

## Use of Ultrasound for the Evaluation of the Air Road in the Obese Patient

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In the operating rooms, the availability of ultrasounds that are useful for hemodynamic monitoring, for the approach of vascular access and for regional anesthesia, as well as other uses that the anesthesiologist usually gives to the benefit of anesthetized patient; one of those uses that can be very useful is the evaluation of the airway to detect predictors that lead to a difficulty in addressing it, especially in patients with risk factors such as the obese patient who has an index body mass of 30 to 39 kg/m<sup>2</sup> and morbid obesity which is defined as one that has a body mass index greater than 40 or 35 when associated with other comorbidities [1,2]. The obese patient involves a challenge for the anesthesiologist, one of the main challenges involves the airway and its total control since it has been reported that the incidence of difficult airway (DAW), both In the operating room as in the ICU when it comes to the obese patient it is considerably high, the airway predictors that are normally associated with this are the presence of Mallampati grade III or IV, obstructive sleep apnea and limited cervical spine mobility [3].

A difficult intubation is defined as the performance of three or more attempts to place the endotracheal tube without success with conventional laryngoscopes, more than 10 minutes trying to place the endotracheal tube or both, it is even accepted that after three unsuccessful laryngoscopy attempts A fourth attempt by a more experienced colleague, however, if not achieved, must be declared a failed intubation and implement a plan B [3,4].

Ultrasound of the upper airway can provide a lot of anatomical information that would not be evident in the clinical examination, so it can be used to predict the difficulty of the airway prior to anesthetic induction, the anatomical structures observable by tomography can also be identify by ultrasound, such as epiglottis, thyroid cartilage, cricoid cartilage, cricotorioid membrane, vocal cords, to name a few, knowledge of this sonoanatomy facilitates the evaluation of the anatomy of the airways to predict difficult airway or to predict stridor post extubation [5,6]. In places where ultrasound is available in the operating rooms its use is recommended dynamically to obtain the maximum benefit in the management of the airway, that is to say immediately before to predict conditions that affect airway management, correct placement of the endotracheal tube and the confirmation of adequate bilateral ventilation by the presence of pleural slippage [7].

The identification of anatomical structures of the airway by ultrasound is a dependent operator; however the learning curve is considered short. For the evaluation of the airway a linear transducer is used and basically 3 planes are identified: sagittal, parasagittal and transverse [8]. One of the ultrasound measurements mentioned in the literature are useful for predicting a difficult airway, it is the measurement of pretracheal fat which can be performed in three different areas called 1, 2 and 3, the ideal and recommended it is the zone 1 corresponding to a transverse window at the level of the vocal cords (Figure 1), once the vocal cords are identified, the anteroposterior diameter is measured in the midline from the skin to the tracheal cartilage (Figure 2), combined with a measurement at 15 mm lateral to the right and to the left, adding the three values obtained if it exceeds 28 mm in a patient with a neck circumference greater than 50 cm

and with a BMI greater than 35 kg/m<sup>2</sup>, a VAD understood as a visualization of the Cormarck-Lehane can be predicted of 3 or 4 in 70% of the cases according to a study conducted by Ezri., *et al.* in this way a close correlation was observed between the thickness of this pretracheal area and the performance of a laryngoscope difficult, the range related to this is 24 - 32 mm, therefore this measurement could be used in patients with body mass indexes greater than 30 kg/m<sup>2</sup> in order to anticipate a difficult airway [9,10].

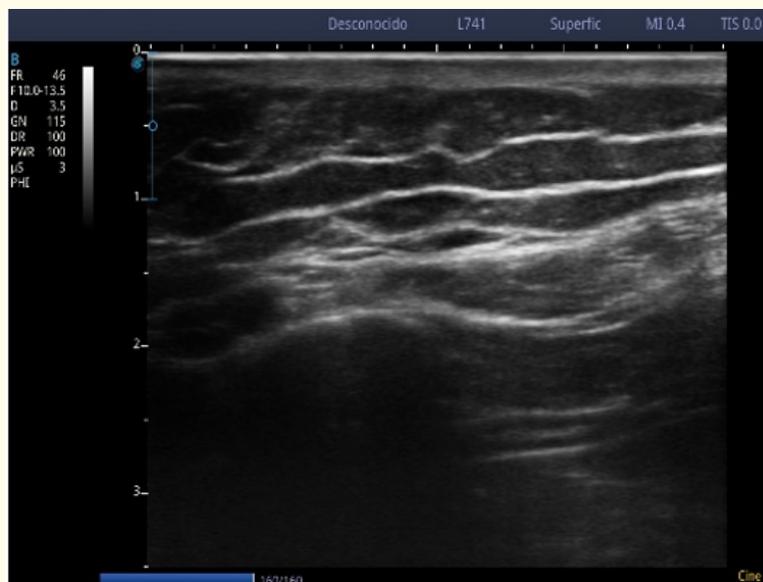


Figure 1



Figure 2

Likewise, as part of the assessment prior to the anesthetic procedure, the cricothyroid membrane can be identified by ultrasonographic scanning as a previous step to the management of a DAW, even recommending marking on the skin the exact point to puncture in case of access to emergency [11,12]. It is also possible to assess the correct placement of the endotracheal tube after intubation mainly in obese or pregnant patients in whom due to anatomical changes of pregnancy frequently occur with DAW, the correct positioning of the endotracheal tube is by the identification of the sign of the Bullet that is nothing more than the change in the morphology in the vocal cords from triangular to circular and the sign of pleural slip which is detected by scanning both pulmonary fields with a sectorial or linear transducer looking for bilateral pleural slip corresponding to the line formed by the union and the sliding between the parietal and visceral pleura that is generated in each respiratory cycle (Figure 3), this technique shows greater speed and accuracy to corroborate the correct endotracheal intubation in relation to pulmonary auscultation in the overweight patient and obesity so it is advisable to look for these signs later to intubation [13,14].



**Figure 3**

The use of ultrasound for the evaluation of the airway before and after the anesthetic induction, is very useful to prevent emergency situations related to the total control of the airway, thus offering greater safety to patients with an index of high body mass, therefore, it is necessary that we all have the necessary knowledge to analyze the airway of patients with obesity and overweight by ultrasound.

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