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CLINICAL IMAGES

Next generation in ultrasound imaging to assess upper airway

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Point of Care Ultrasound (POCUS) is well established in anesthetic practice but underused for and during airway management. In addition to 2D images, three/four Dimensional (3D/4D) ultrasound technology provides clearer and more accurate imaging for airway, and additional visual information to diagnose potential pathological conditions more efficiently.[1] Moreover, POCUS facilitates rapid screening for possible difficult laryngoscopy[2] and identification of the cricothyroid membrane.[3] We present a complete four-step upper airway assessment in 2D (Column 1) images and the correspondence with 3D/4D images (Column 2), and the position for ultrasound probe (Column 3).

Figure 1 shows four-step measurements of ultrasound parameters that assess upper airway anatomy suggesting difficult laryngoscopy. Picture 1a and 1b corresponds to Hyomental Distance (HMD) in Midline Sagittal Plane (MSP); Picture 2a and 2b is the Distance from Skin to Hyoid bone (DSH) in Transversely Plane (TP); Picture 3a and 3b shows the Distance from Skin to Epiglottis (DSE) in TP; Picture 4a and 4b displays the Distance from Skin to Vocal Cords (DSVC) in TP.

Figure 2 shows four-step tracheal structures to identify the cricothyroid membrane. Pictures 1a and 1b corresponds to Cricoid cartilage in TP; Pictures 2a and 2b, to tracheal rings in TP; Pictures 3a and 3b, to Cricoid cartilage and tracheal rings in MSP and Pictures 4a and 4b, to cricothyroid membrane in MSP.

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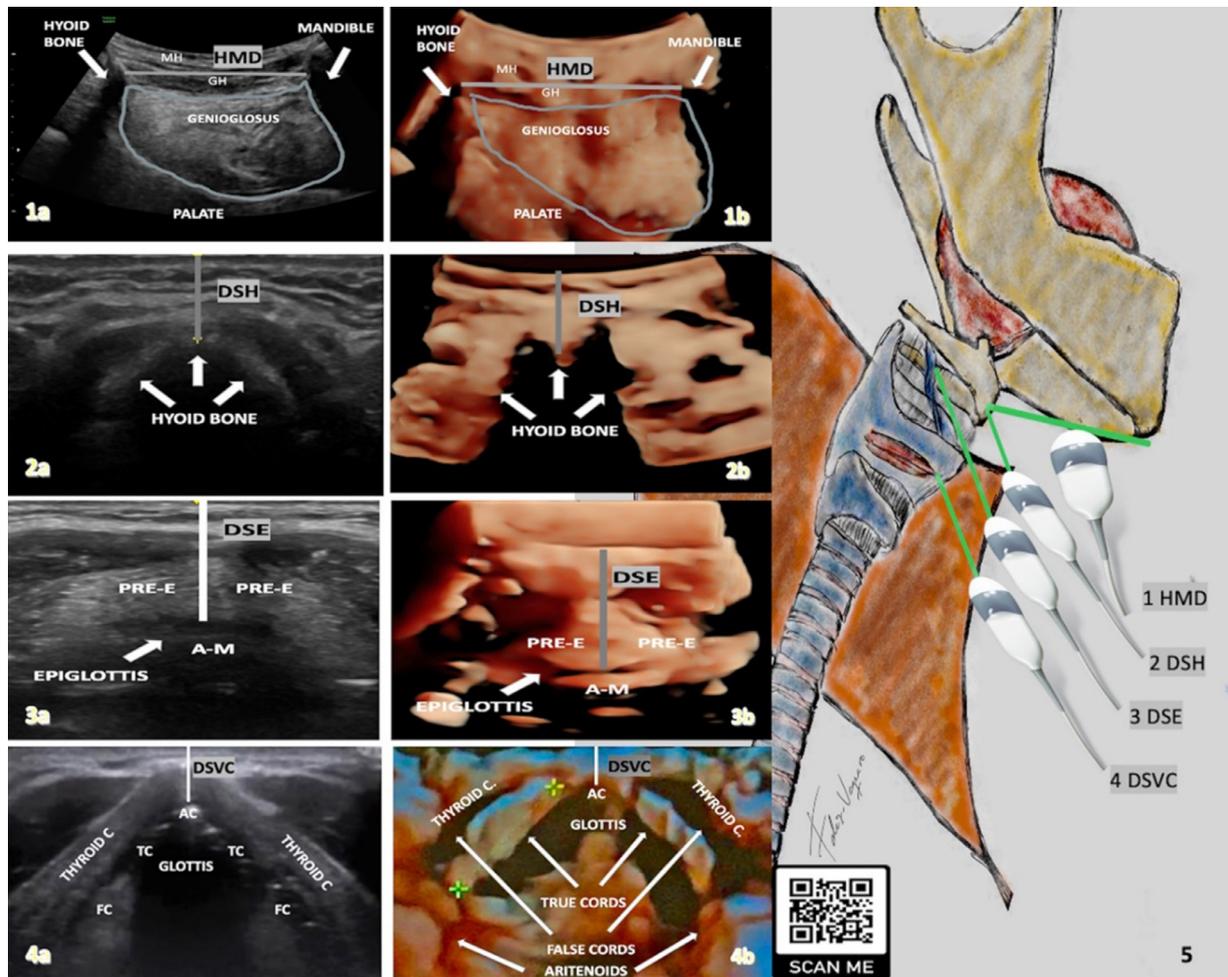
Figure 1 Four-step measurements of ultrasound parameters that assess upper airway anatomy suggesting difficult laryngoscopy. Column 1: 2D images; Column 2: 3D/4D images. Gained from a Voluson Swift ultrasound machine and a Convex Array Volume Probe (GE; Little Chalfont, UK). QR available. Picture 1a/b Midline sagittal scan of Hyomental Distance (HMD); Hyoid bone; Mandible; Genioglossus muscle; Palate; Mylohyoid Muscle (MH) and Geniohyoid Muscle (GH). Picture 2a/b transverse midline scan of Distance from Skin to hyoid bone (DSH) and Hyoid bone. Picture 3a/b transverse midline scan of Distance from Skin to Epiglottis (DSE); Pre-Epiglottic Space (PRE-E); Epiglottis and Air-Mucosa interface (A-M). Picture 4a/b transverse midline scan of Distance from Skin to Vocal Cords (DSVC); Anterior Commissure (AC); True Cords (TC); False Cords (FC); Arytenoids and Thyroid cartilage. Picture 5 the position of the ultrasound probe for pictures 1-2-3-4 respectively.
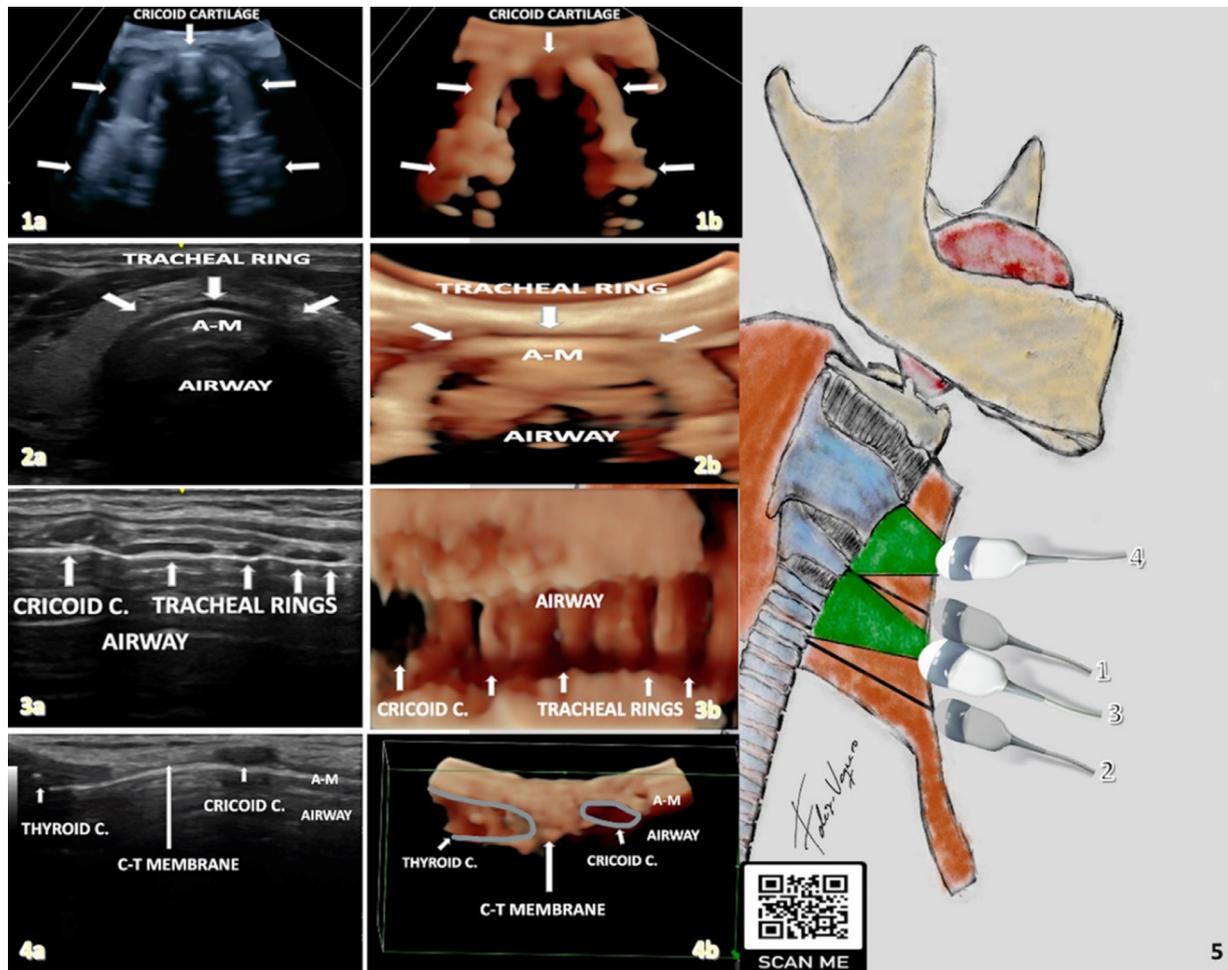
Figure 2 Four-step tracheal structures to identify the cricothyroid membrane. Column 1: 2D images; Column 2. 3D/4D images. Gained from a Voluson Swift ultrasound machine and a Convex Array Volume Probe (GE; Little Chalfont, UK). QR available. Picture 1a/b transverse midline scan of Cricoid cartilage. Picture 2a/b transverse midline scan of a tracheal ring; Airway and Air-Mucosa interface (A-M). Picture 3a/b midline sagittal scan of Cricoid cartilage; Tracheal rings and airway. Picture 4a/b midline sagittal scan of Thyroid Cartilage (Thyroid C.); Cricothyroid Membrane (C-T Membrane); Cricoid cartilage (Cricoid C.); Airway and Air-Mucosa interface (A-M). Picture 5 the position of the ultrasound probe for pictures 1-2-3-4 respectively.

Presentation

The images have been accepted for presentation at Euroa-naesthesia (June 2022 Milan, Italy), the annual conference of ESAIC (European Society of Anaesthesiology and Intensive Care).

Conflicts of interest

The authors declare no conflicts of interest.

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Supplementary materials

Supplementary material associated with this article can be found in the online version at doi:10.1016/j.bjane.2022.05.008.

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