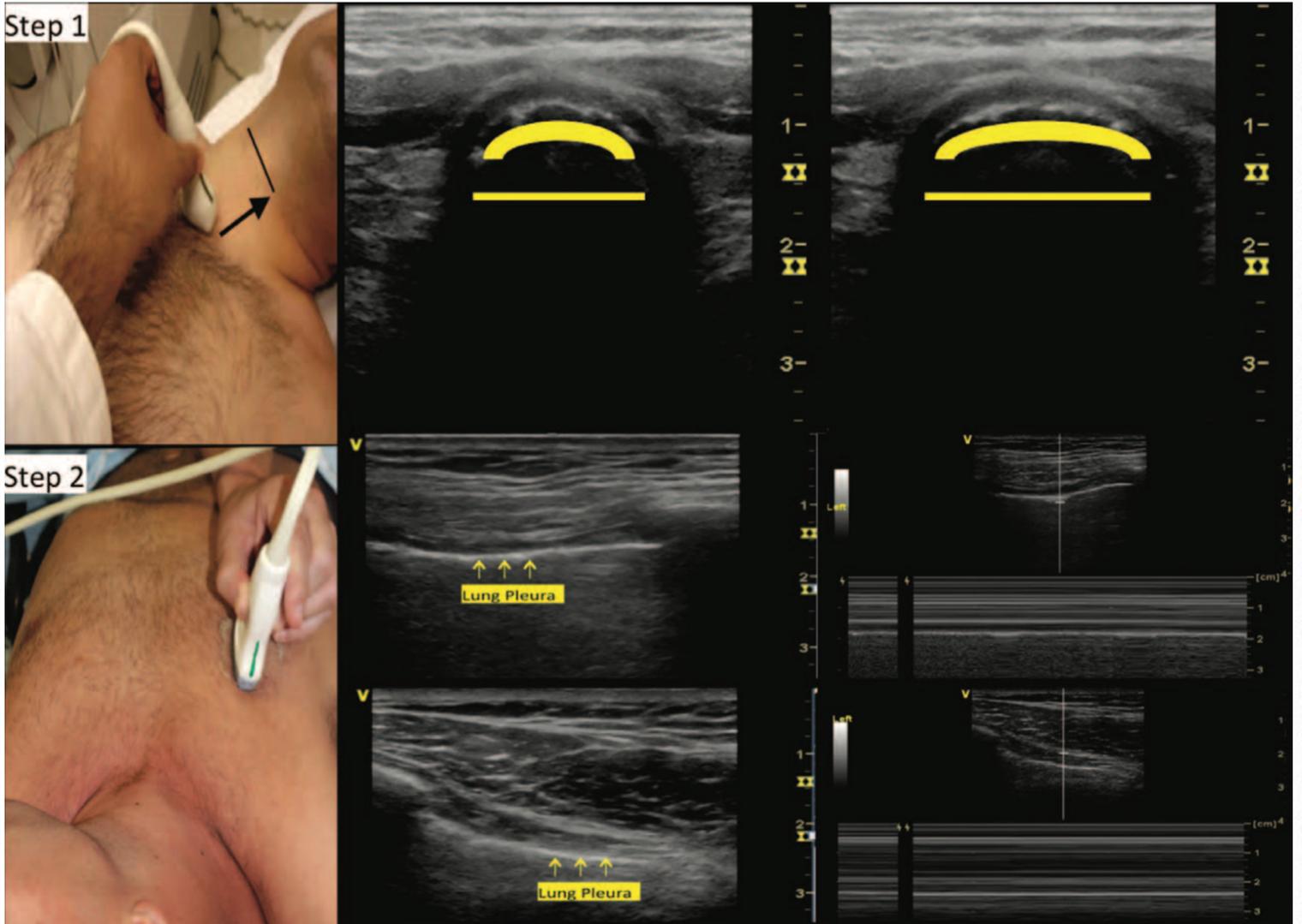


# 16

## Ultrasound for Identification of Successful Endotracheal Tube Placement & Position



## V. Additional Topics – Identification of Successful ET Placement And Cuff Location

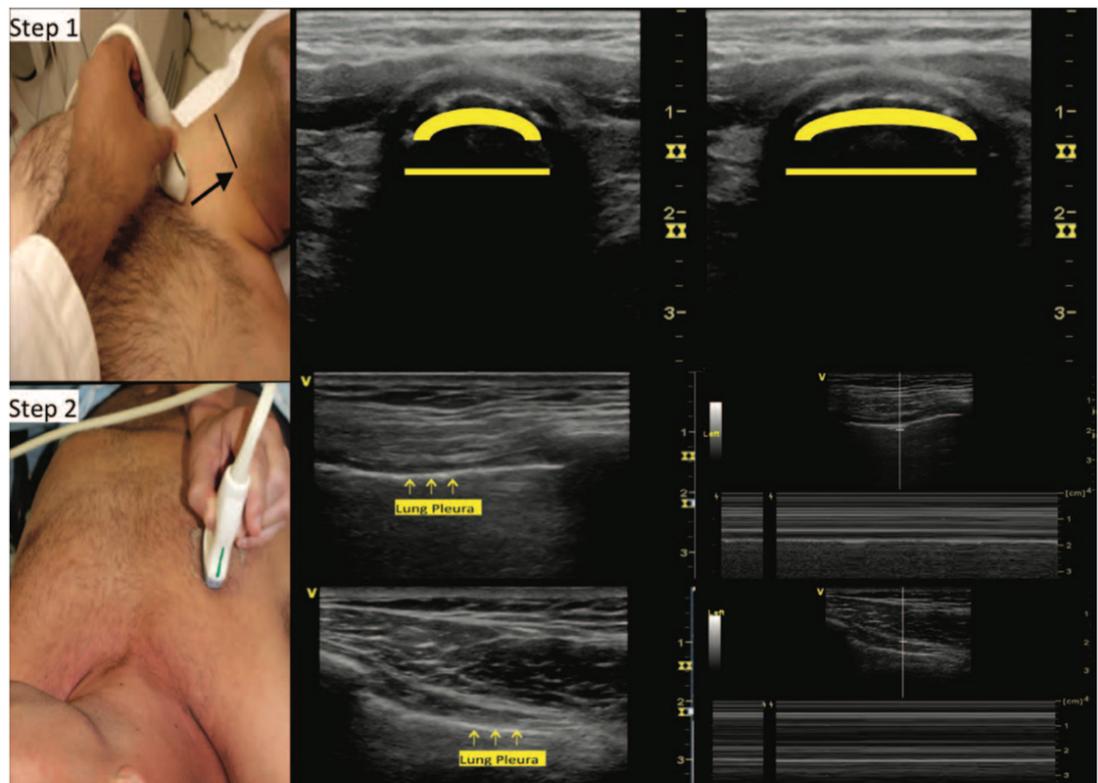
**Ultrasound for Identification of Successful ET Placement:** Esophageal intubation is one of the main causes of accidents leading to death or neurologic damage. Direct visualization of the tracheal tube passing through the glottis is often applied in practice, but it is not always possible to see the glottis, especially if intubation is difficult. Recently, POC US has been proven to reliably detect successful trachea intubation as well as identify unwanted esophageal intubation with 100% sensitivity and specificity.

**Probe type:** high frequency linear probe only

**Image acquisition:** Place the ultrasound probe transversely on the anterior neck just superior to the suprasternal notch **BEFORE** tracheal intubation (see pic below). When the tracheal tube passes through the trachea, a hyperechoic shadow, or comet sign, is shown deep in the trachea. Esophageal intubation is much more striking because one sees it being opened by the tracheal tube

**ETT Location within the Trachea:** One can identify the location of the ETT by placing the ultrasound probe transversely on the anterior neck approx. 2 cm superior to the suprasternal notch and scanning (cranially / caudally ) to cricothyroid membrane.

During this exam one will deflate and inflate ETT to examine for tracheal dilation . Then one can examine the lung pleura to also assess for bilateral equal pleural lung sliding. In this examination it is the **absence** of tracheal dilation with cuff inflation that is concerning for deep ETT position (at risk for main stem intubation) and one can examine for pleural sliding to see if the ETT is likely main-stemmed (lack of lung sliding would indicate main-stem on the opposite side).



**Fig. 1.** Pulmonary tree and Lung expansion Ultrasound Study examination. Step 1: tracheal dilation assessment—ultrasound probe placed transversely on the anterior neck approximately 2 cm superior to the suprasternal notch and scanned cranially to the cricothyroid membrane. The marker for endotracheal cuff is tracheal dilation with balloon inflation. The image on the *left* in step 1 shows a nondilated trachea, and the one on the *right* shows a dilated trachea secondary to balloon inflation. Absence of tracheal dilation suggests that the endotracheal cuff is not in the area examined. Step 2: pleural sliding assessment—ultrasound placed vertically on the anterior chest at the third rib space midclavicular line bilaterally. Assessment of lung expansion evaluated by the detection of the horizontal movement of the two pleural linings with respiration. Use of M-mode facilitates pleural sliding assessment. The *top* image for step 2 examination shows normal pleural sliding verified with M-mode identification of pleural motion. The *bottom* image for step 2 examination shows absence of pleural sliding verified with no motion identified with M-mode.