



M.G. VANNINI
OSPEDALE RELIGIOSO
CLASSIFICATO ACCREDITATO
ISTITUTO FIGLIE DI SAN CAMILLO

Gli ultrasuoni nella Gestione delle Vie Aeree



Dott. Pasqualino Volturo
Direttore U.O.C Anestesiologia e Rianimazione

DICHIARAZIONE CONFLITTO DI INTERESSI

In qualità di docente/relatore/tutor, ai sensi dell'art. 3.3 sul Conflitto di Interessi, pag. 18,19 dell'Accordo Stato-Regione del 19 aprile 2012, per conto del Provider SIAARTI ID 205

dichiaro

che negli ultimi due anni non ho avuto rapporti anche di finanziamento con soggetti portatori di interessi commerciali in campo sanitario.

El-Ganzouri et al.

Preoperative airway assessment: predictive value of a multivariate risk index.

Anesth Analg 1996; 82: 1197-204

Table 4 El-Ganzouri score

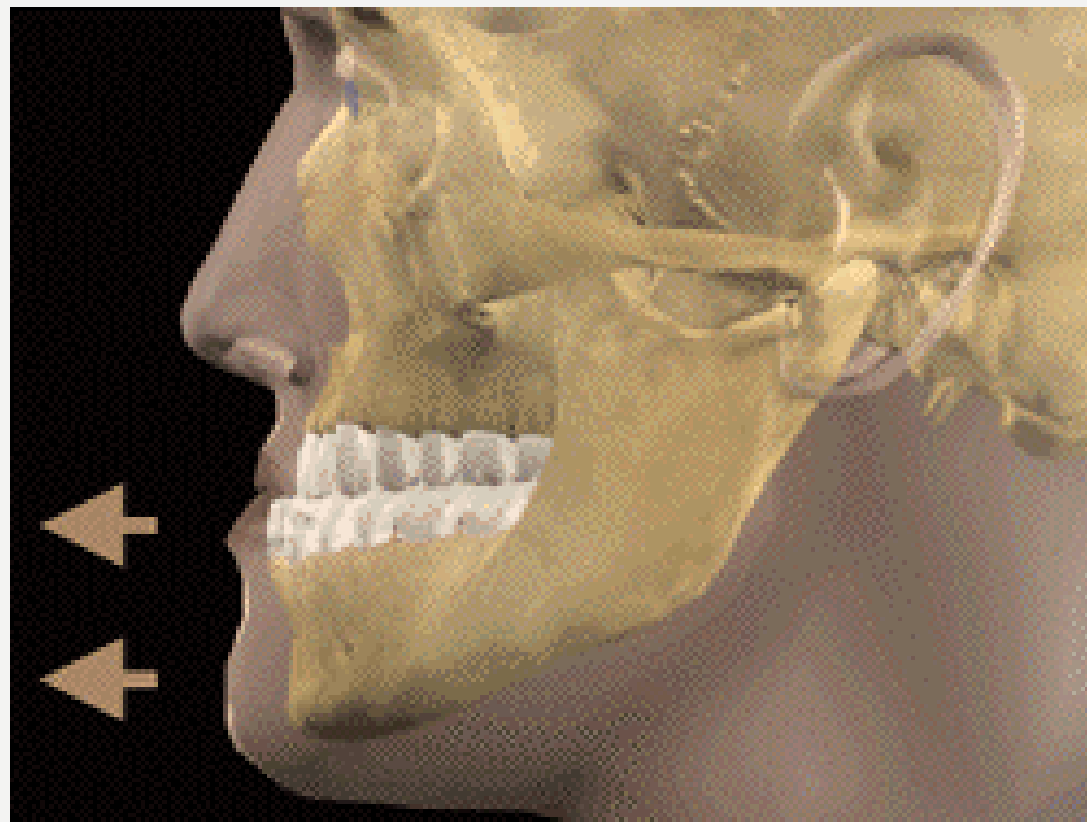
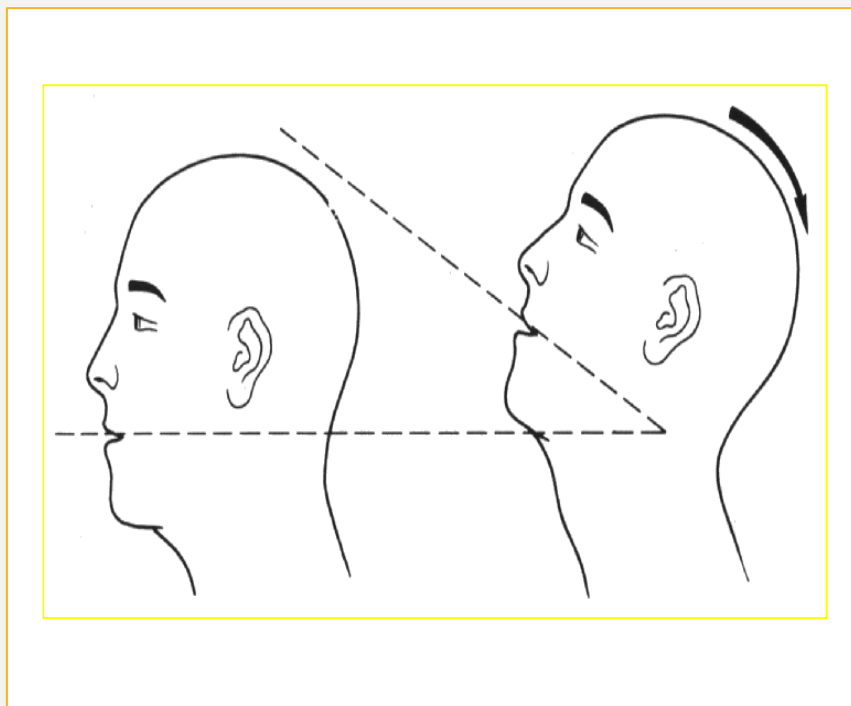
Criterion	Score 0	Score 1	Score 2
Weight (kg)	< 90	90 to 110	> 110
Head and neck mobility (°)	< 90	90 ± 10	< 80
Mouth opening (cm)	≥ 4	< 4	
Subluxation > 0	Possible	Not possible	
Thyromental distance (cm)	> 6.5	6 to 6.5	< 6
Mallampati classification	1	2	3
History of difficult intubation	no	possible	established

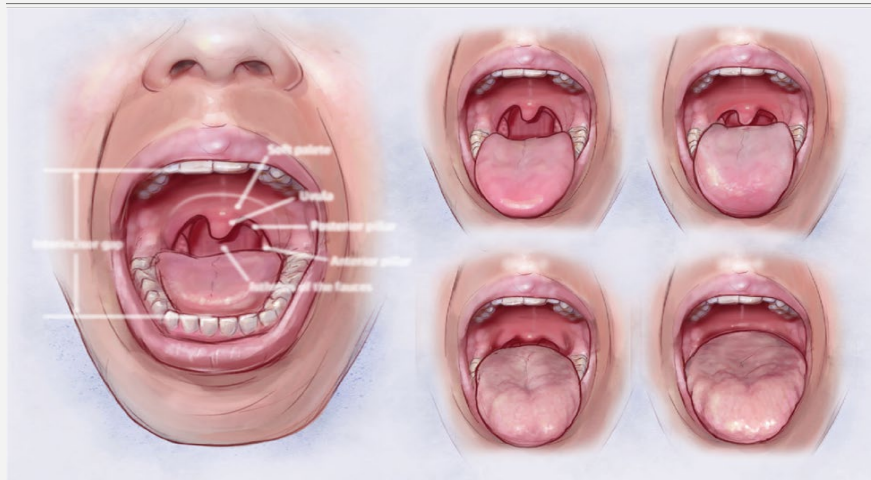
Modified from El-Ganzouri et al.⁴⁷⁰

Weak Chin

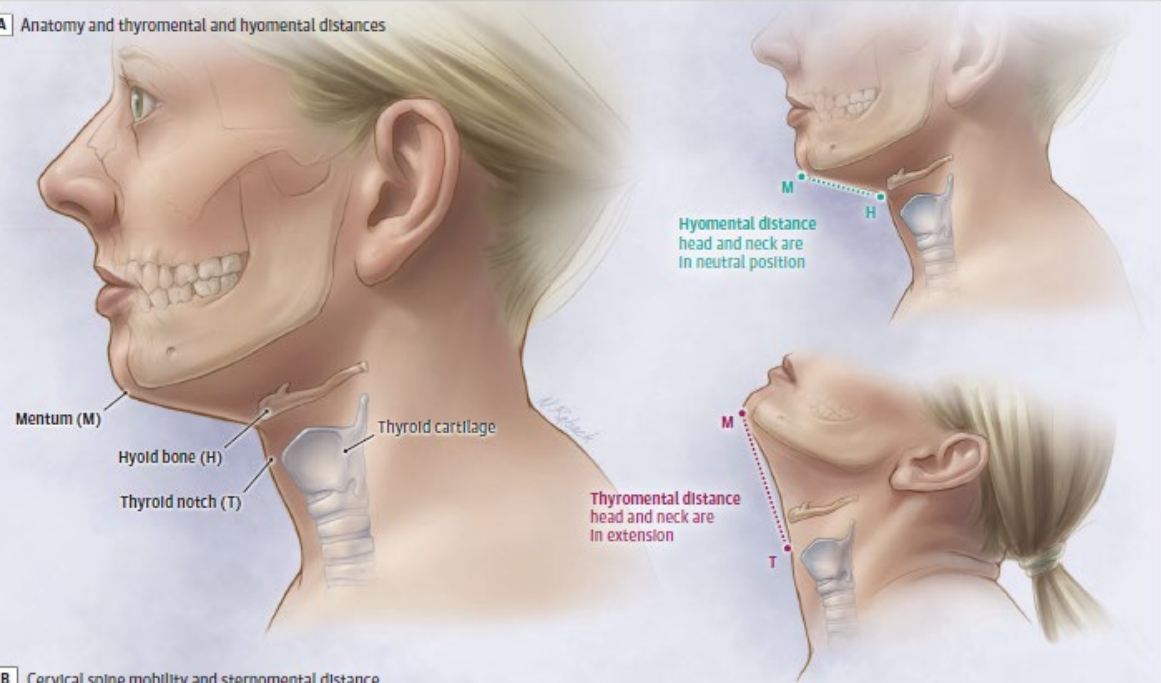


Functional test

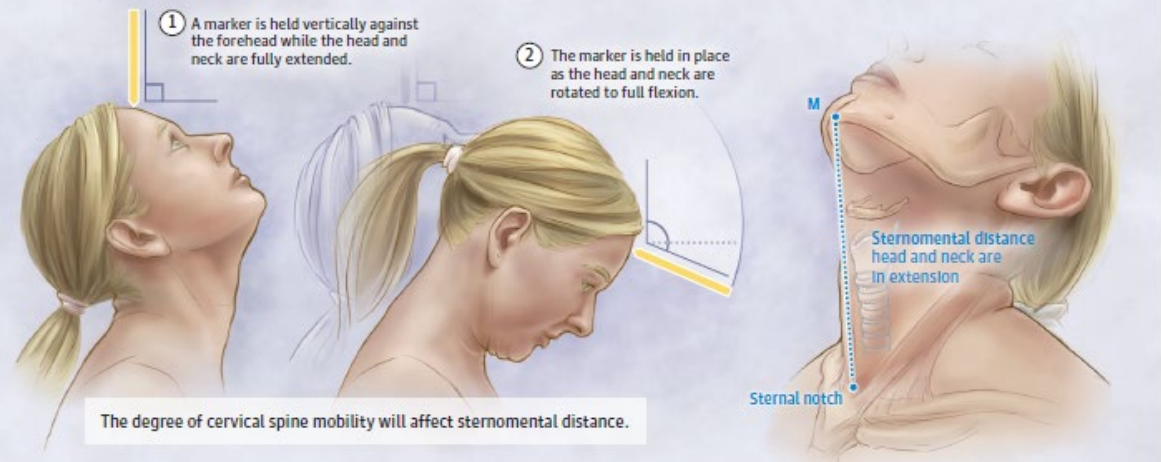




A Anatomy and thyromental and hyomental distances



B Cervical spine mobility and sternomental distance



The degree of cervical spine mobility will affect sternomental distance.

DIFFICOLTA' INTUBATORIA PREVISTA SU 1 SOLO PARAMETRO

CRITERI ASSOLUTI

- 1. MALLAMPATI 4 (con fonazione)***
- 2. TIRO-MENTONIERA < 6 cm***
- 3. INTERINCISIVA < 3 cm (INTERINCISIVA < 2 cm = standard impossibile)***
- 4. COLLO RIGIDO IN FLESSIONE***
- 5. PROGNA TISMO MASCELLARE 1 cm (non correggibe)***

DIFFICOLTA' VENTILATORIA IN MASCHERA FACCIALE

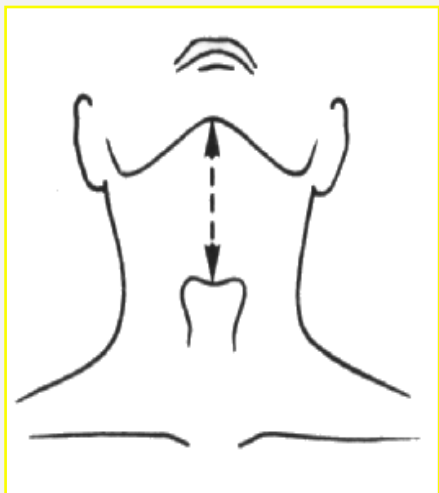


CRITERI DI PREVISIONE

Mallampati 4

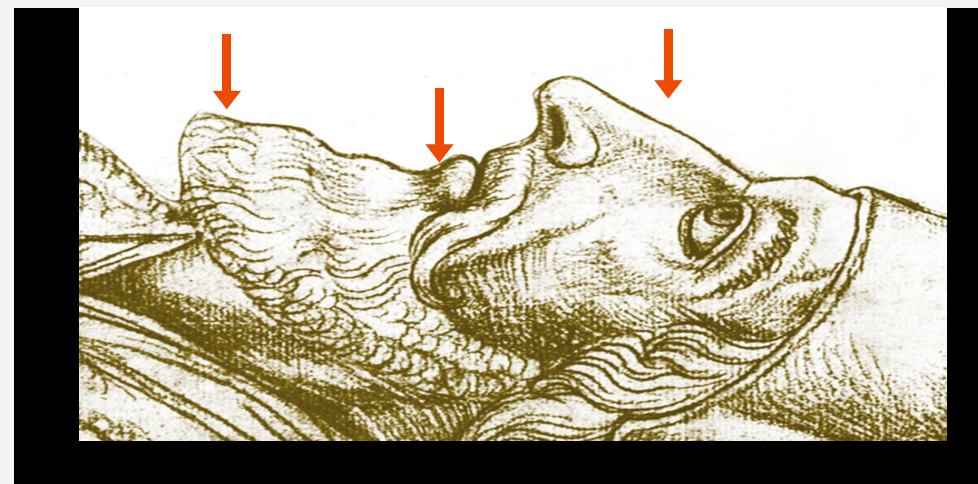
Russamento e sleep apnea

Presenza di barba Edentulia Naso grosso



***DISTANZA
DI PATIL***

Obesità



Dati epidemiologici

Una ventilazione in maschera difficile si associa spesso ad una difficoltà di intubazione

(rischio di ID 4 volte superiore, di IT impossibile 12 volte superiore)

Prediction of difficult mask ventilation. *Anesthesiology* 2000, 92:1229-36. Langeron o et al.

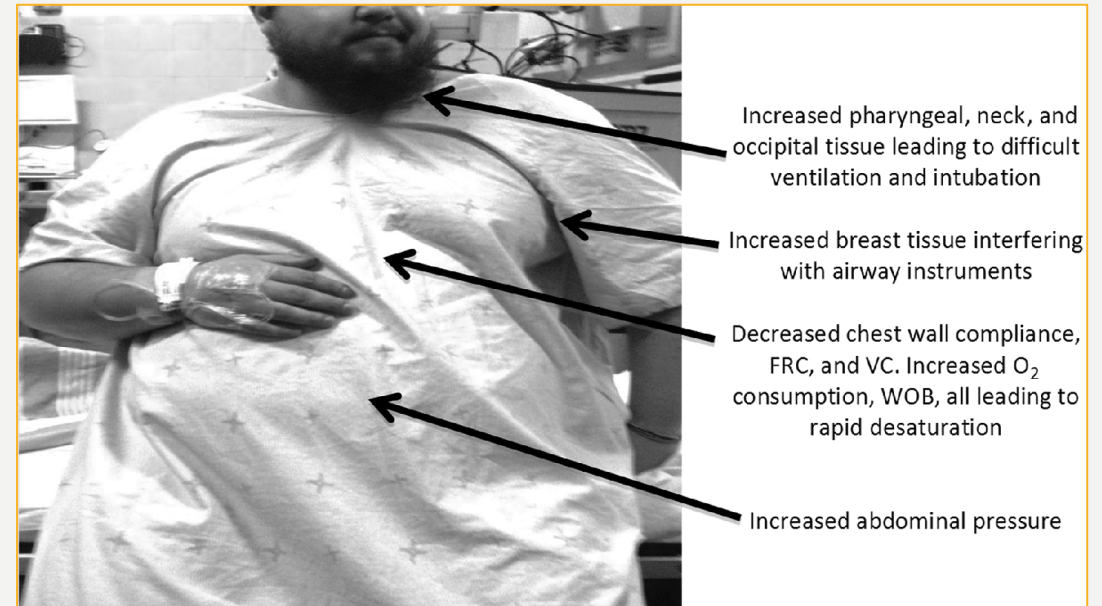
Specific indexes for obese patients

➤ **Neck circumference 41 cm/43 cm**

➤ **Waist to hip ratio > 0,8/0.9**

➤ **STOP-BANG >5**

➤ **BMI >50**



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Minerva Anestesiologica 2017 November;83(11)

Obesità e buone pratiche cliniche perioperatorie/ periprocedurali: Consensus SIAARTI 2016

A cura di: Ida DI GIACINTO ¹, Rita CATALDO ², Clelia ESPOSITO ³, Flavia PETRINI ⁴,
Paolo PELOSI ⁵, Guido MERLI ^{6,7}, Massimiliano SORBELLO ^{8,9}
per la Obesity Task Force del Gruppo di Studio SIAARTI Gestione delle Vie Aeree

OBSITA' E BUONE PRATICHE CLINICHE PERIOPERATORIE/ PERIPROCEDURALI

VALUTAZIONE PREOPERATORIA

S	SNORING (RUSAMENTO): Russa sonoramente (tanto forte da essere sentito attraverso le porte chiuse o il suo partner la sveglia durante la notte?)
T	TIFED (STANCHEZZA): Si sente spesso stanco, affaticato o assonnato durante il giorno (es: abbastanza stanco da addormentarsi mentre guida?)
O	OBSERVED (OSSERVAZIONE): Qualcuno ha osservato che smette di respirare o soffoca/rimane senza fiato durante il sonno?
P	PRESSURE (PRESSIONE): E' iperteso o assume terapia antiipertensiva?
B	BM: Indice di massa corporea superiore a 35 kg/m ² ?
A	AGE (ETA'): Età > di 50 anni?
N	NECK (COLLO): Il collo (misurato al pomo d'Adamo) è grosso? Per gli uomini: il collo della sua camicia misura 43 cm o più? Per le donne: il colletto della sua camicia misura 41 cm o più?
G	GENDER (SESSO): Maschile?

<5

≥5

IN CASO DI UNO PIU' DEI SEGUENTI:

NO	METs ≤ 4 ECG PATOLOGICO CARDIOPATIA IPERTENSIVA/ISCHEMICA SpO ₂ < 94% IN ARIA AMBIENTE ASMA - EPOC (poco controllata), WHEEZING PREGRESSA TVP PREGRESSA EP
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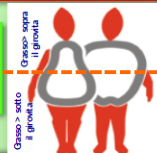
SE NECESSARIO CONSIDERARE:

- Consulenza pneumologica e/o cardiologica (LEGRE 2014)
- Eccardiogramma
- Emogasanalisi
- Polisomnografia
- nCPAP domiciliare

Anestesta con competenze specifiche - Team esperto
Se chirurgia maggiore: elevare il livello di assistenza

OBSITA' PERIFERICA (PERA)

valutare la comorbidità



OBSITA' CENTRALE (MELA)

- RISCHIO MAGGIORE:**
- Complicanze cardiocircolatorie / TVP-EP
 - Sindrome metabolica
 - Ventilazione difficile
 - Possibile intubazione difficile

SICUREZZA DELLE VIE AEREE

INDICATORI DI RISCHIO STANDARD
Manuale Ministeriale per la Sicurezza in Sala Operatoria
SIAARTI «Raccomandazioni per la gestione delle vie aeree» (2005)

INDICATORI DI RISCHIO SPECIFICI:
Circonferenza collo cm: D > 41 - U > 43
OSA (nota o sospetta) - OHS
WHR: D > 0.8 - U > 0.9

PIANIFICARE una STRATEGIA di GESTIONE DELLE VIE AEREE in caso di:
Difficoltà di ossigenazione, di ventilazione, di laringoscopia

ESTUBAZIONE IN SICUREZZA

VALUTARE LE ATTREZZATURE E LE COMPETENZE DEL TEAM
PIANIFICARE IL PERCORSO CLINICO-ASSISTENZIALE
MIGLIORARE L'APPROCCIO MULTIDISCIPLINARE
REGISTRARE SULLA DOCUMENTAZIONE CLINICA I DATI E LE STRATEGIE ATTUATE

VALUTARE idoneità per Day Surgery

Procedere **SEMPRE** in MAC

PREVEDERE **ALERT** PER MODULARE IL LIVELLO DI ASSISTENZA

GESTIONE INTRAOPERATORIA

DOTAZIONI SPECIFICHE

- Letto, sedia a rotelle, barella e tavolo operatorio adeguati e con supporti specifici (per dimensione e peso) - pedana per l'Anestesia
- Dispositivi di movimentazione - personale in numero adeguato per posizionamento e trasporto
- Presidi anti-decubito/anticaduta appropriati - indumenti adeguati (per dimensioni) per il rispetto della dignità dei pazienti
- Bracciole per NBP di misura adeguata - aghi lunghi per accessi vascolari e/o ALR
- Presidi per posizione ramped - presidi per vie aeree difficili (presidi extraglottici di 2^a generazione - VDL - FBS - introduttore - scambiatubi - set orotracheali)
- Monitoraggio: NMB - EtCO₂ (anche per NORA) - considerare il monitoraggio della profondità dell'anestesia (rischio awareness)
- Ventilatore che consenta tecniche controllate, assistite o spontanee con PEEP/CPAP
- Presidi a compressione intermittente per profilassi della TVP
- Disponibilità di emergenza

POSIZIONE RAMPED

(trago alivello dello stomo)
per inalazioni/intubazioni/estubazione



GESTIONE DELL'ANESTESIA

- Valutare profilassi antiacido, antiemetica ed antibiotica
- Monitorare: glicemia - temperatura -olemia
- Prevenire le lesioni da decubito: se possibile, far posizionare il paziente da solo sul letto operatorio
- Valutare se utilizzare presidi alternativi al tubo endotracheale
- Pianificare la strategia in caso di difficoltà di gestione delle vie aeree
- Valutare il rischio delle procedure in analgesedazione e respiro spontaneo (apnea)
- Posizione ramped per preossigenazione (± THRIVE nCPAP/NPV in maschera) e per intubazione
- Minimizzare il tempo di apnea durante l'induzione per evitare la desaturazione
- Passare rapidamente alla fase di mantenimento (rischio awareness)
- Impostare ventilazione protettiva
- Pri vilegiare farmaci a breve durata d'azione - analgesia multimodale
- Considerare blocco neuromuscolare profondo - monitoraggio NMB
- Applicare una strategia di estubazione protetta (includendo posizione semi-seduta 25-30°)

Privilegiare tecniche chirurgiche MINI-INVASIVE

CONSIDERARE SPECIALI PRECAUZIONI PER LA PAZIENTE OBESA GRAVIDA

- Effettuare precocemente la valutazione anestesiologica
- Ricorrere prontamente alla tecnica epidurale (supporto ecografico)
- Considerare il rischio di "accesso lombare difficile"
- Non considerare ALR come alternativa ad una difficoltà prevista di intubazione e/o ventilazione
- Considerare FBS da sveglia

Criteri di dimissibilità SO - RR - PACU - NORA

Criteri STANDARD	Criteri SPECIFICI
Ministero della Salute	SpO ₂ quanto più vicina possibile al valore preoperatorio con la minima supplementazione di ossigeno
Locali (ospedale)	Assenza di ipoventilazione (ipopnea/apnea per almeno 1 ora) ALERT in caso di difficile gestione delle vie aeree

ASSISTENZA POSTOPERATORIA

INTENSITA' ASSISTENZIALE

Adeguaire il Livello di Cura (I, II, III) a:

- Comorbidità
 - Complessità della procedura
 - Rischio di ipo/disventilazione
- L'assistenza in reparto include le CONSEGNE per:
- Analgesia multimodale
 - Posizione semi-seduta 25-30°
 - Mobilizzazione e fisioterapia precod
 - Profilassi TVP opportunamente protratta
 - Sorveglianza e monitoraggio se utilizzo di sedativi a lunga durata d'azione o oppiacei
 - Criteri di preallarme (modello NEWS)
 - Prevenzione diagnosi precoce e trattamento della rabdomioliisi
 - Profilassi e controllo delle infezioni



Precauzioni in caso di OSA/OHS

- Mantenere posizione semi-seduta 25-30°
- Evitare sedativi o oppiacei
- Valutare con attenzione la somministrazione di ossigeno - riprendere nCPAP se già in uso
- Monitoraggio SpO₂: in pazienti non trattati/intolleranti nCPAP se utilizzati oppiacei
- In caso di criticità, adeguare il livello di cura: passare a II (con disponibilità di letto di livello III)

IN CASO DI DIFFICILE GESTIONE DELLE VIE AEREE

- Ripartire le informazioni nella documentazione clinica ed anestesiologica
- CONSEGNE - modulo di ALERT al reparto ed al paziente

ALERT SPECIFICI PER LA TERAPIA INTENSIVA (Livello III - UTI)

- Team esperto per la gestione delle vie aeree difficili nel paziente critico/in emergenza
- Tacheotomia: Valutare timing / difficoltà (tecnica percutanea/chirurgica)/ scelta della cannula
- Ventilazione protettiva
- Attrezzature e risorse umane adeguate per mobilizzazione frequente e prevenzione dei decubiti
- Precoce riabilitazione
- Organizzazione adeguata in caso di trasporto secondario

PRECAUZIONI SPECIFICHE

IMPLEMENTAZIONE DI PROTOCOLLI ERAS

GRAVIDANZA (PUNTO NASCITA)

"SICUREZZA MATERNO-INFANTILE" - ALERT analgesia - anestesia e precauzioni per il post-partum

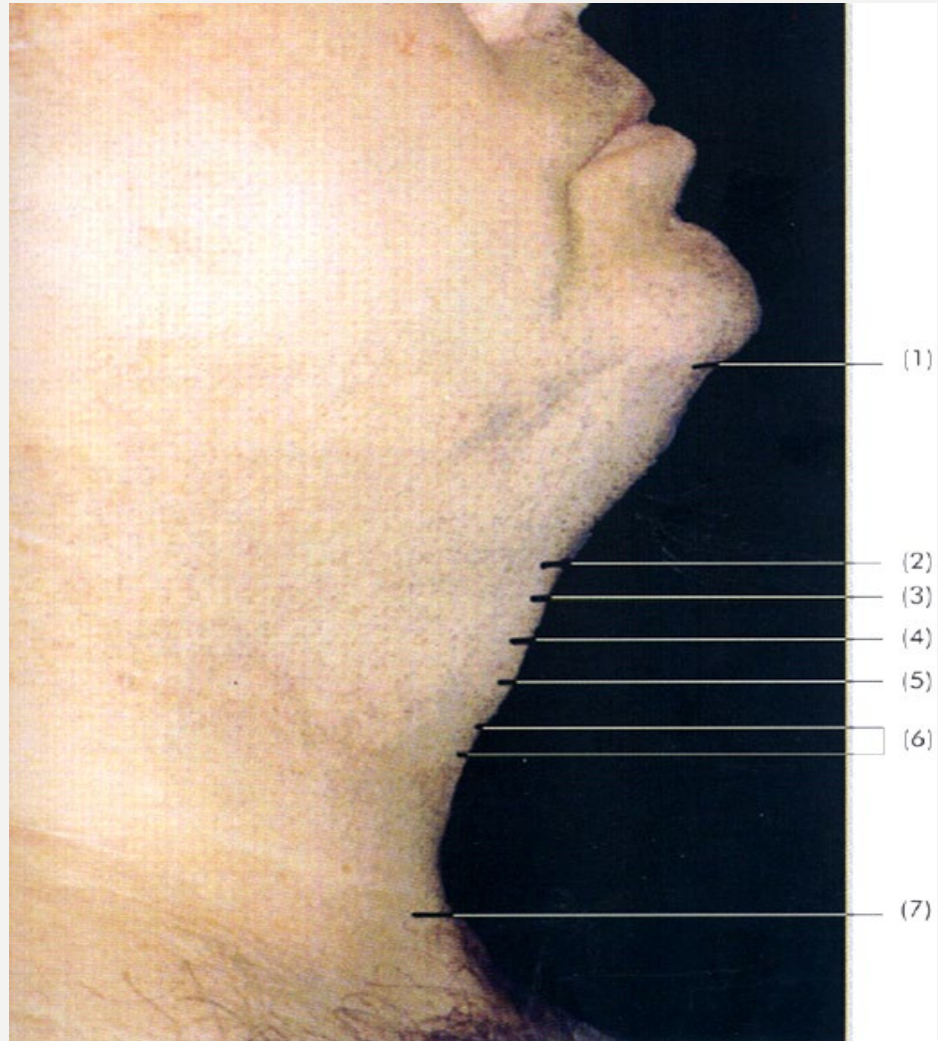
SISTEMA DI RISPOSTA RAPIDA ALLE EMERGENZE INTRA-OSPEDALIERE

Criteri operativi di Alert precoce - Attrezzature adeguate e competenze del team delle emergenze

ALERT IN DEA

- Prevedere supporti, sistemi di movimentazione, attrezzature adeguati a dimensioni/peso dei pazienti
- Precoci allertamento del MET per la valutazione del rischio di vie aeree difficili: competenza di specialisti ed abilità nelle tecniche in emergenza
- Particolari attenzioni per l'assistenza durante il trasporto secondario (Ambulanza/Bicottoro)

REPERI ANATOMICI

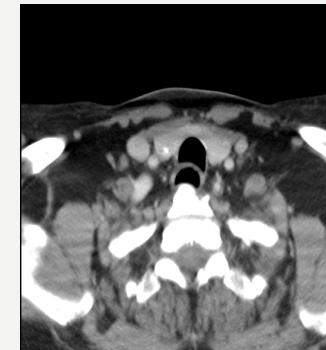
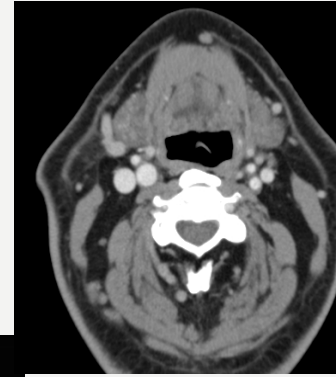
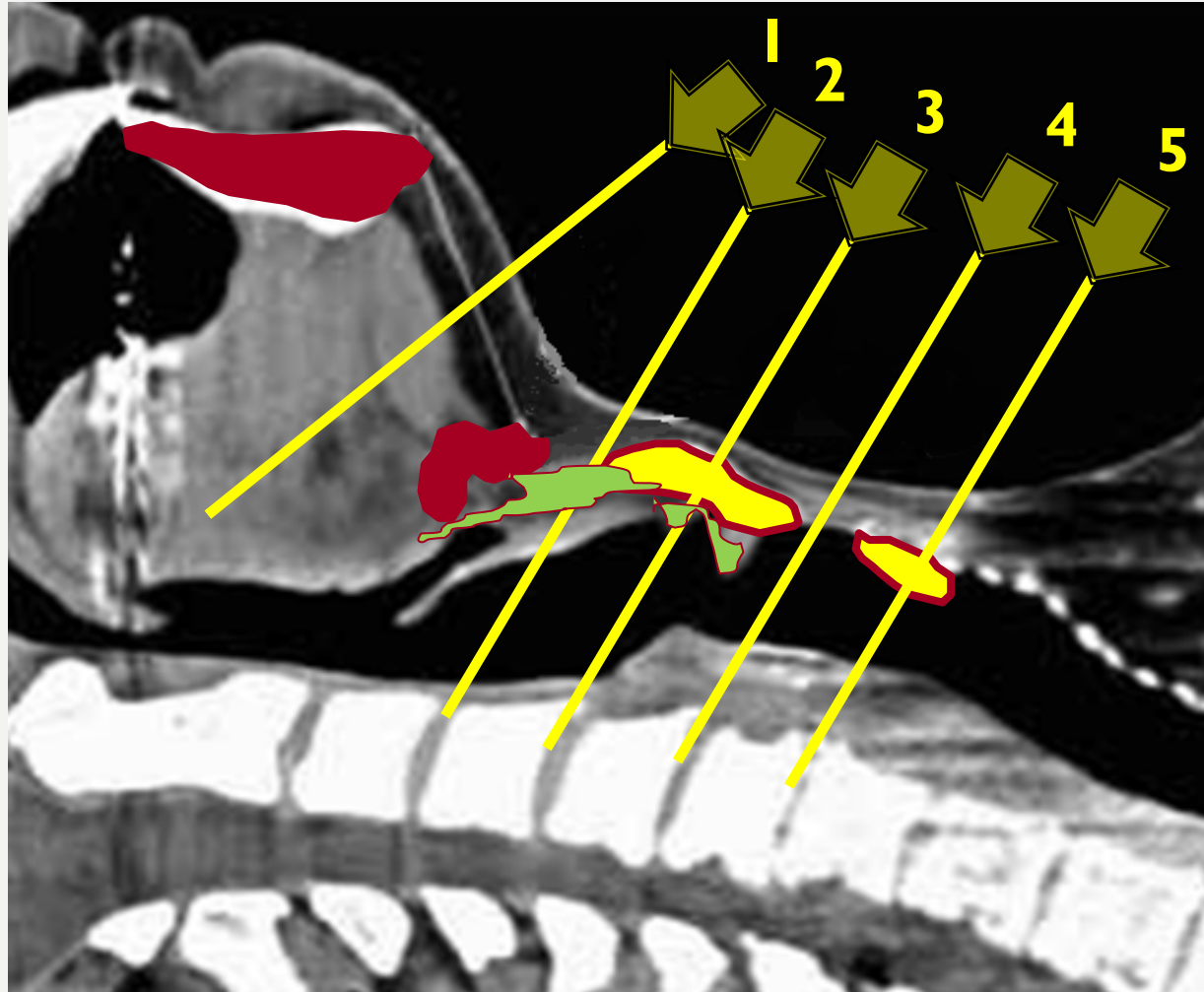


1. Mandible
2. Hyoid bone
3. Thyroide cartilage
4. Cricothyroide membrane
5. Cricoide cartilage
6. Tracheal rings
7. Jugulus



Comparison of Sonography and Computed Tomography as Imaging Tools for Assessment of Airway Structures. Arun Prasad, MBBS, DA, FRCA, FRCPC, Eugene Yu, MD, FRCPC, David T.

U.S. scanning



C.T. scanning

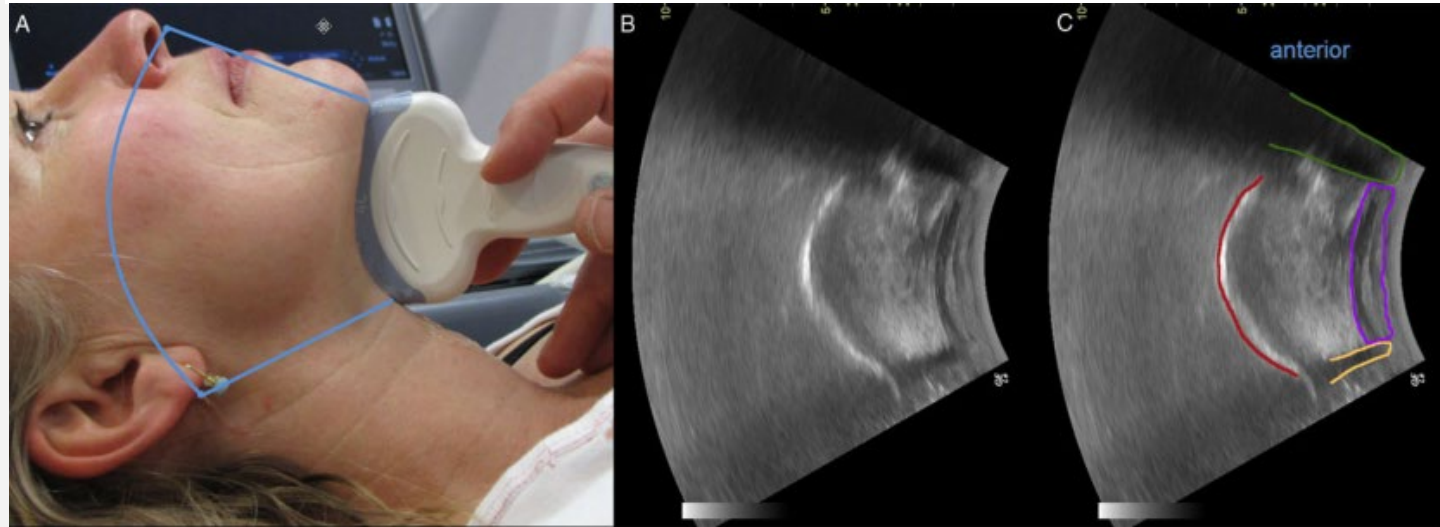
Ultrasonography in the management of the airway

Acta Anaesthesiol Scand 2011; 55: 1155–1173
Printed in Singapore. All rights reserved

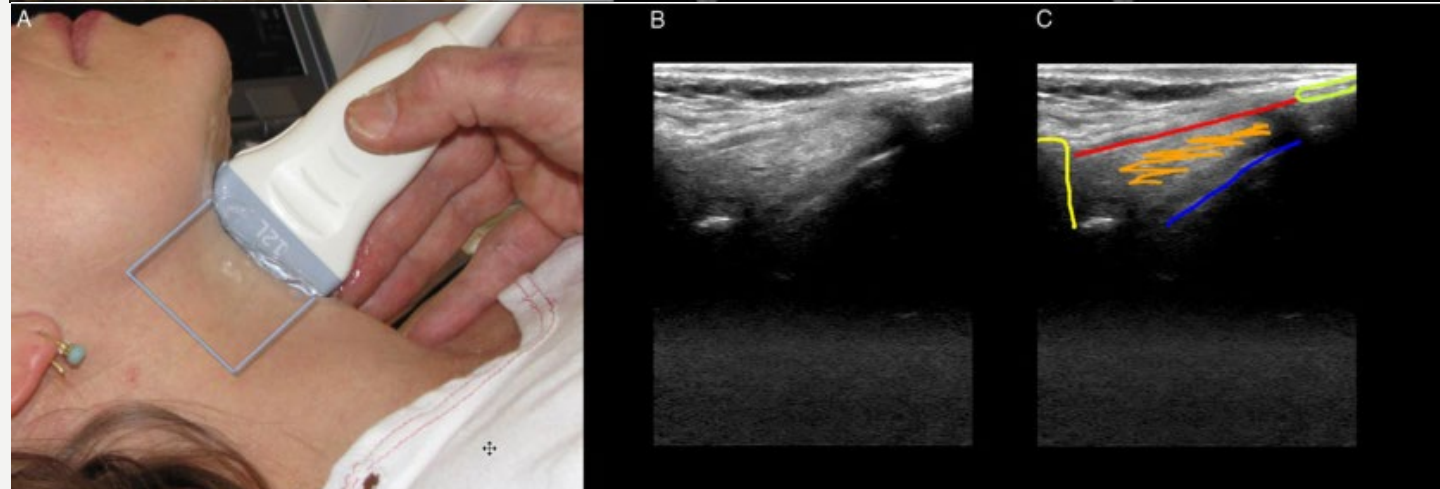
M. S. KRISTENSEN

Department of Anaesthesia and Operating Theatre Services 4231, Center of Head and Otorhinolaryngology, Copenhagen University Hospital, Rigshospitalet, Denmark

**CONVEX probe
(4-7 mHz)**

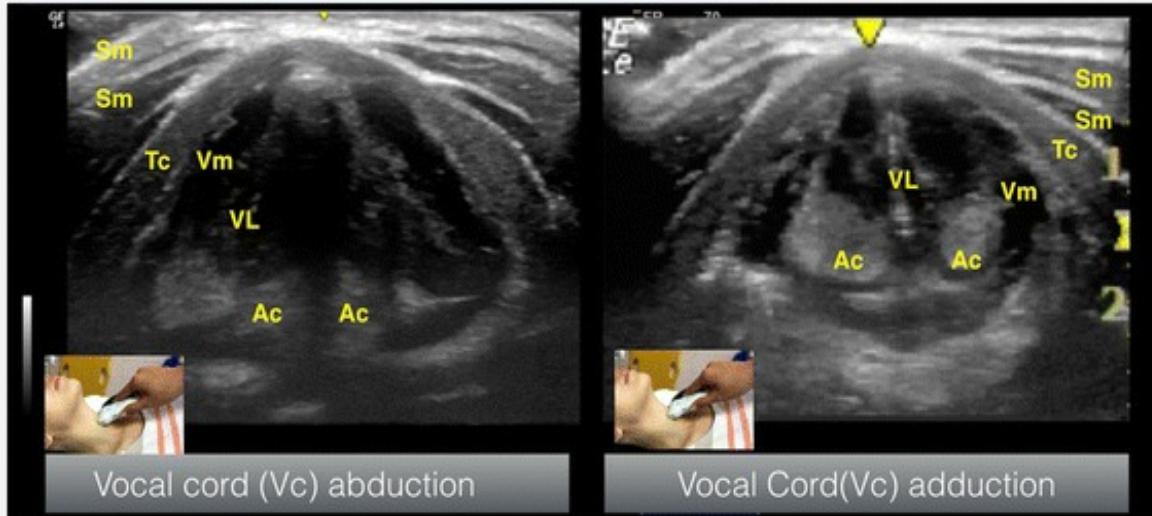


**High frequency
LINEAR transducer
(10-13 mHz)**



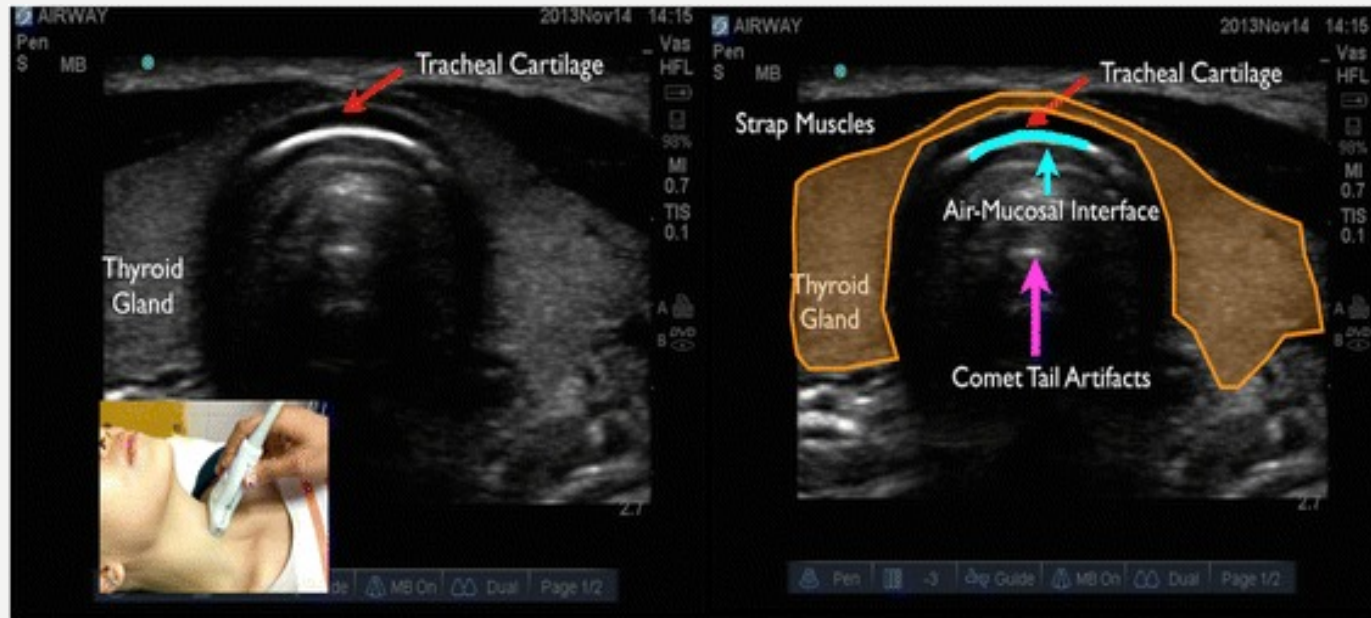
ANATOMICAL STRUCTURES

Osman and Sum *Journal of Intensive Care* (2016) 4:52
DOI 10.1186/s40560-016-0174-z



Vocal cord (Vc) abduction

Vocal Cord(Vc) adduction

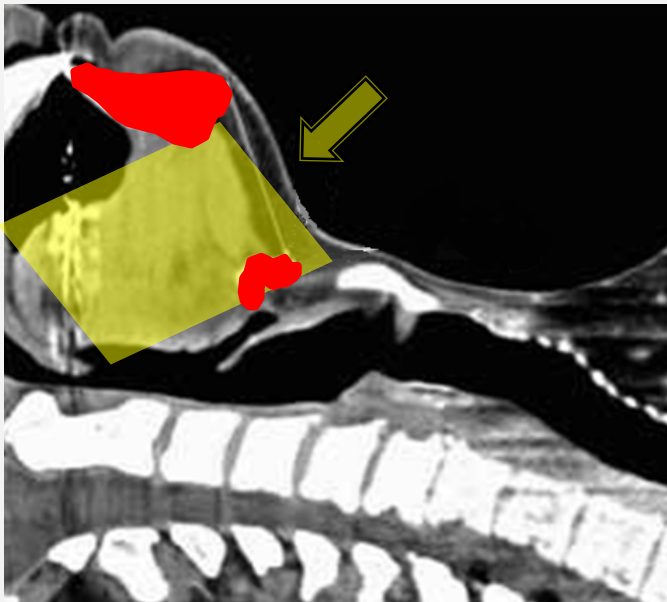


ARTIFACTS

Air-tissue Interface

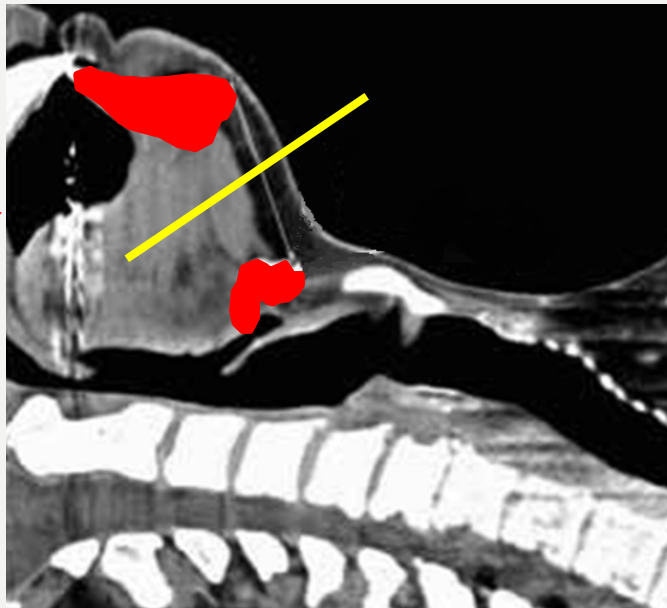
Oral Cavity

LONG.

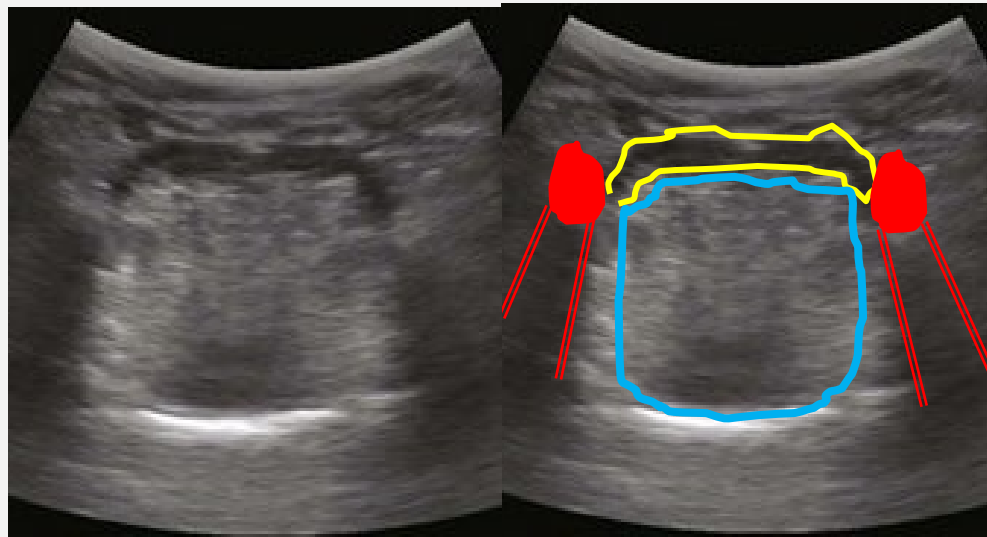
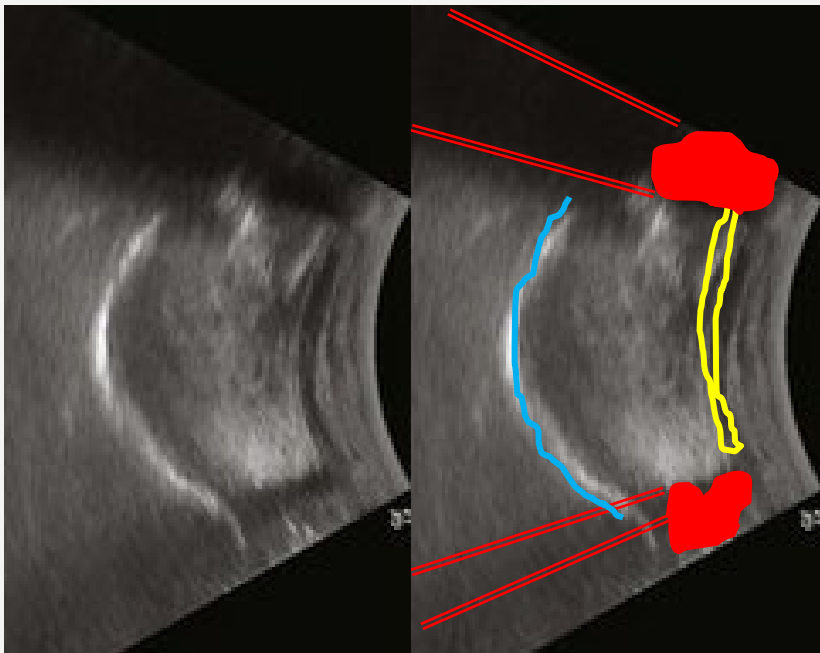


90°

Convex
probe (4-7
mHz)

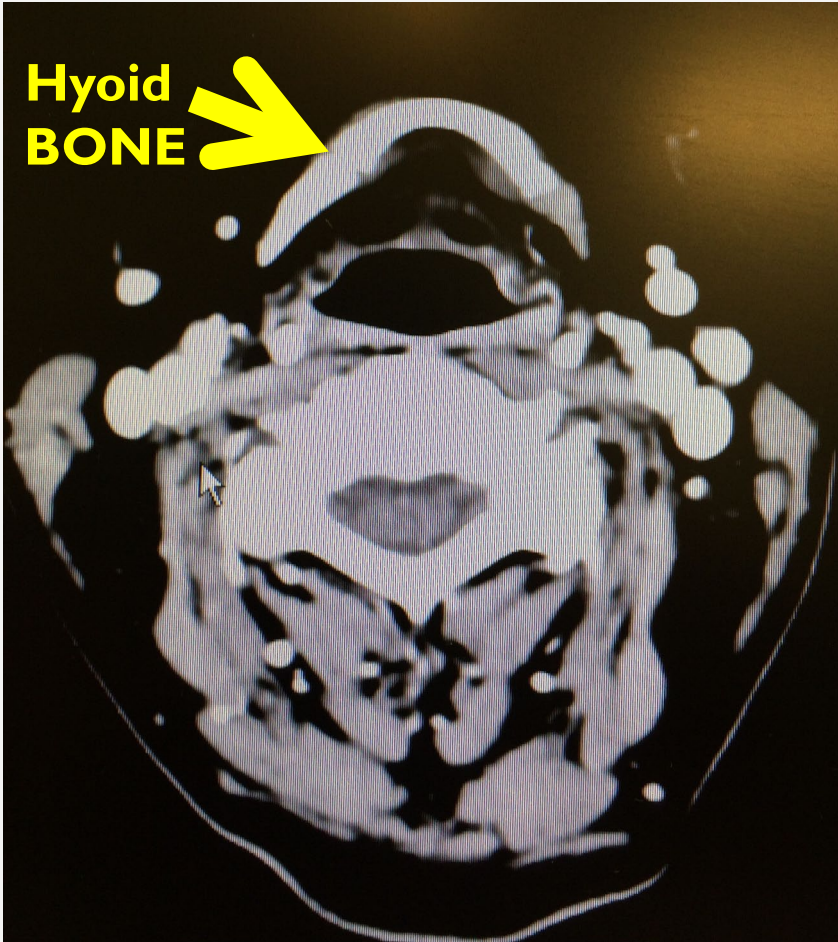


TRANSV.

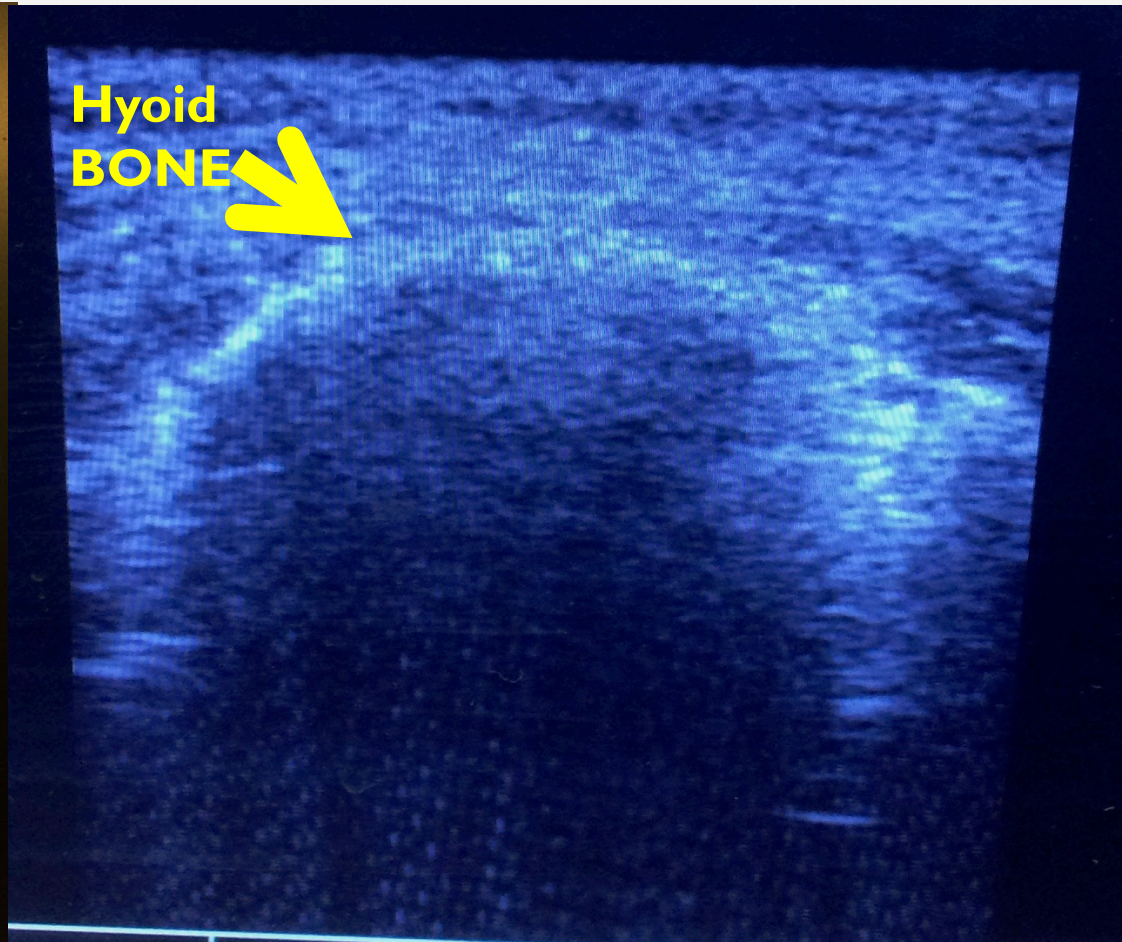


Hyoid Bone transv.

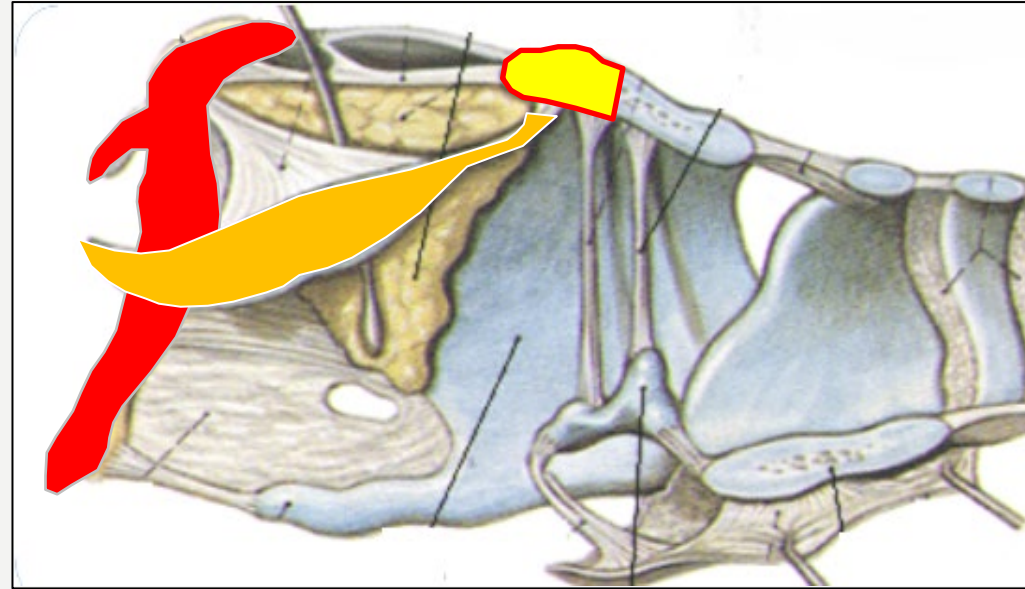
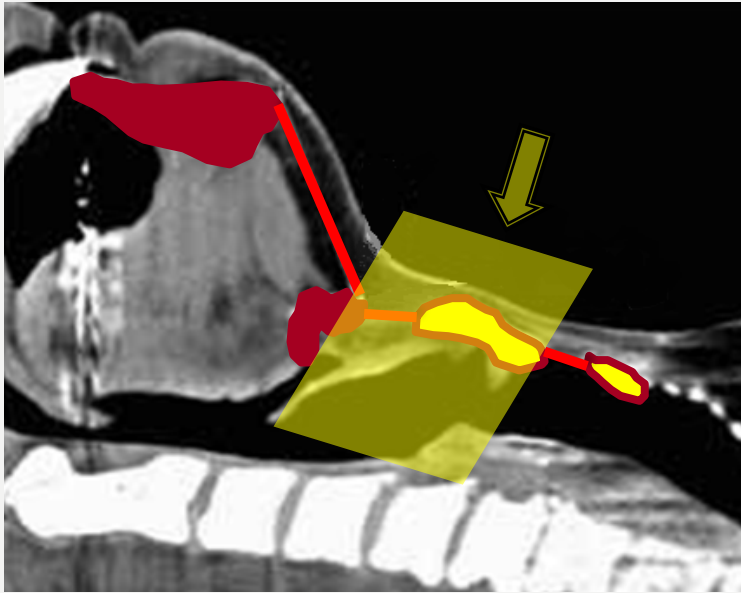
CT SCAN



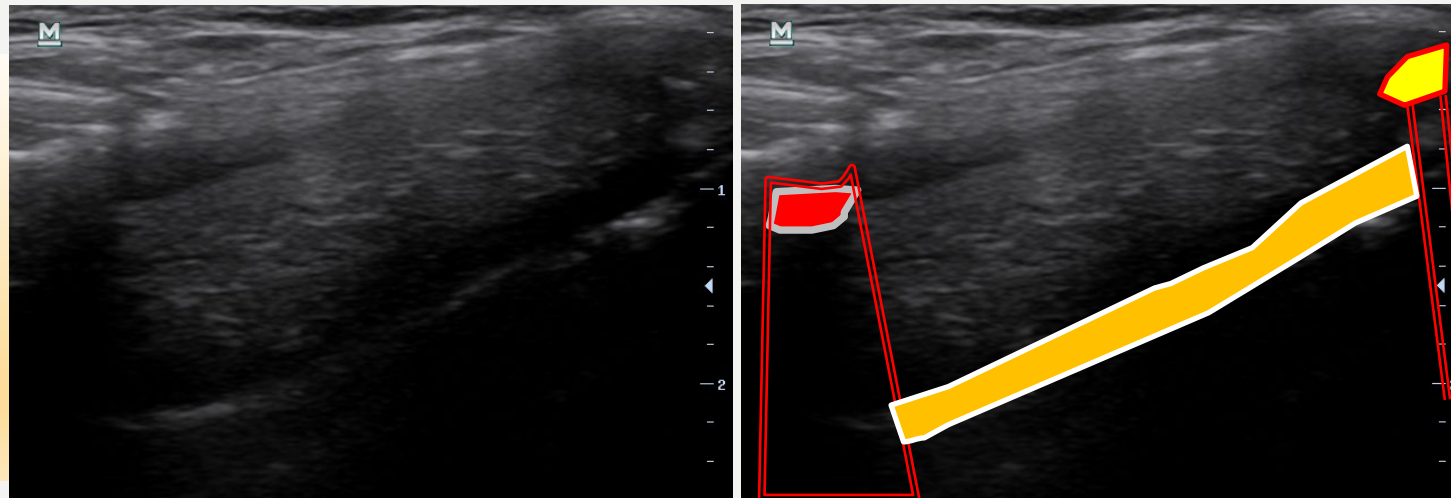
ULTRASOUND (US)



Thyro-Hyoid Membrane long.



High frequency linear transducer (10-13 mHz)



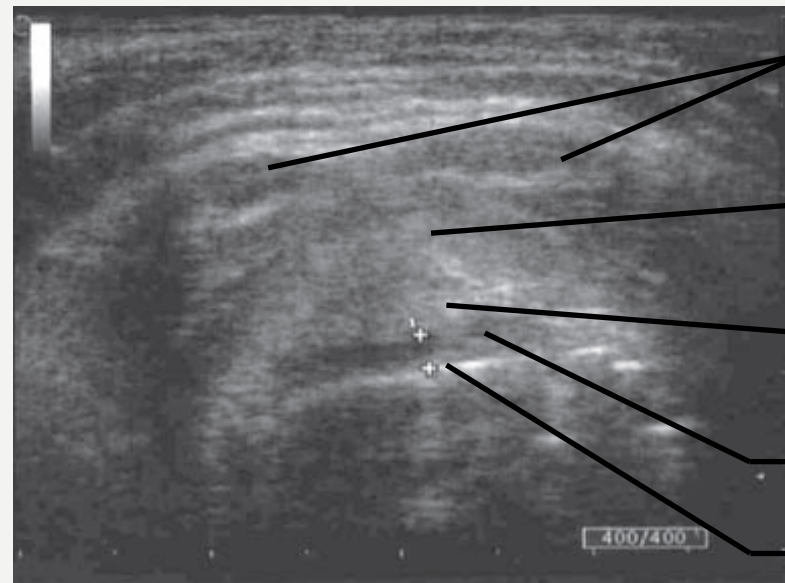
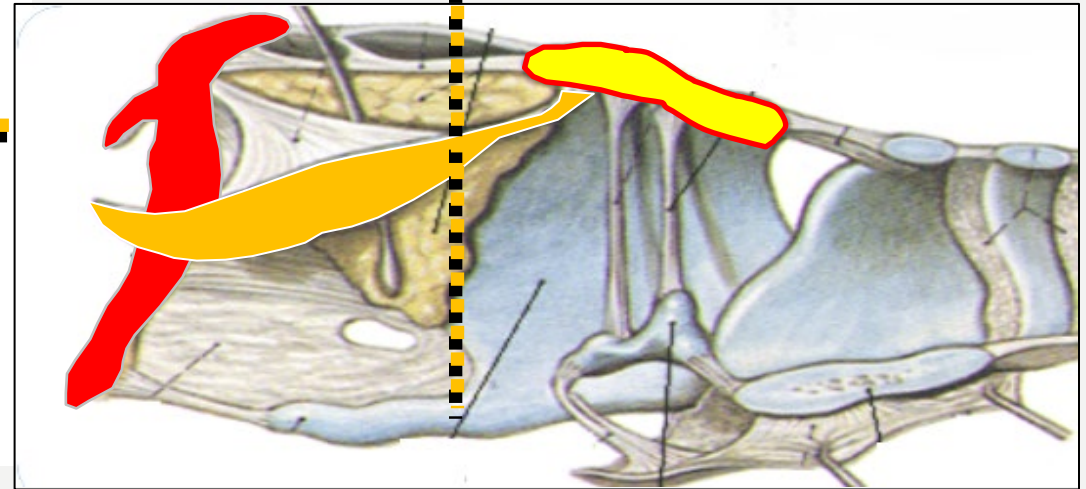
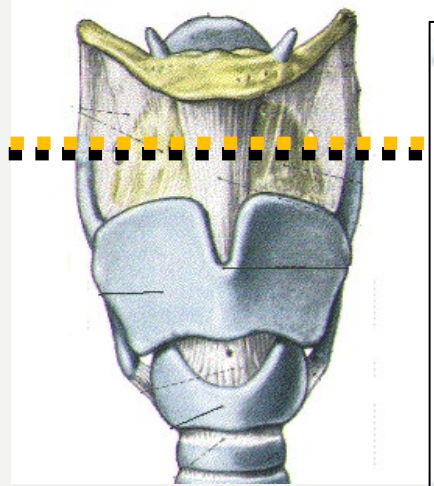
EPIGLOTTIS

Thyro-Hyoid Membrane

transv.

At the level of thyrohyoid membrane, the **epiglottis** is visible as a **hypoechoic** curvilinear structure with its posterior border demarcated by a bright hyperechoic linear **air-mucosal interface**.

In this plane, the visualisation obtained, including the thyrohyoid muscles, provides an image we called the '*small face sign*'



Thyro-hyoid muscles

Thyro-Hyoid membrane

Pre-epiglottis

space
Epiglottis

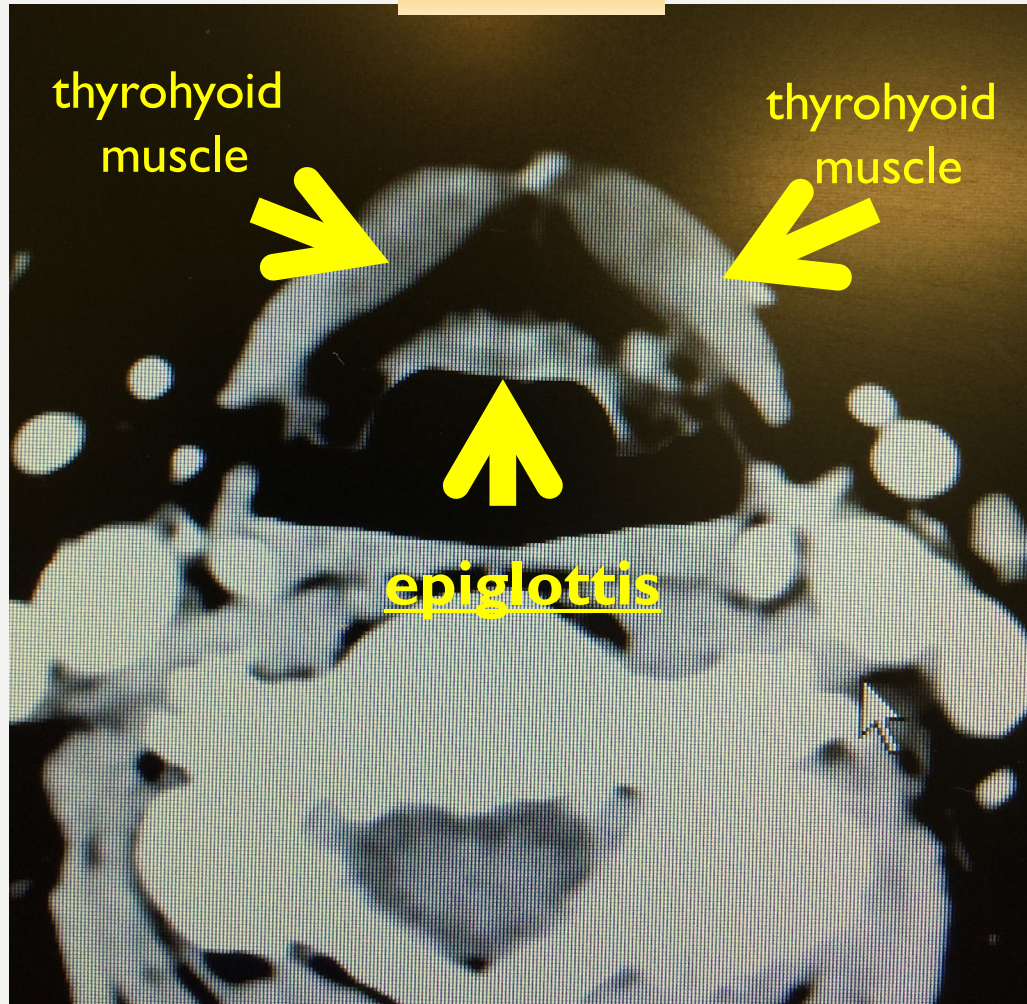
Air-Tissue interface

«Small Face Sign»

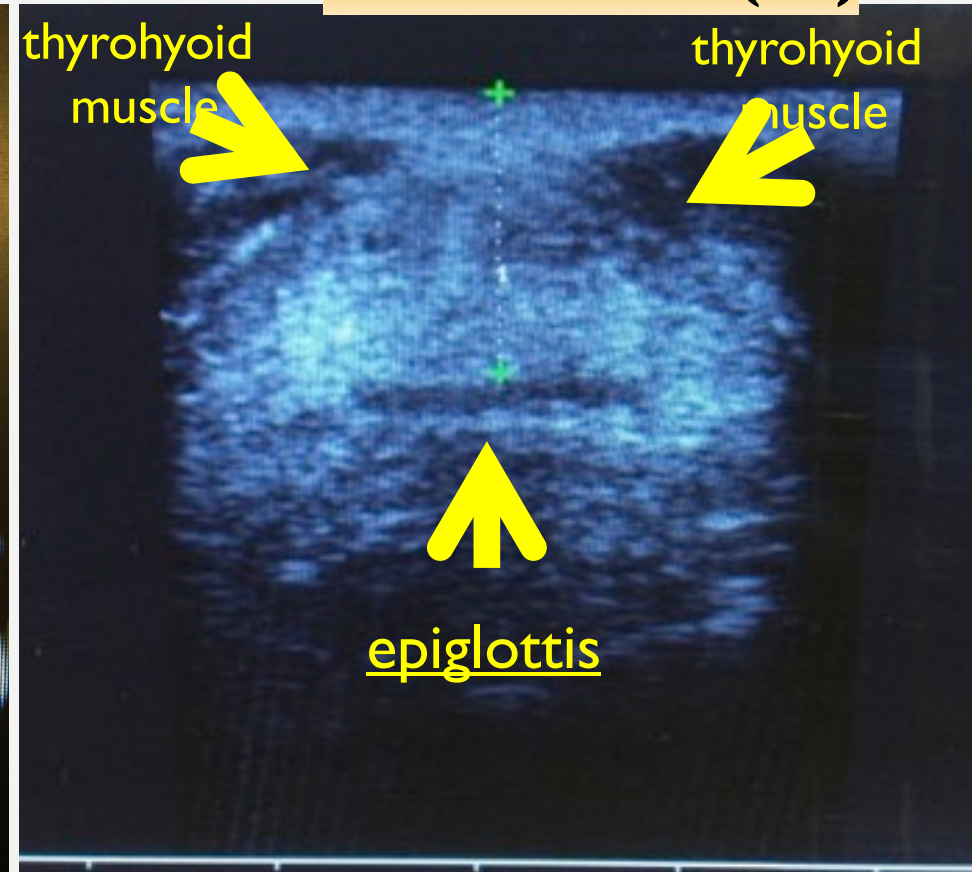
Thyro-Hyoid Membrane

transv.

CT SCAN



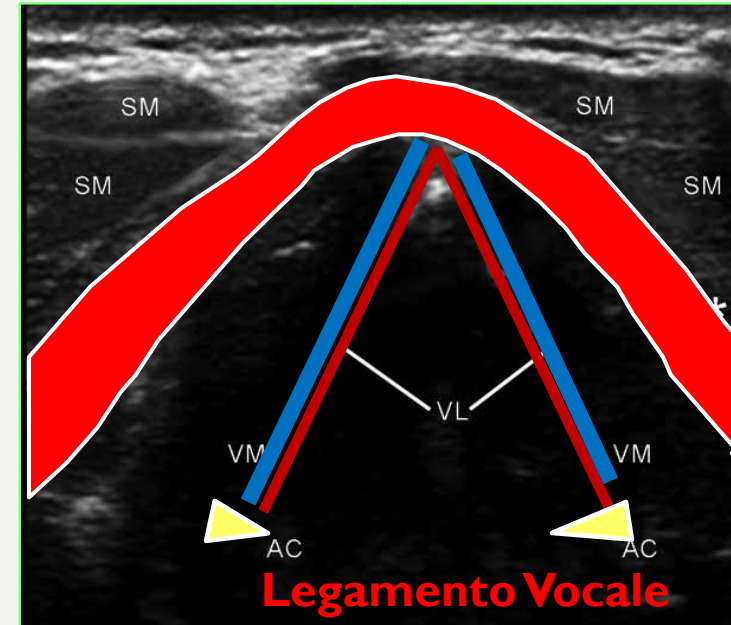
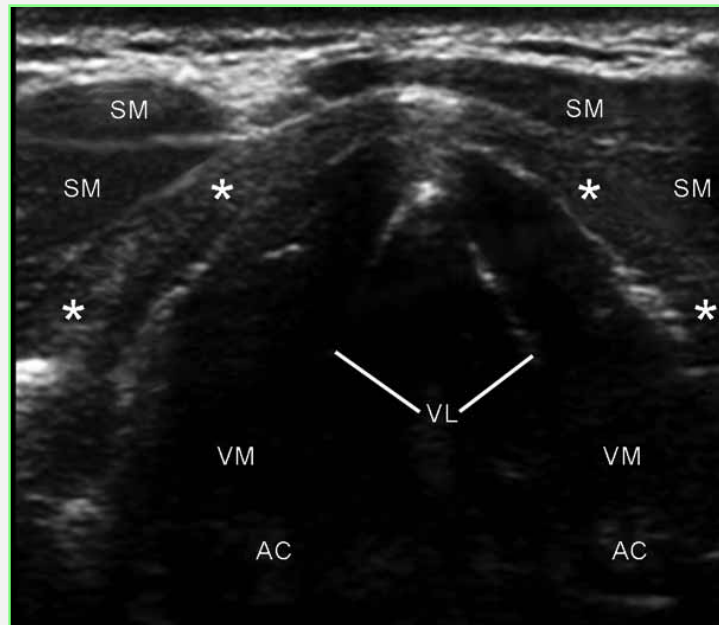
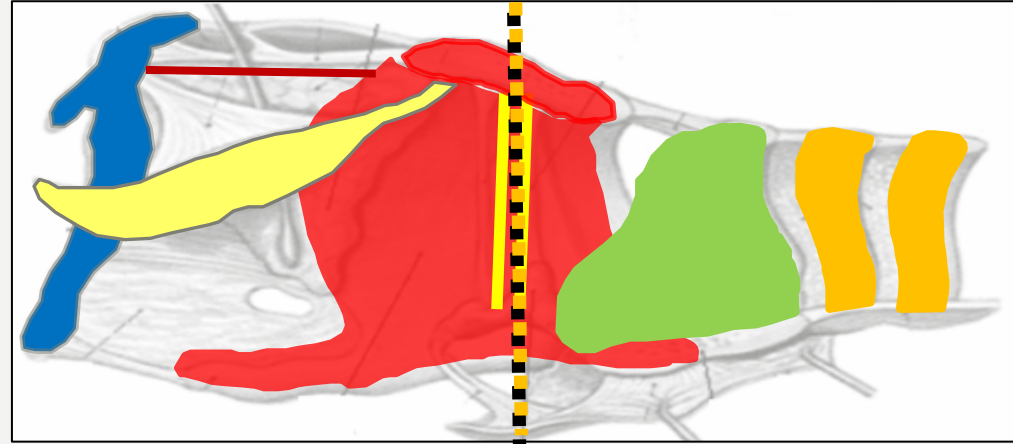
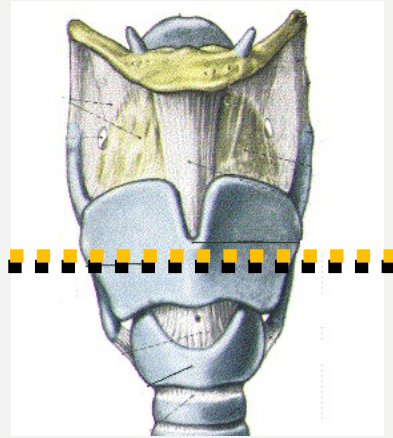
ULTRASOUND (US)



“small face” sign

Thyroid Cartilage transv.

The two **vocal cords** with arytenoids appear as **hyperechoic** lateral V-shaped structures. Protrusion of the tongue or swallowing help to identify the epiglottis, whereas identification of the vocal cords is facilitated by observing their movements during breathing or phonation



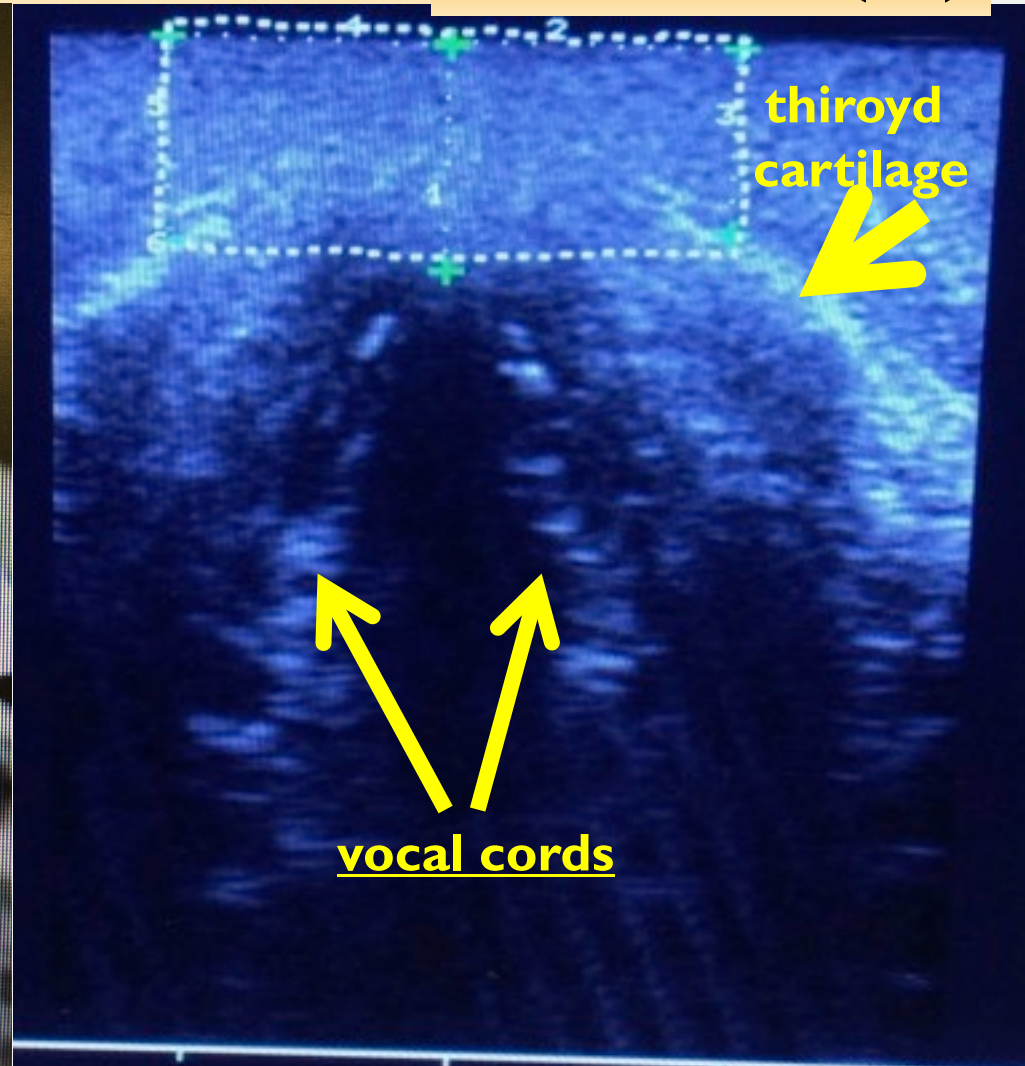
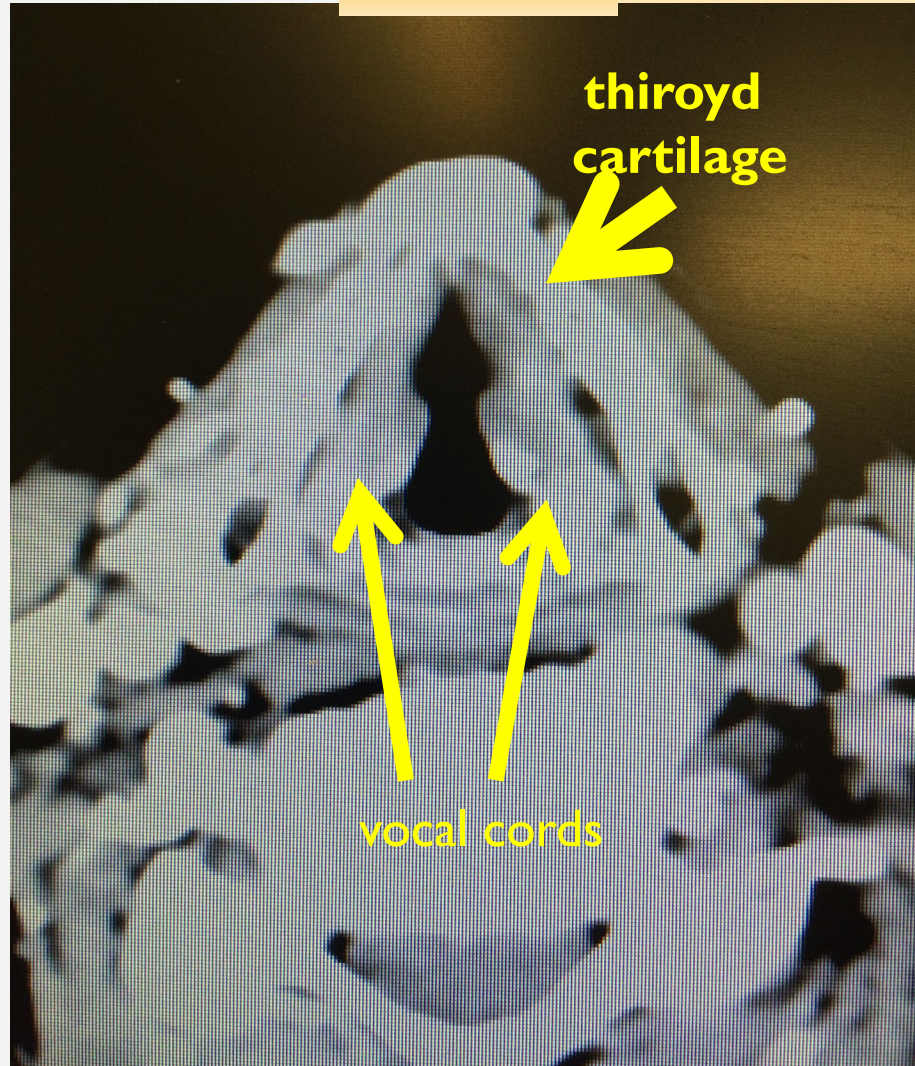
Corde Vere

Thyroid Cartilage transv.:

VOCAL CORDS

CT SCAN

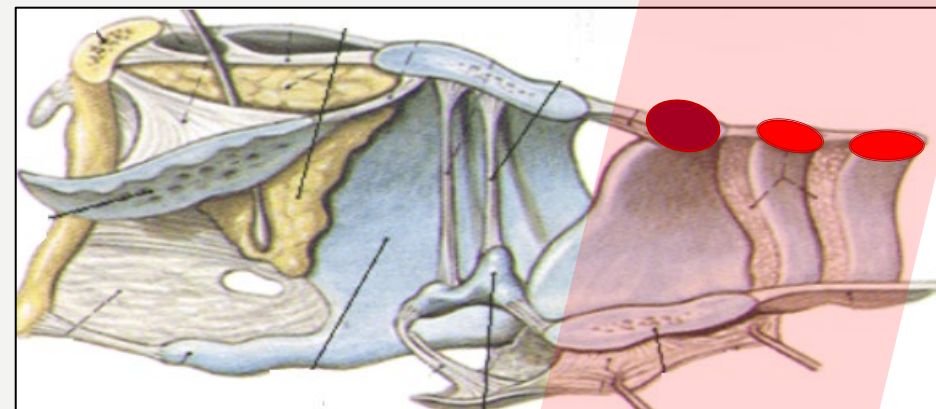
ULTRASOUND (US)



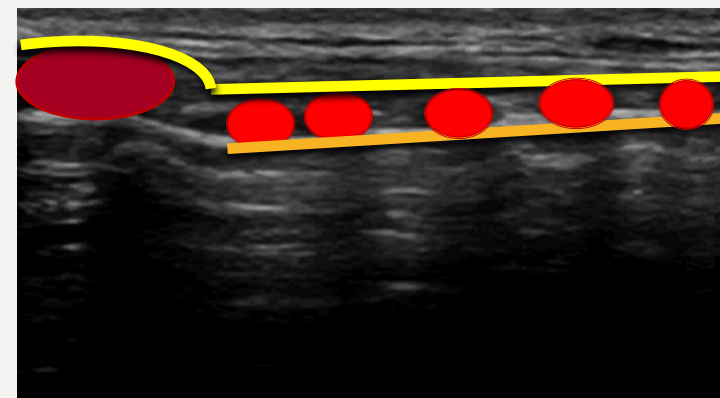
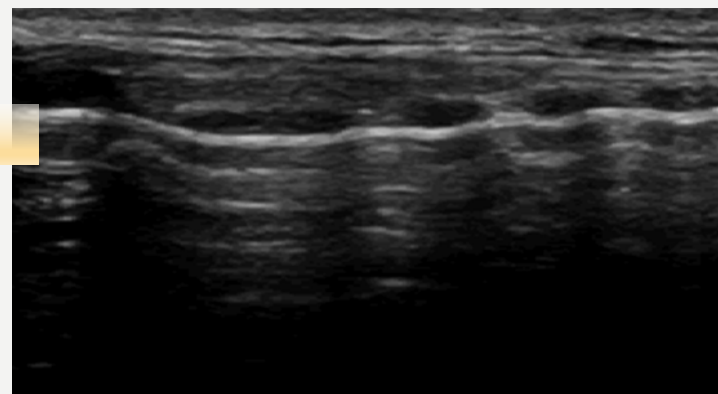
Cricoid cartilage & Trachea long.



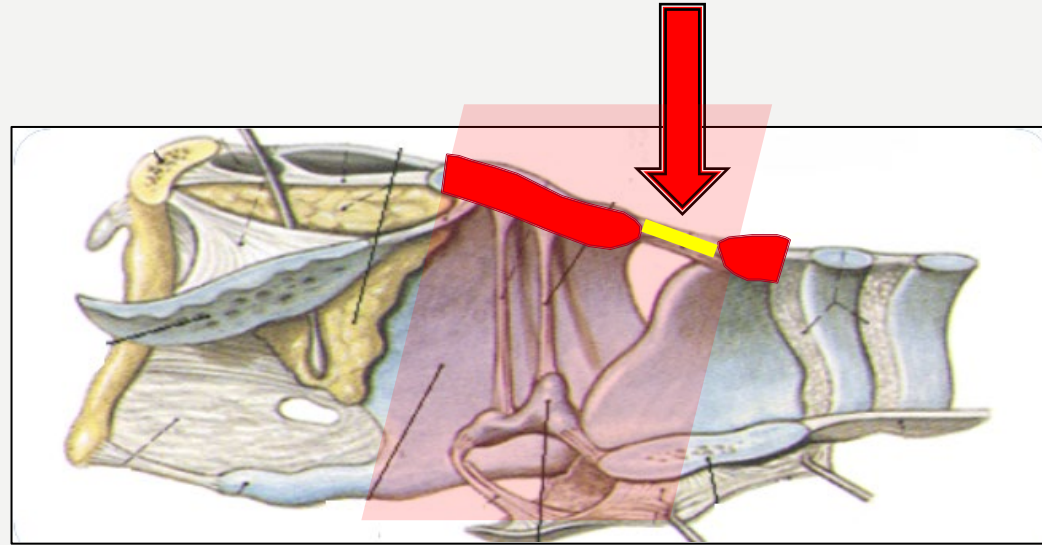
“PEARLS
STRING”



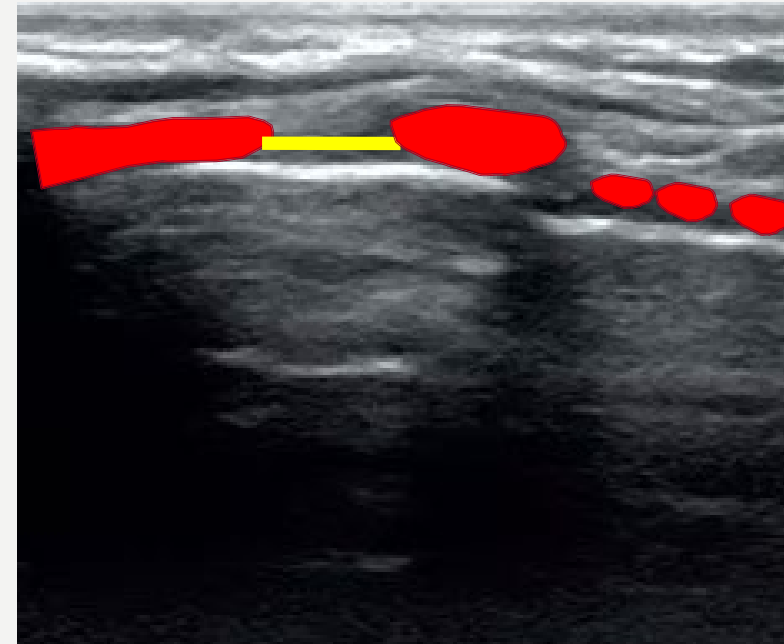
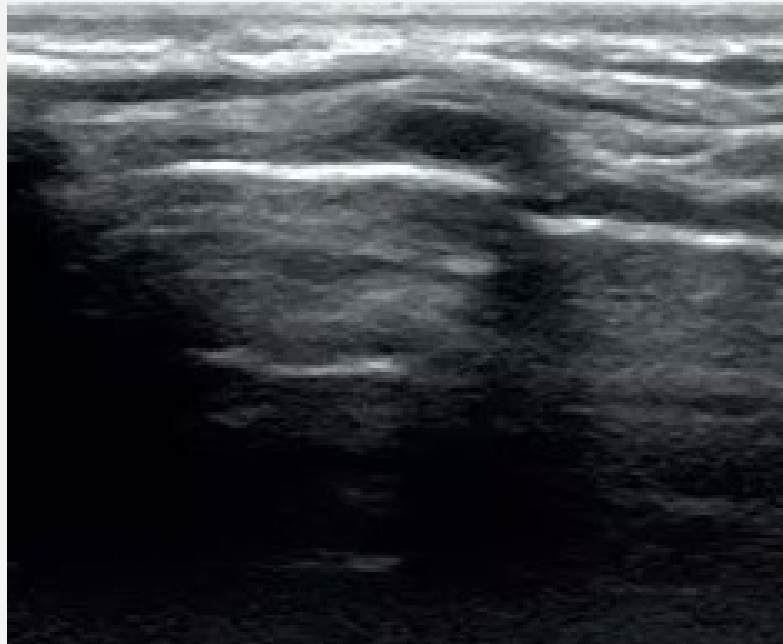
“PEARLS
STRING”



Crico-Thyroid membrane (CTM) long.

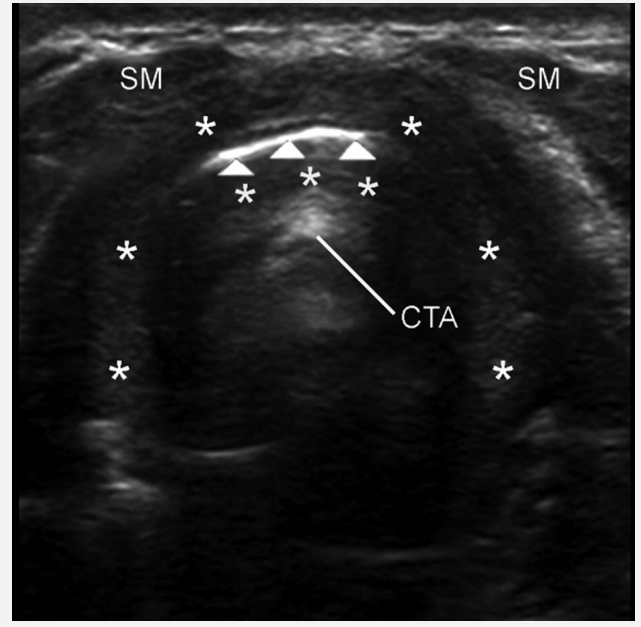
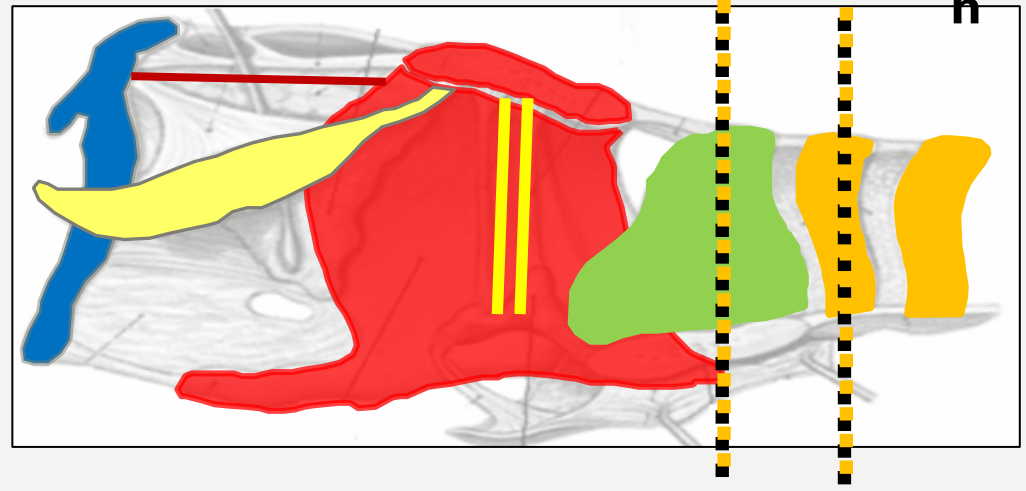
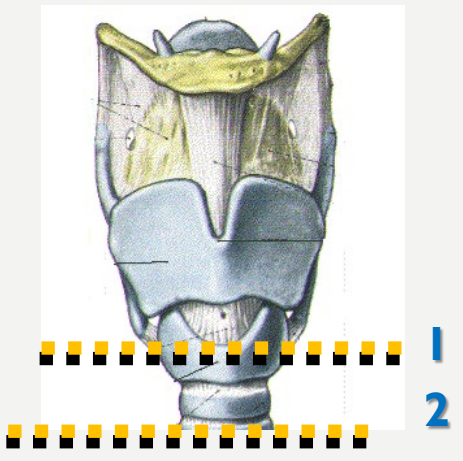


Solitamente si utilizza la scansione longitudinale, ma anche la scansione trasversale può essere utile....

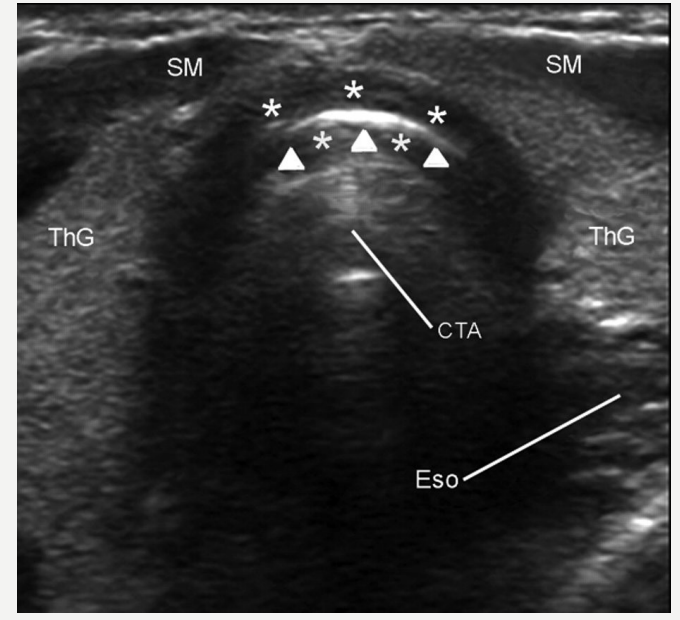


Cricoid cartilage & Trachea **transv.**

ETT Position?
Mass?
Stenosis/deviatio
n



1 2



PREDICTION OF DIFFICULT AIRWAYS MANAGEMENT

Ultrasounds measurements:

...over Hyoid bone

DCH = Distance Chin to Hyoid Bone (Oral Cavity)

Tongue = Width & Volume

TMJ = Temporo Mandibular Joint Motility

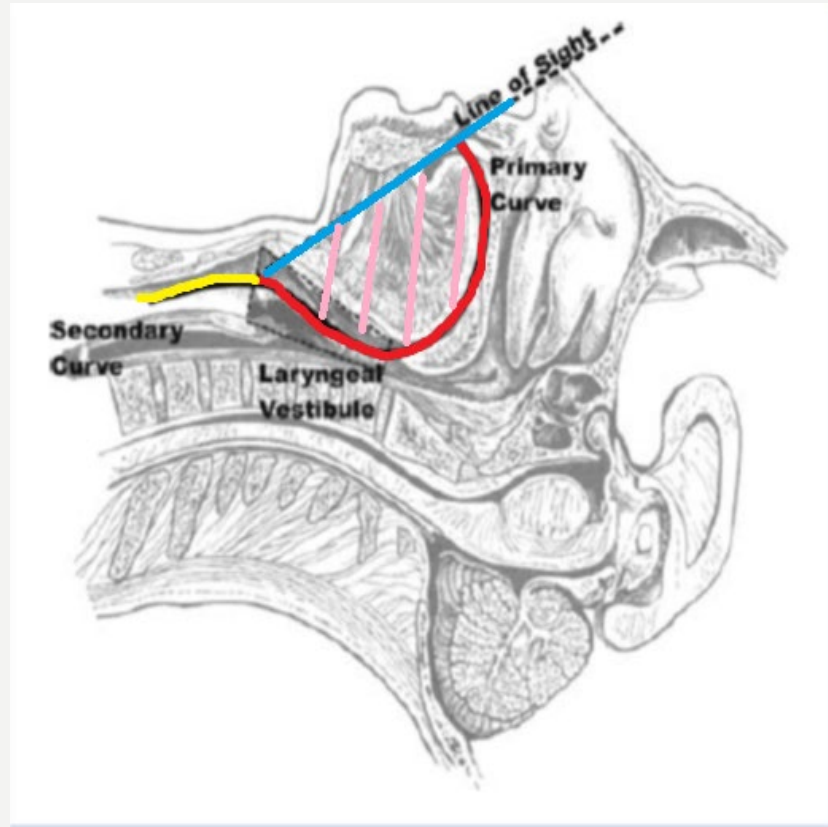
...under Hyoid bone

DSH = Distance Skin to Hyoid Bone

DST = Distance Skin to Thyroid cartilage (vocal cords)

DSE = Distance Skin to Epiglottis

UNDER HYOID BONE



Greenland K. The sniffing and extension-extension position: the need to develop the clinical relevance.

the «Greenland model for direct laryngoscopy»

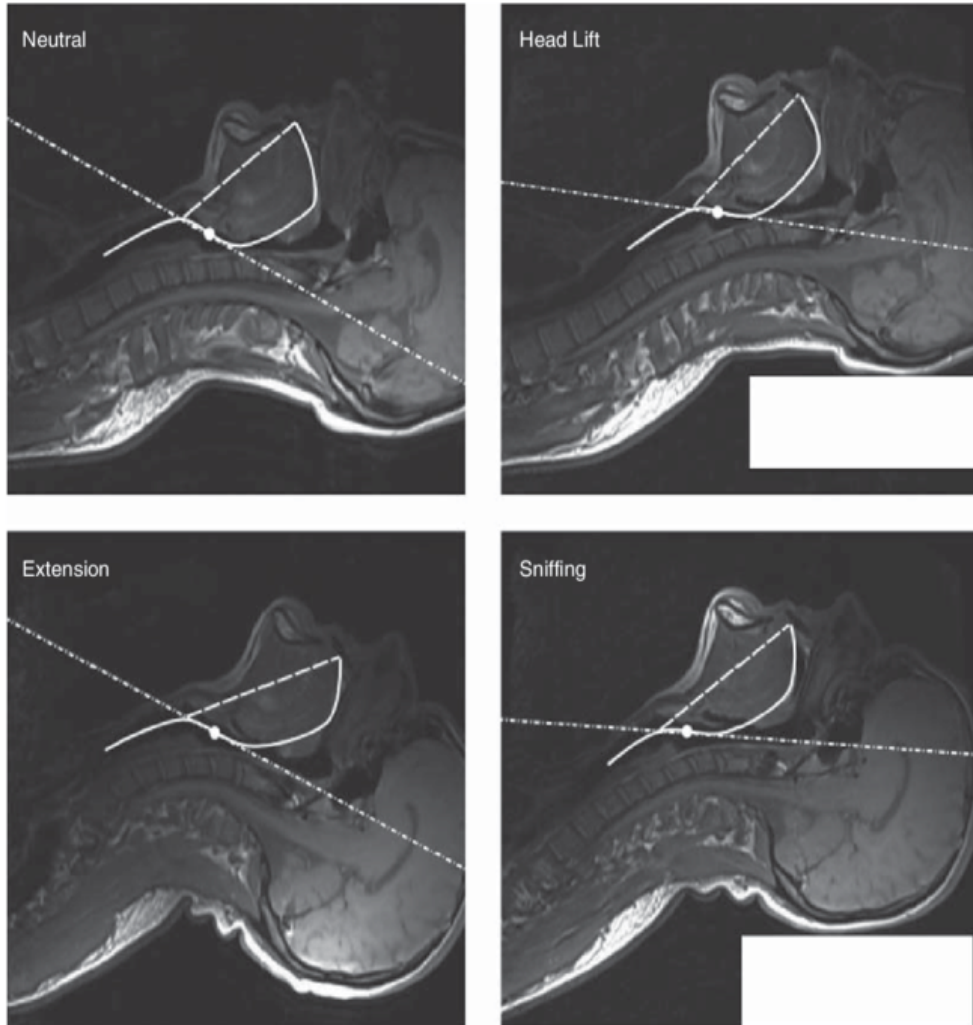
the 2 physio-pathologic hypothesis:

1. High distance between the skin to the epiglottis is associated with a high probability of difficult laryngoscopy, especially when associated with a reduced distance between the skin and vocal cords.

2. HIGH PRE-LARYNGEAL SOFT TISSUE THICKNESS AS IN OBESE

UNDER HYOID BONE

the «Greenland model for direct laryngoscopy»



the 2 physio-pathologic hypothesis:

- 1. High distance between the skin to the epiglottis is associated with a high probability of difficult laryngoscopy, especially when associated with a reduced distance between the skin and vocal cords.**
- 2. HIGH PRE-LARYNGEAL SOFT TISSUE THICKNESS AS IN OBESE**

Original Article

Correlation between preoperative ultrasonographic airway assessment and laryngoscopic view in adult patients: A prospective study

Aruna Parameswari, Mithila Govind, Mahesh Vakamudi

Department of Anaesthesiology, Critical Care and Pain Medicine, Sri Ramachandra Medical College and Research Institute, Sri Ramachandra University, Chennai, Tamil Nadu, India

Abstract

Background and Aims: Difficult tracheal intubation is associated with serious morbidity and mortality and cannot be always predicted based on preoperative airway assessment using conventional clinical predictors. Ultrasonographic airway assessment could be a useful adjunct, but at present, there are no well-defined sonographic criteria that can predict the possibility of encountering a difficult airway. The present study was conducted with the aim of finding some correlation between preoperative sonographic airway assessment parameters and the Cormack-Lehane (CL) grade at laryngoscopic view in adult patients.

Material and Methods: This was a prospective, double-blinded study on 130 patients undergoing elective surgery under general anesthesia. Preoperative clinical and ultrasonographic assessment of the airway was done to predict difficult intubation and was correlated with the CL grade noted at laryngoscopy. The sensitivity, specificity, positive predictive value, and negative predictive values of the parameters were assessed.

Results: The incidence of difficult intubation was 9.2%. Among the clinical predictors, the modified Mallampati classification had the maximum sensitivity and specificity, and among the sonographic parameters, the skin to epiglottis distance had the maximum sensitivity and specificity to predict difficult laryngoscopy. A combination of these two tests improved the sensitivity in predicting a difficult laryngoscopy.

Conclusions: The skin to epiglottis distance, as measured at the level of the thyrohyoid membrane, is a good predictor of difficult laryngoscopy. When combined with the modified Mallampati classification, the sensitivity of the combined parameter was found to be greater than any single parameter taken alone.

Keywords: Airway, assessment, laryngoscopy, ultrasonography

the three most studied parameters

OVER HYOID BONE

=Anteroposterior



Figure 1: Blue dotted line: Width of the tongue

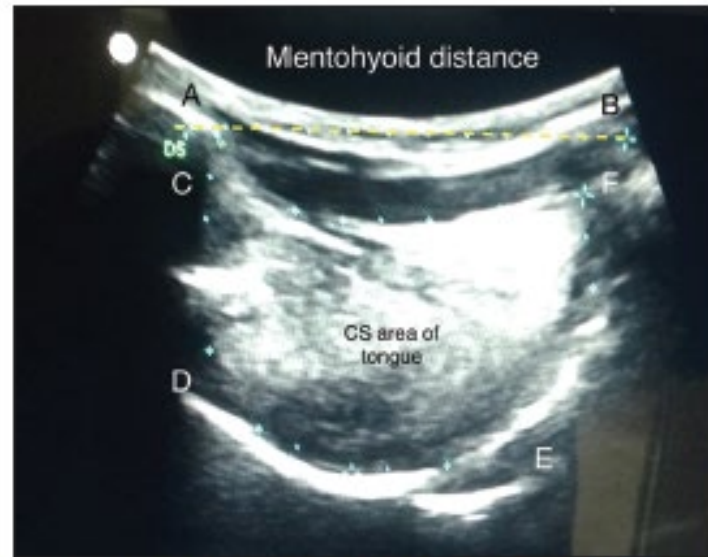


Figure 2: Blue dotted area CDEF: Cross-sectional area of the tongue; yellow dash line AB: Mentohyoid distance

UNDER HYOID BONE



Figure 3: Skin to epiglottis distance shown by blue dotted line

TONGUE WIDTH

TONGUE VOLUME & MENTHO-HYOID DISTANCE

SKIN TO EPIGLOTTIS

Table 3: Comparison of the various sonographically assessed parameters to predict difficult laryngoscopy

Parameter	Sensitivity (%)	Specificity	Positive predictive value (%)	Negative predictive value (%)
Skin to hyoid distance	58.3	56.8	12.1	93.1
Volume of tongue	66.7	62.7	15.4	94.6
Volume of floor of mouth	50	55.9	10.3	91.7
Skin to epiglottis	75	63.6	17.5	96.2

Table 2: Distribution of patients according to the Cormack-Lehane grade of laryngoscopic view

Cormack-Lehane grade	Number of patients (%)
I	81 (62.3)
II	37 (28.5)
III	12 (9.2)
IV	None

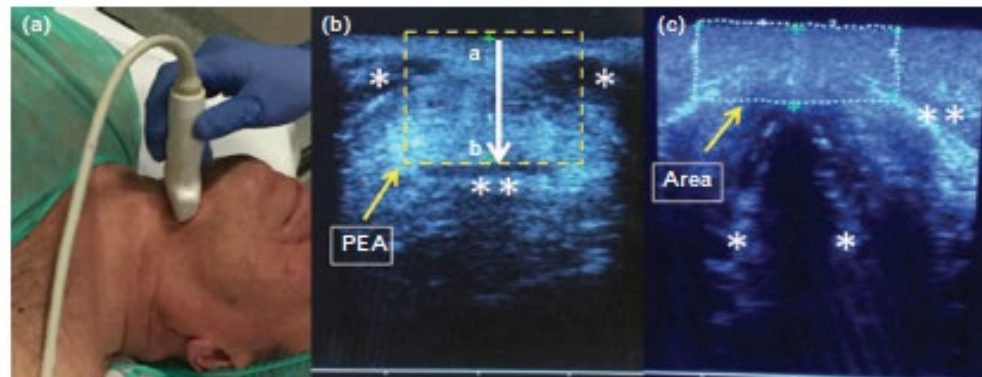
ORIGINAL ARTICLE

Evaluation of two neck ultrasound measurements as predictors of difficult direct laryngoscopy

A prospective study

Stefano Falchetta, Simona Cavallo, Vincenzo Gabbanelli, Paolo Pelaia, Massimiliano Sorbello, Ivana Zdravkovic and Abele Donati

Fig 1



(a) Ultrasonography at the level of thyrohyoid membrane and vocal cords. (b) 'The small face sign' (pre-epiglottic space) at the level of thyrohyoid membrane. *Thyroid muscles; **epiglottis; a-b, median distance skin to epiglottis; **pre-epiglottic area. (c) *Vocal cords; a-b, median distance skin-vocal cords; prevocal cords area.

PRE-laryngeal soft tissue's thickness

301 patients enrolled

...C-L in six degrees & correlation stratified for gender

PREDICTORS OF DIFFICULT FONA

- **Difficulty identifying the location of the cricothyroid membrane**
 - Female sex
 - Age less than 8 years
 - **Thick/obese neck**
 - Displaced airway
 - Overlying pathology (eg, inflammation, induration, radiation, tumor)
- **Difficult access to the trachea through the anterior neck**
 - **Thick neck/overlying pathology**
 - Fixed cervical spine flexion deformity



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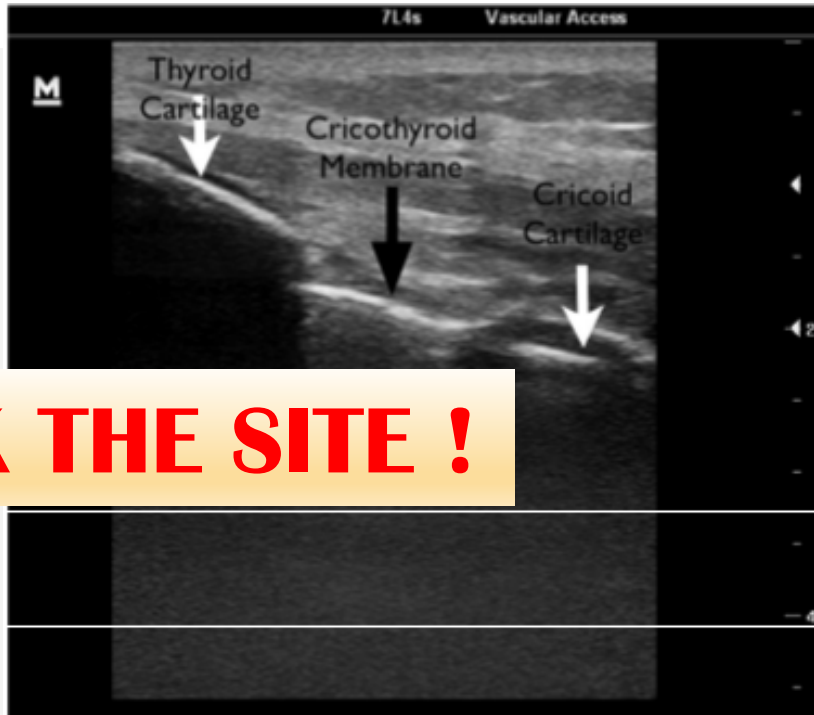


Brief Report

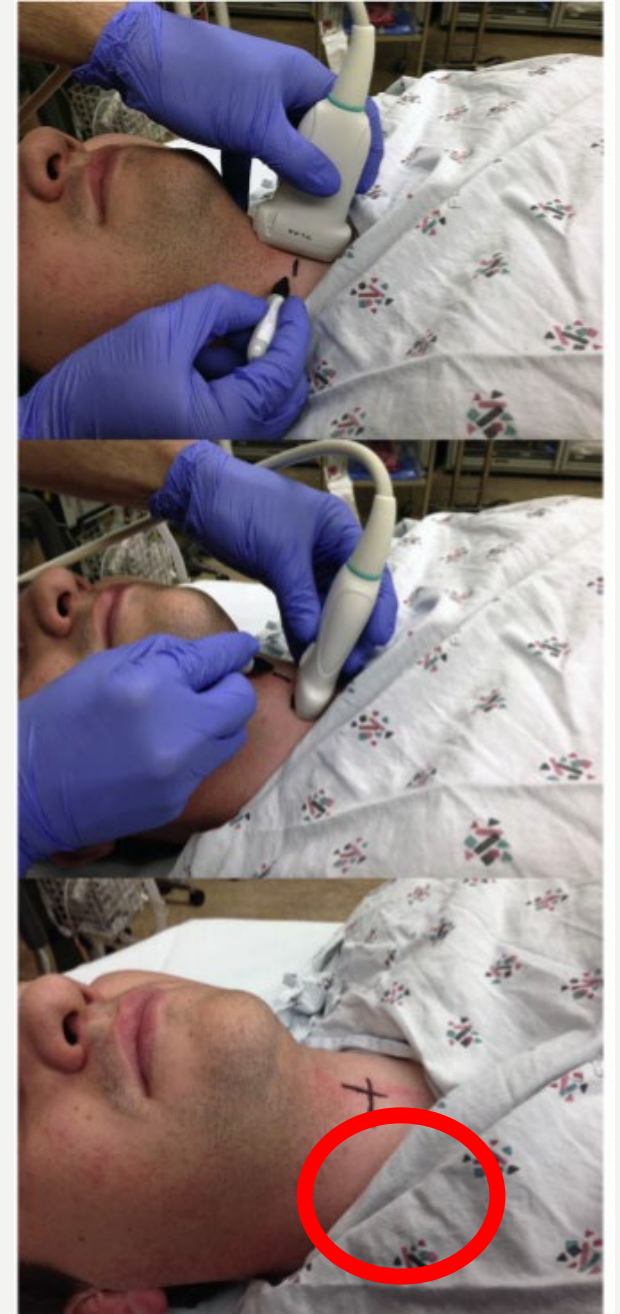
Accuracy of ultrasound-guided marking of the cricothyroid membrane before simulated failed intubation ☆☆☆☆

Michael Mallin, MD^{a,*}, Keith Curtis, MD^a, Matthew Dawson, MD^b, Patrick Ockerse, MD^a, Matthew Ahern, DO^a

^a University of Utah, Salt Lake City, UT
^b University of Kentucky, Lexington, KY



MARK THE SITE !



WHEN???

Not during CICO crisis,
but **before** starting to
manage the airways...

CASE REPORT

Open Access



Ultrasound-guided identification of the cricothyroid membrane in a patient with a difficult airway: a case report

Hiromu Okano¹, Kohji Uzawa^{1*}, Kunitaro Watanabe¹, Akira Motoyasu¹, Joho Tokumine¹, Alan Kawarai Lefor² and Tomoko Yorozu¹

Abstract

Background: Surgical cricothyroidotomy is considered to be the last resort for management of the difficult airway. A major point for a successful surgical cricothyroidotomy is to identify the location of the cricothyroid membrane.

Case presentation: We encountered a patient with progressive respiratory distress who was anticipated to have a difficult airway due to a large neck abscess. We prepared for both awake intubation and surgical cricothyroidotomy. The cricothyroid membrane could not be identified by palpation, but was readily identified using ultrasound.

Conclusion: Ultrasound-guided identification of the cricothyroid membrane may be useful in a patient with a difficult airway due to neck swelling.

Keywords: Cricothyroid membrane, Cricothyroidotomy, Ultrasound, Difficult airway

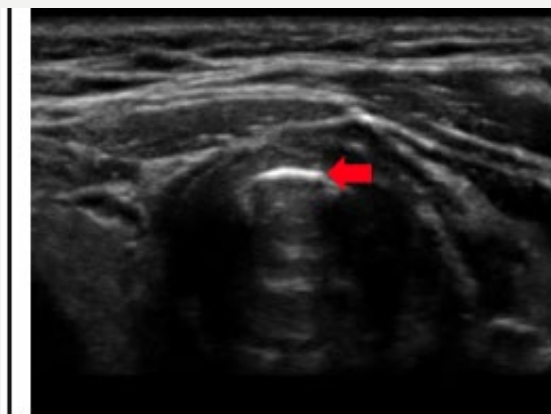


Fig. 2 Ultrasound-guided identification of the cricothyroid membrane. This is a cross-sectional view of the cervical ultrasound image. The red arrow shows the cricothyroid membrane. The cricothyroid membrane could not be identified by palpation, but was identified on ultrasound



Fig. 1 The patient's neck. The asterisk indicates the area palpated by the surgeon to find the cricothyroid membrane. The red circle shows the cricothyroid membrane identified by ultrasound

sprayed the vocal cords under endoscopic control. Fiberoptic intubation was successfully performed trans-orally without complications. The neck abscess was drained operatively. The patient was treated as an inpatient with antibiotics, and discharged on postoperative day 23, without complications.



Fig. 3 Cervical computed tomography. The white arrow indicates the apparent center of the neck. The true center (sagittal line) of the neck is present toward the right side. The ultrasound probe (white trapezoid) is placed perpendicularly to the skin and the ultrasound beam (red dashed arrow) directed to the cricothyroid membrane. The trachea is deviated to the right and rotated to the right

GRAZIE!

