



Il Supporto Ecografico nelle Vie Aeree difficili

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Emergenza Territoriale 118

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US Airway Management - Obiettivi

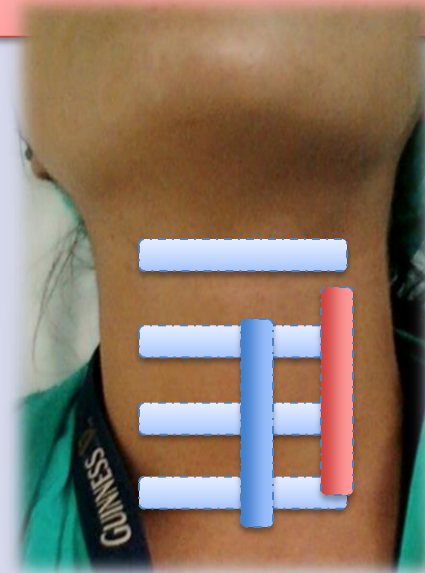
- Sonde
- Anatomia ecografica collo
- Confermare IOT
- Ausilio in «cricotiroidotomia» d'emergenza

Sonde e Posizioni

- Lineare
 - dettaglio
- Convex
 - Visione panoramica



- Trasversale
- Sagittale mediana
- Sagittale paramediana



Cosa vedo?

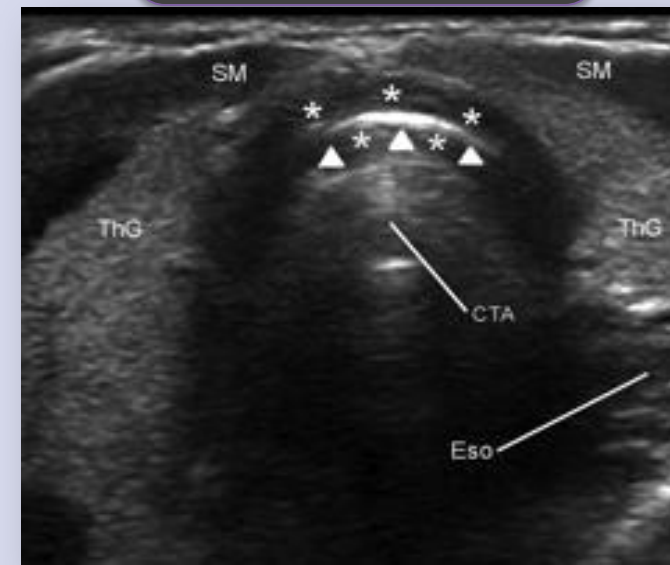
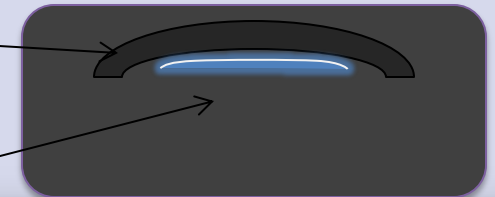
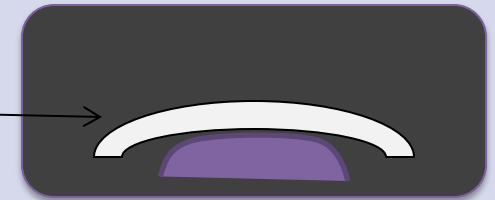
- Ossa
 - Iperecogene con ombra acustica ipoecogena
- Cartilagini
 - Ipoecogene con sottostante:
- **Interfaccia Aereo-Mucosa (A-M)**
 - Brillante iperecogena

La superficie intraluminare anteriore è:

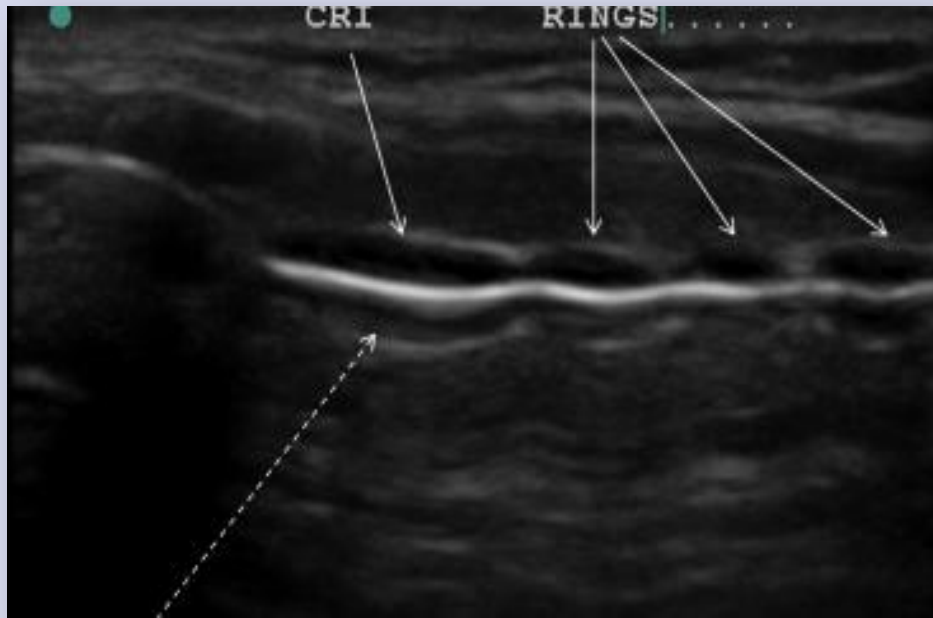
- Brillante iperecogena

Superficie intraluminare posteriore:

- Non si vede



Interfaccia Aero-Mucosa



Scansione trasversale

Cerca la «V» rovesciata di
Vie Aeree..

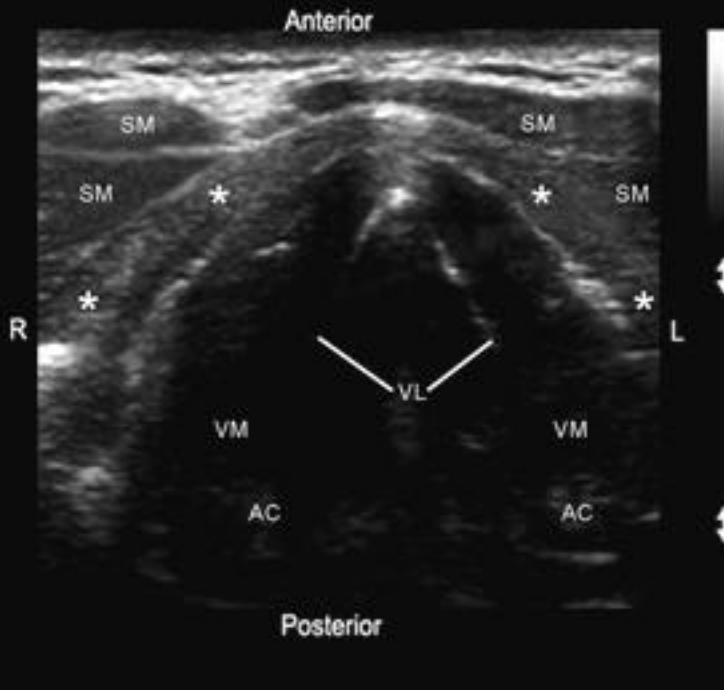


... in posizione
trasversale e
mediana...

... e poi la **“C”**



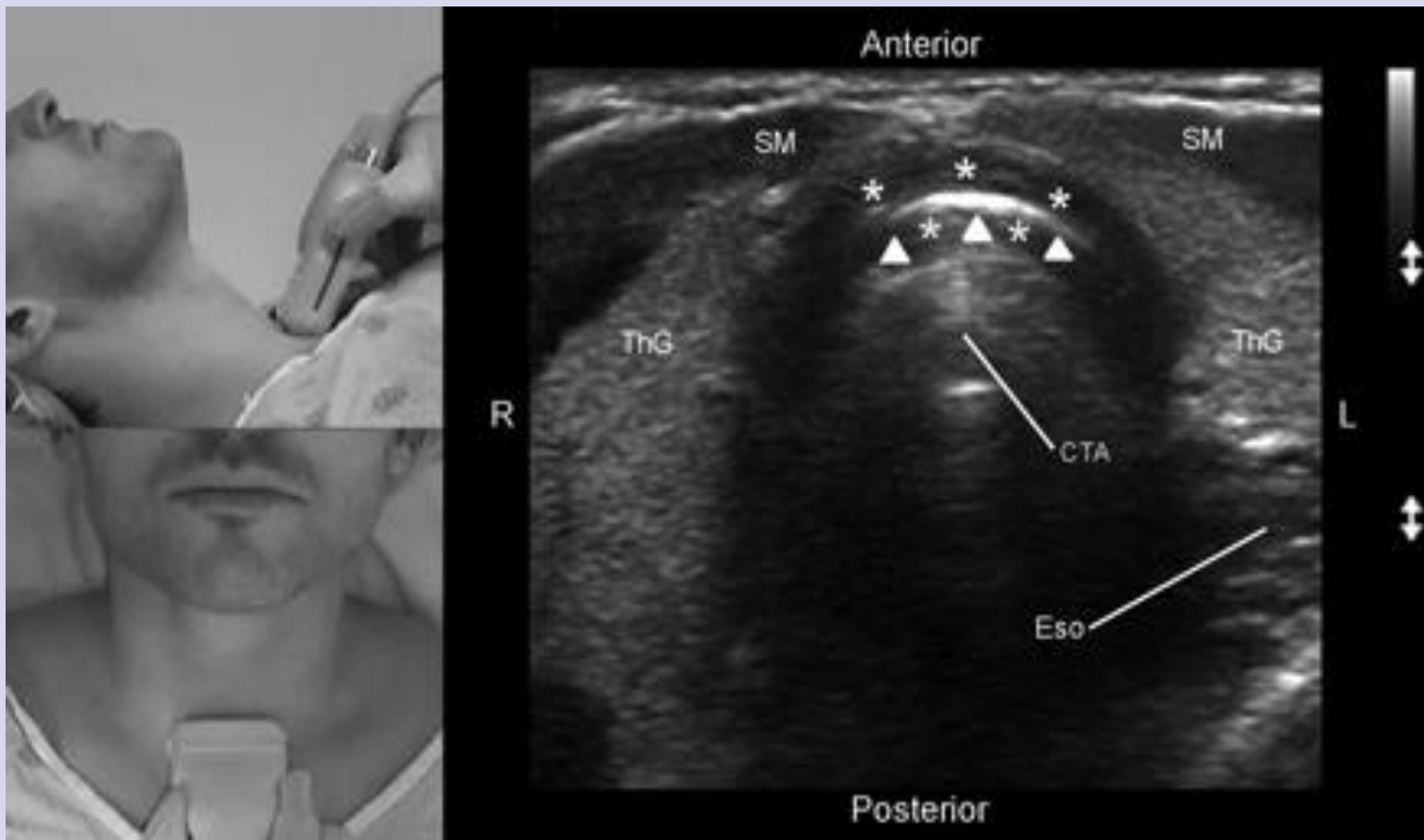
Corde Vocali

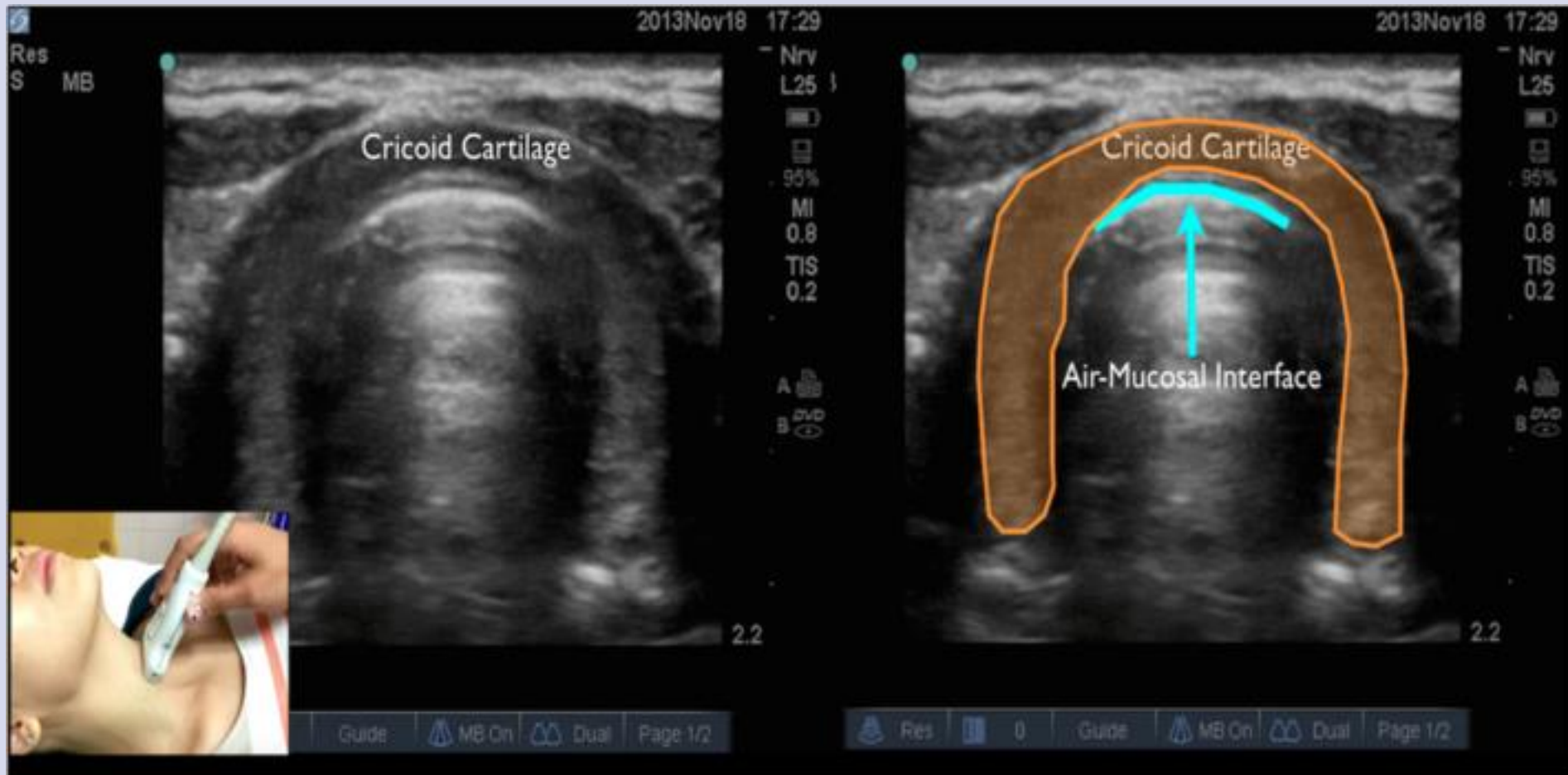


- S. Lineare
- P. trasversa :
- Corde vocali (legamenti)
 - triangolo
 - ipereco
- Muscoli vocali
 - ipoeco
- False corde
 - Ipereco (> contenuto lipidi)

AC indicates arytenoid cartilage; asterisks, thyroid cartilage; SM, strap muscles; VL, vocal ligaments, and VM, vocalis muscle.

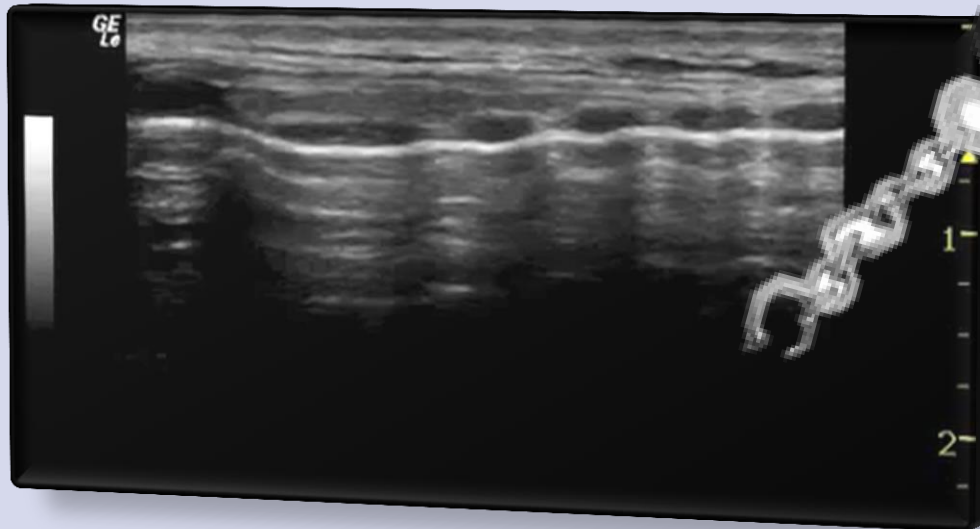
Crico e Trachea ...la "C"

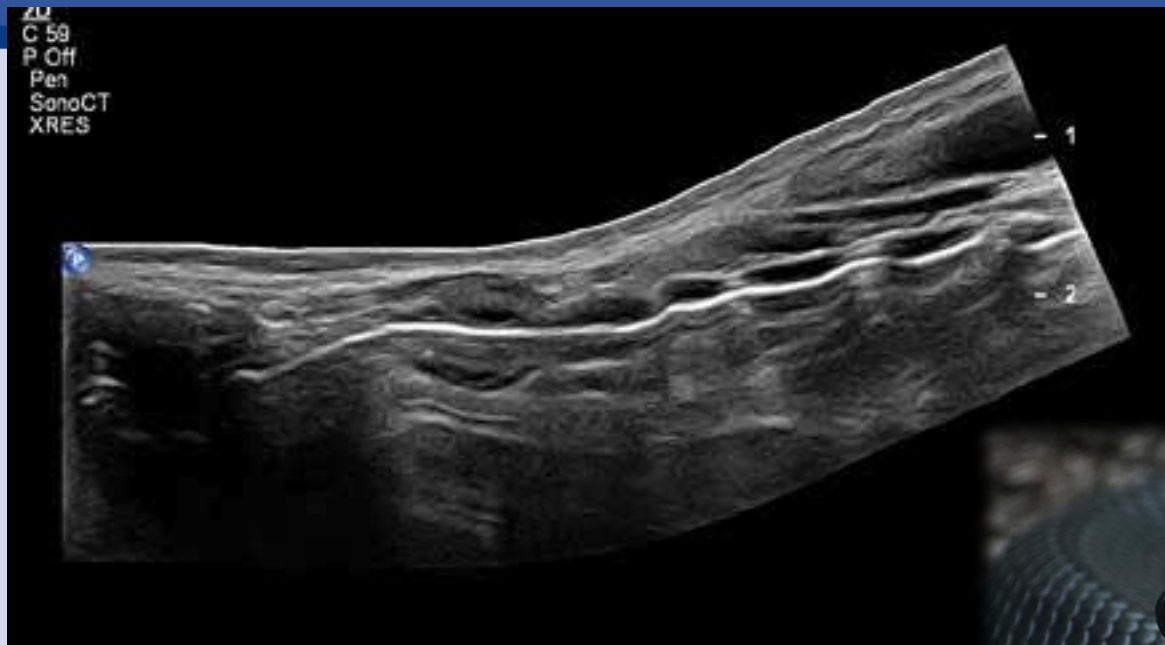


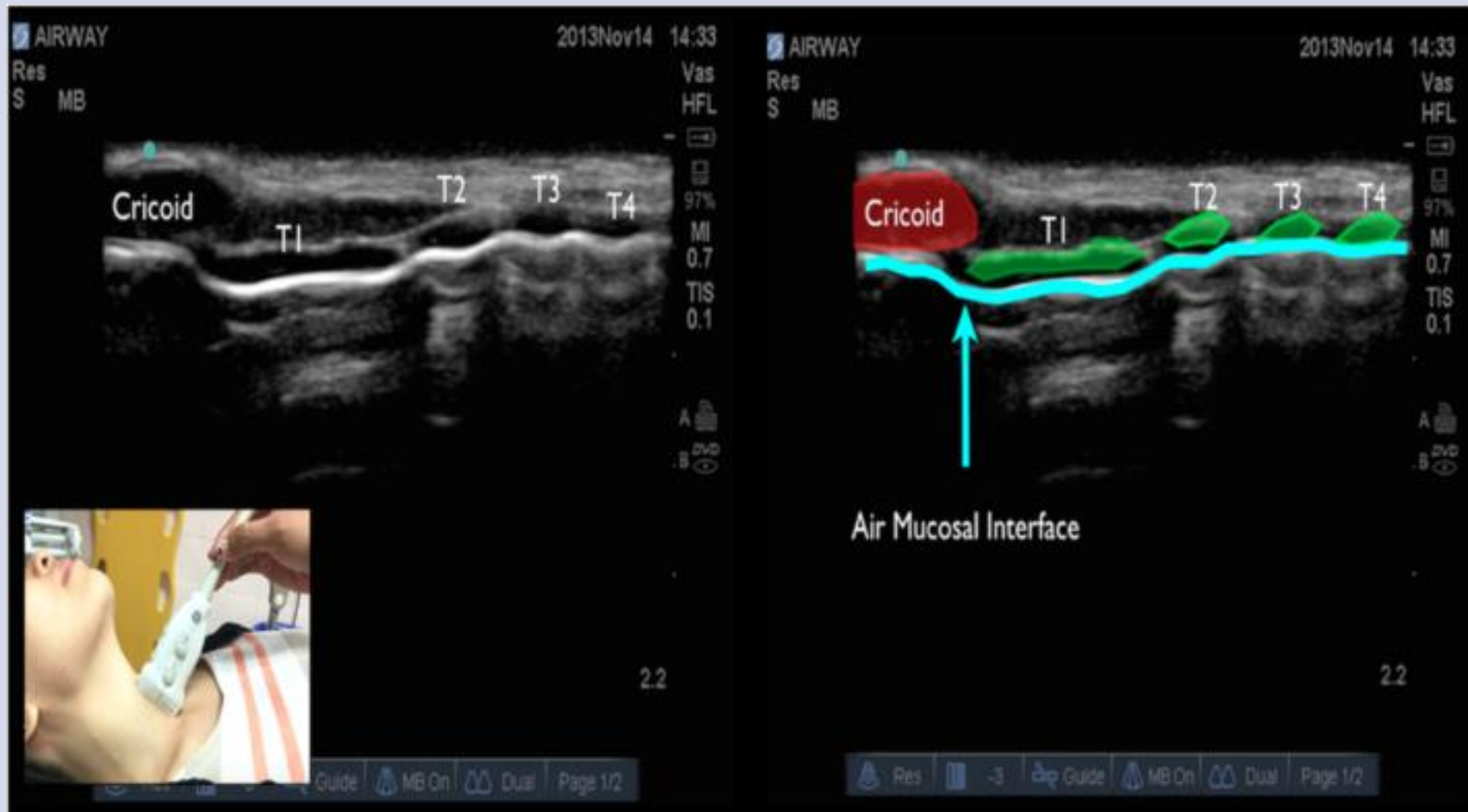


Scansione longitudinale: ruota di 90° e cerca la corona di rosario nera...

... in posizione longitudinale mediana

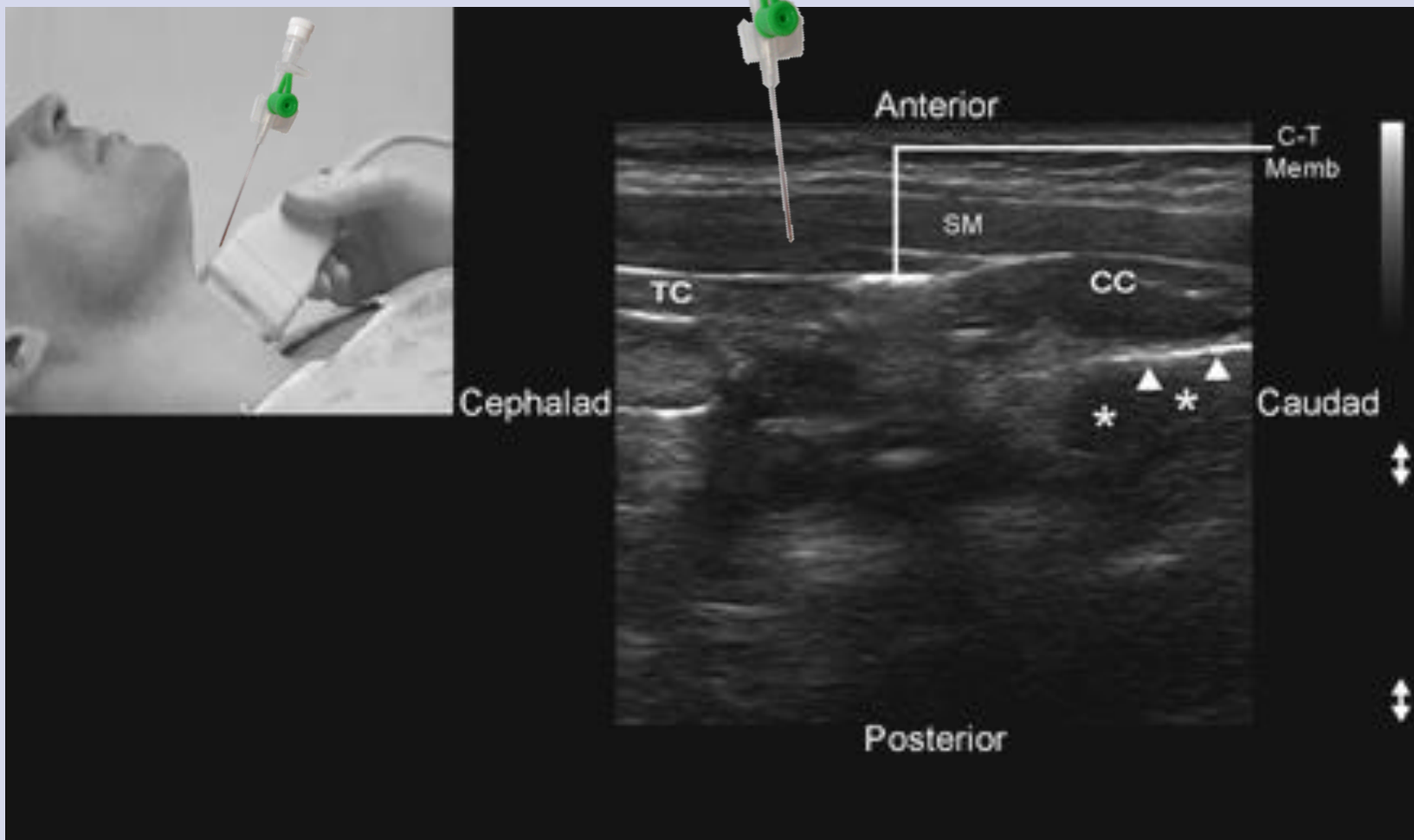




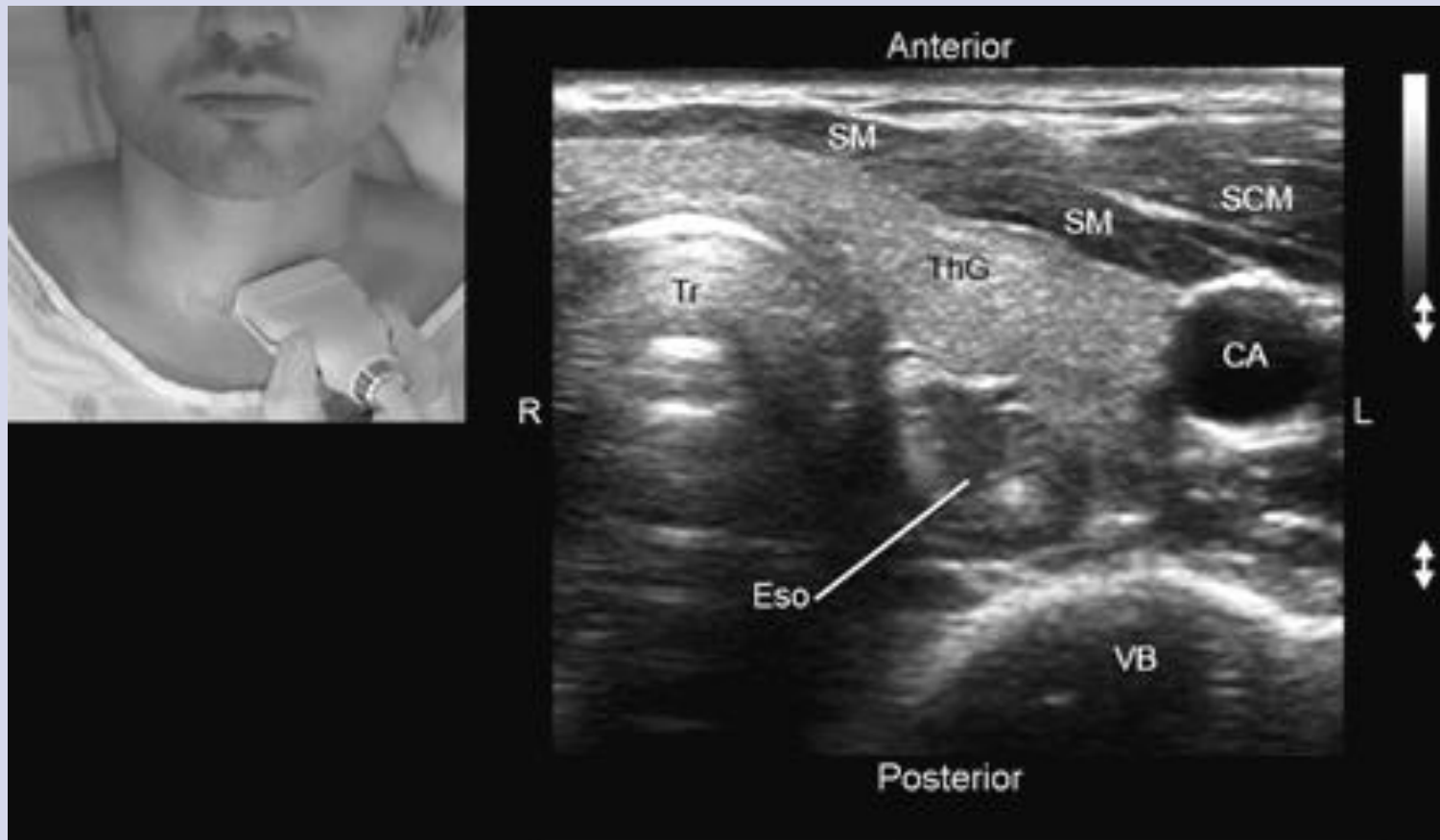


The image displays two side-by-side ultrasound scans of the airway, both dated 2013 Nov 14 at 14:33. The left scan shows a grayscale view of the airway with labels for 'Cricoid', 'T1', 'T2', 'T3', and 'T4'. The right scan is the same view with color overlays: a red area for 'Cricoid', green areas for 'T1', 'T2', 'T3', and 'T4', and a cyan line for the 'Air Mucosal Interface' indicated by a cyan arrow. Both scans show technical parameters: 'AIRWAY', 'Res', 'S', 'MB', 'Vas', 'HFL', 'MI 0.7', and 'TIS 0.1'. An inset photo in the bottom left shows a patient's neck with an ultrasound probe. The bottom of the image contains a control bar with 'Guide', 'MB On', 'Dual', and 'Page 1/2' on the left, and 'Res', '-3', 'Guide', 'MB On', 'Dual', and 'Page 1/2' on the right.

Membrana Crico-Tiroidea



Esofago



Gestione Vie aeree: Airway

Caso: M 45 aa, motociclista sbalzato, GCS 8, anisocorico, SpO₂ 92% in O₂ in discesa, tachipnea, PAS 110

Il paziente arriva in Sala Emergenza in respiro spontaneo



“The Airway Strategy”

Pianificare & Condividere

- **Airway** strategy – concordata – comunicata – condivisa con il team
- Deve includere un **PIANO A** (IOT)
- Deve includere **PIANO B** (Presidio EG)
- **PIANO C** (Cricotiroidotomia)
- Utile una **checklist** aiuta a verbalizzare e pianificare
- ***Pre-marking della membrana crico***

The “Airway Strategy”

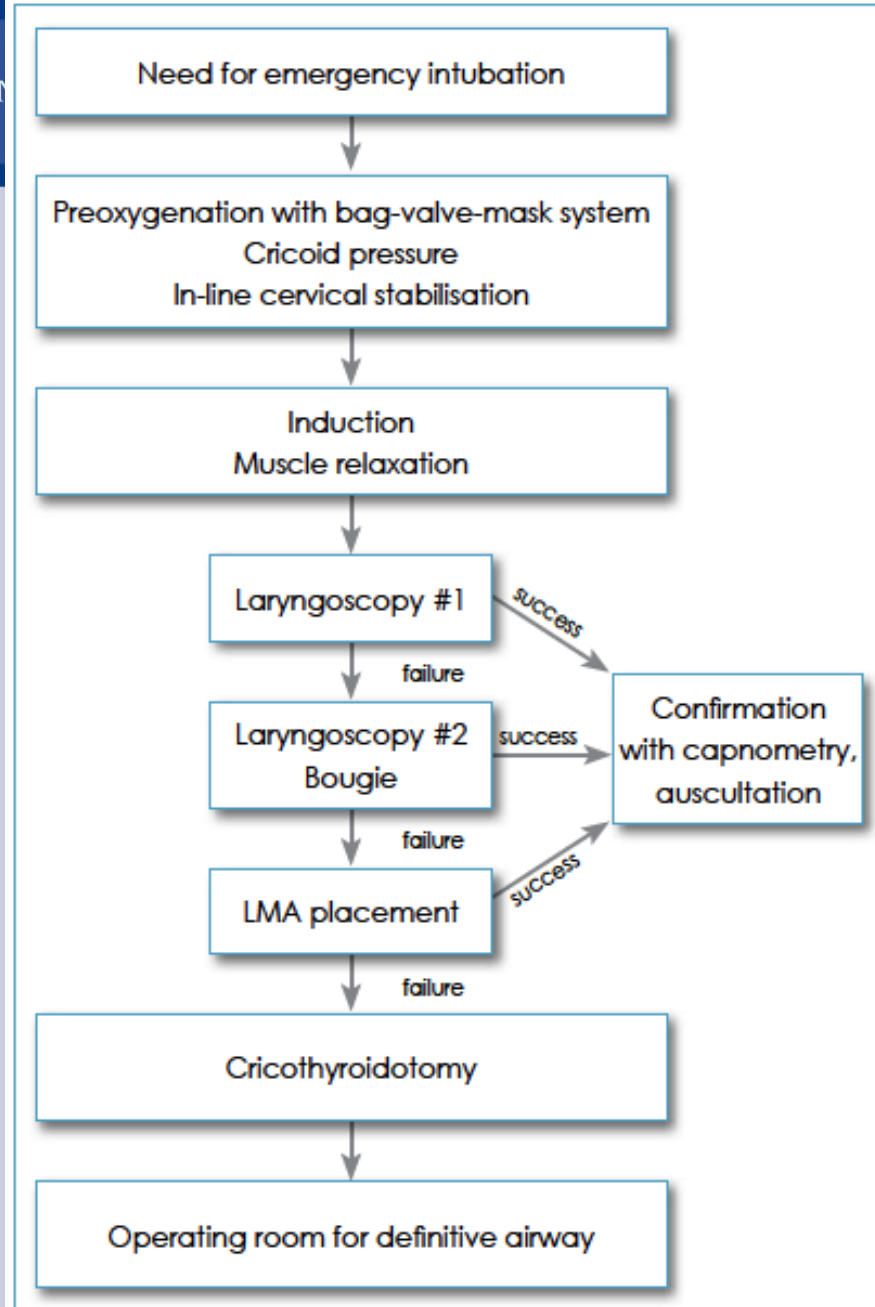
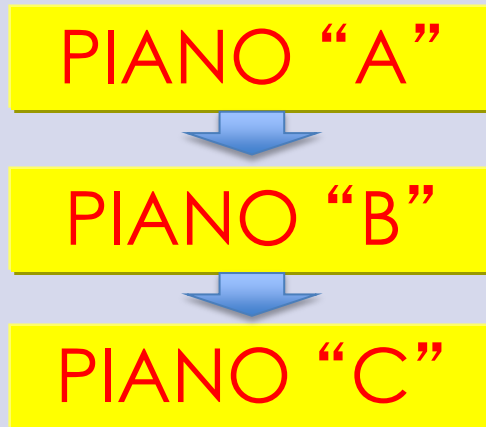


Figure 3: Emergency airway management algorithm used at the R Adam Cowley Shock Trauma Center⁴

Vie Aeree in Emergenza – Piano & Strategia

Piano

A₁

O₂ →
 - Pre-ossigenazione
 - Posizione Testa
 - Monitor: Fc, ECG, FR, SpO₂, PA

Farmaci

MDZ 0,1-02 mg/kg
 Keta 1-2 mg/kg
 Propofol 1-2mg/kg
 Fenta 0,1-02 mcg/kg
 Sux 1,5-2mg/kg
 Rocuronio 1,2 mg/Kg



Cerotto/
Fissatubo

Lubrificante

- ✓ Distribuisci i compiti
- ✓ Anticipa le difficoltà
- ✓ Individua/Mark su membrana cricoidea (Us Ecografo)
- ✓ Prepara Carrello Vie Aeree
- ✓ Fai un piano A - B - C
- ✓ Immobilizzazione manuale
- ✓ Prepara Aspiratore
- ✓ Farmaci
- ✓ Guarda il Tempo!
- ✓ Se difficoltà → **Chiama aiuto!**



Piano

A₂

Mandrino Lungo
Bougie

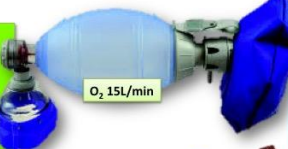
- ✓ Strategia Alternativa
- ✓ Riposiziona il capo
- ✓ Ventilazione a 2 mani
- ✓ **Mandrino lungo**
- ✓ **Video Laringoscopia**

Video Laringoscopia



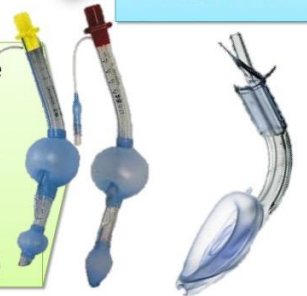
Piano

B



- ✓ Mantieni Ossigenazione
- ✓ Mantieni Ventilazione

- Ventilazione bimanuale
 Pallone
 Maschera
 - PEG (Presidi Extra Glottici)



- ✓ Can't Intubate
- ✓ Can't Ventilate

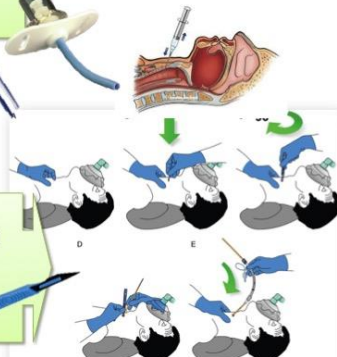
Piano

C

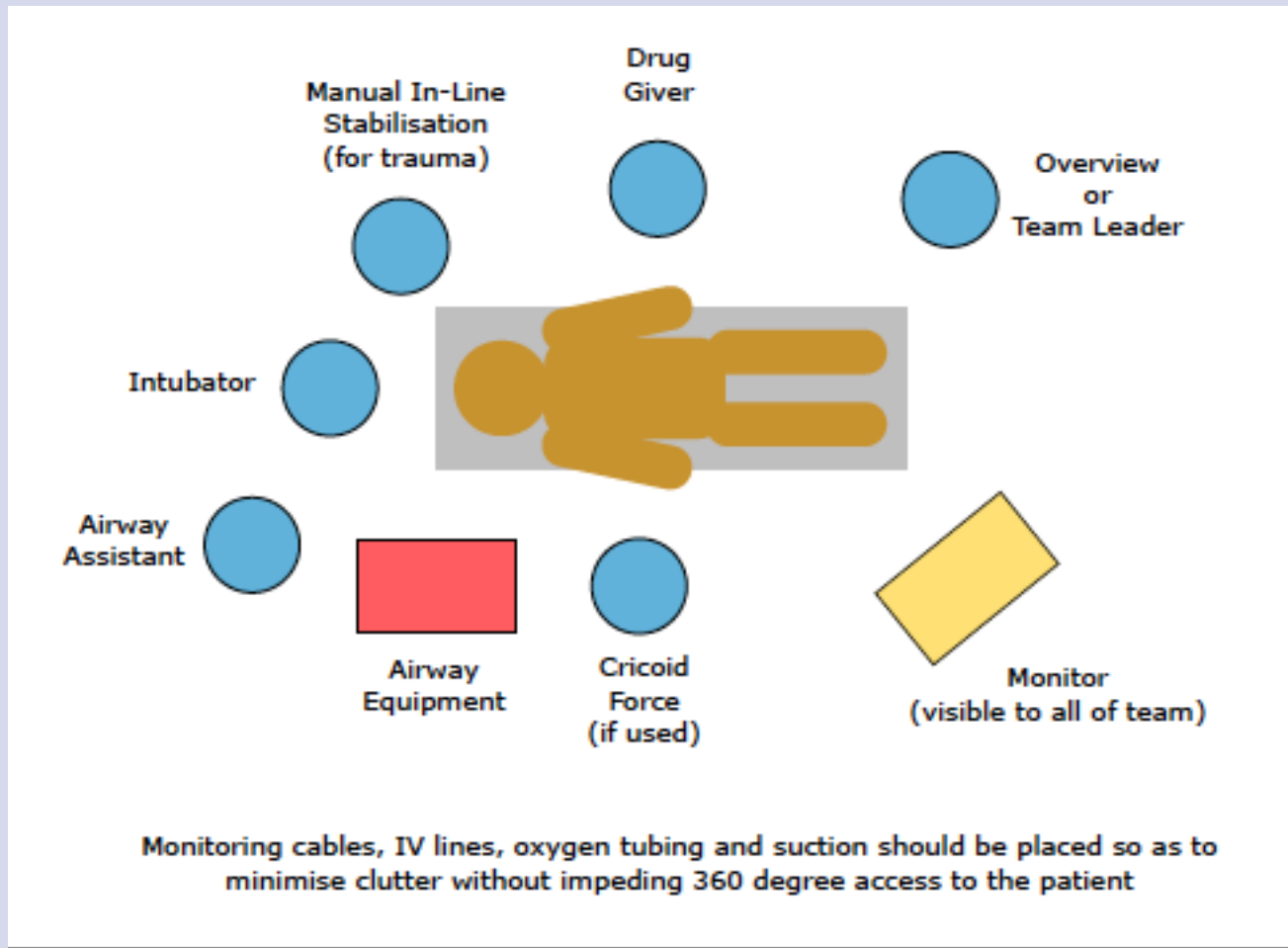
Cricotirotomia con Ago



Cricotirotomia con Bisturi + Bougie



The Airway Team



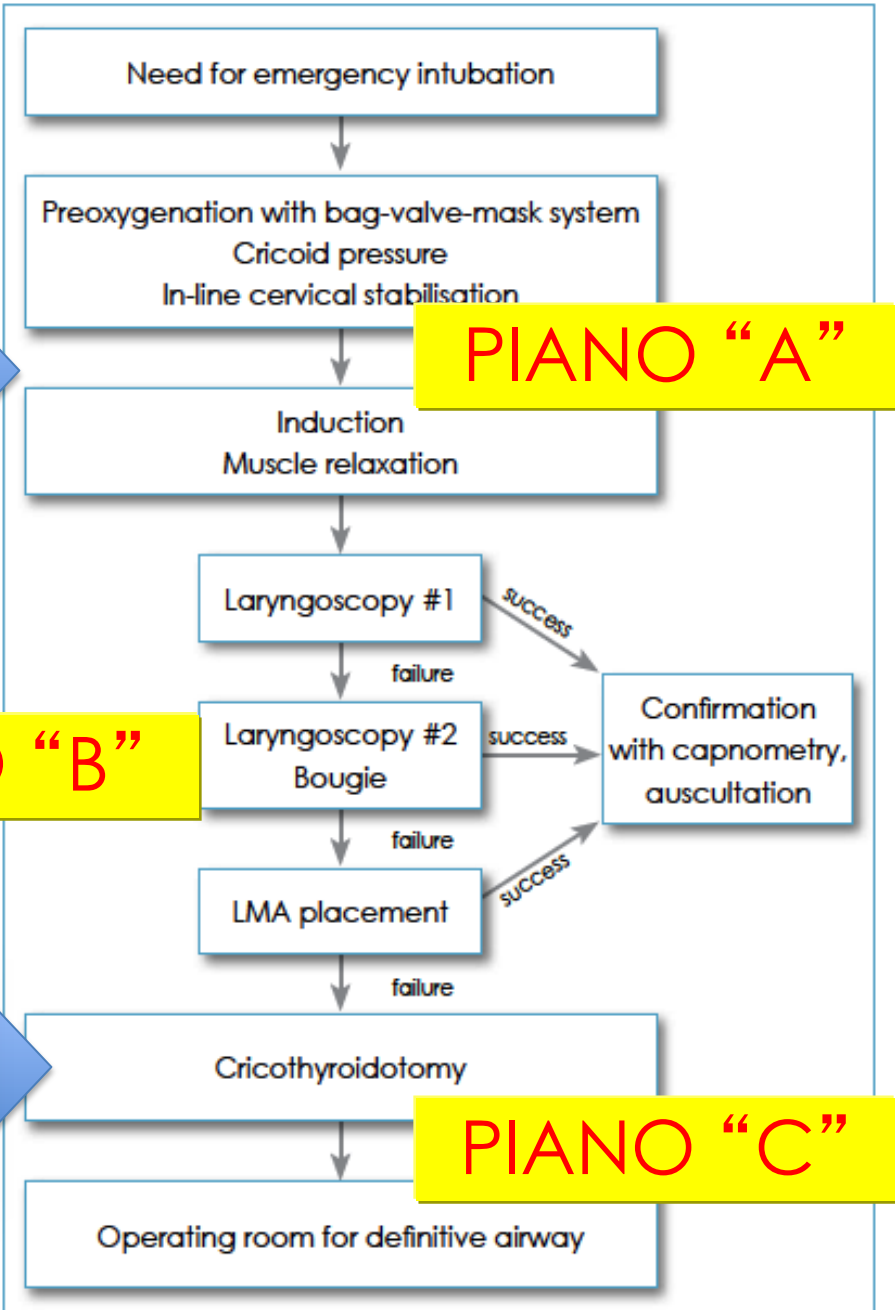
US e Airway Management





The “Airway Strategy & US”

PIANO “B”



PIANO “A”

PIANO “C”

Figure 3: Emergency airway management algorithm used at the R Adam Cowley Shock Trauma Center⁴

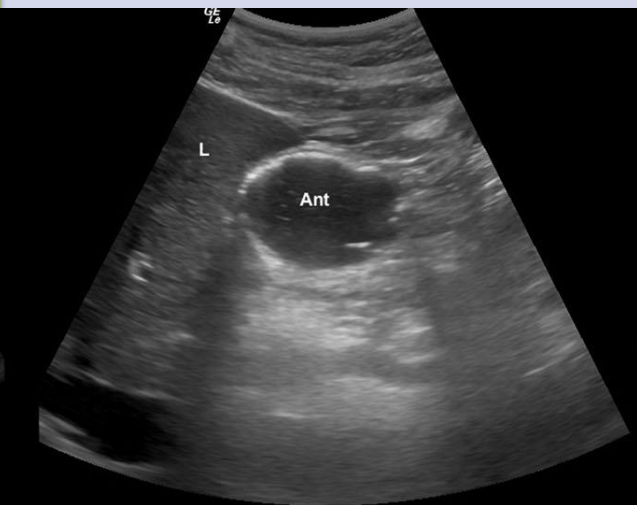


PIANO “A” & US

- Preparazione & Monitoraggio
- **Pre-Mark membrana Crico**
- **Valutazione “stomaco pieno” & contenuto**
- **Misura Diametro trachea nel bambino**



Stomaco Pieno?





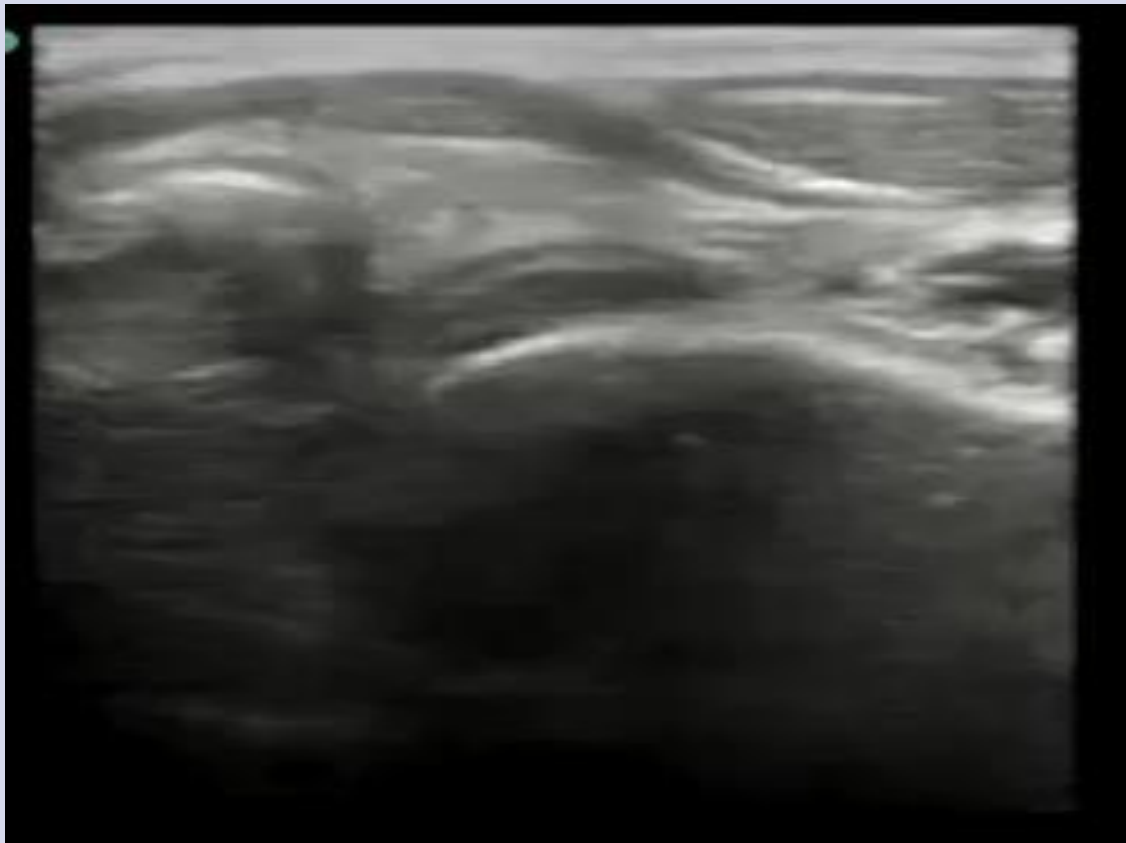
PIANO “A” & US

- **Conferma IOT:**
 - Laringoscopia diretta
 - Ascultazione
 - ETCO2
 - **Ecografia**

Cosa
vedi?



▶ IOT
corretta



- ▶ IOT in esofago

Conferma IOT - Eco



Lr

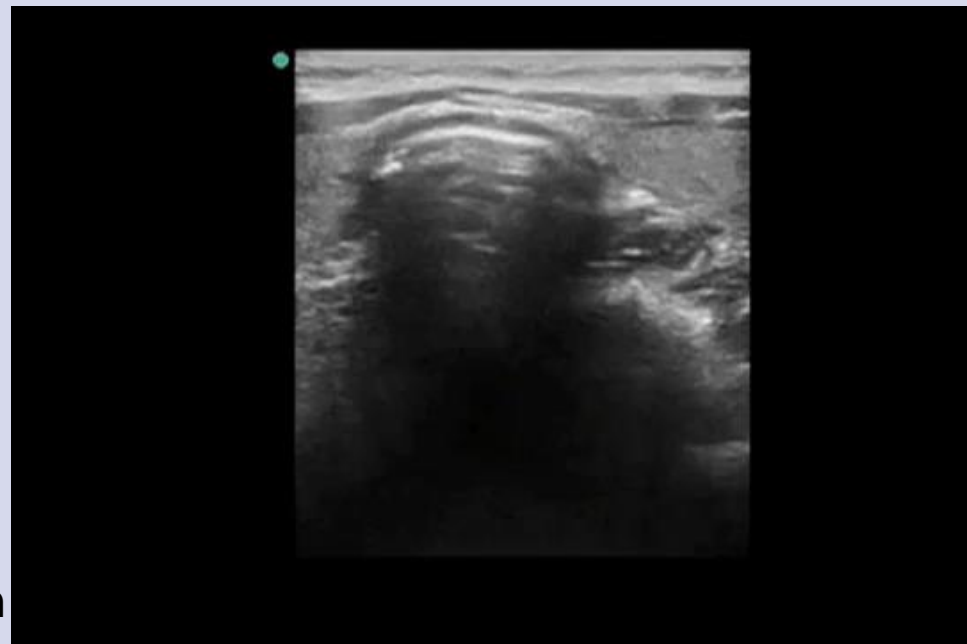
Tr

Pdx

Psn

St

Es



Conferma Ventilazione - Eco



Lr

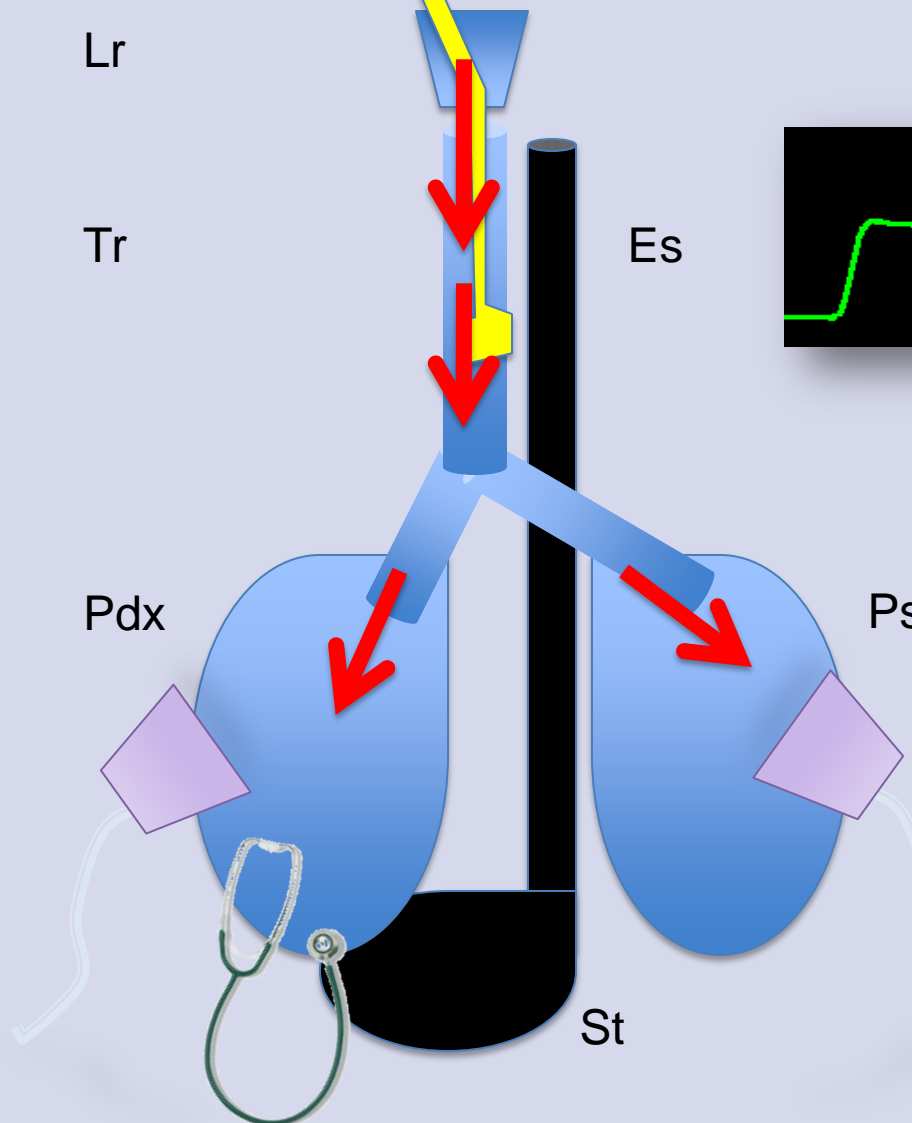
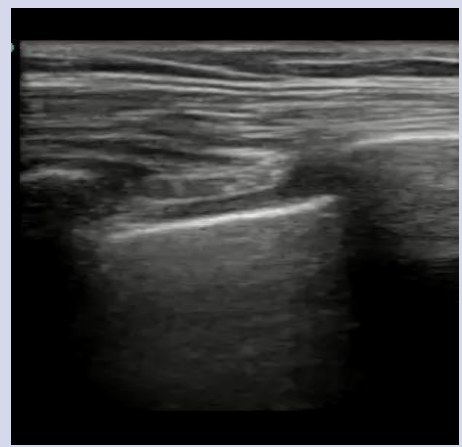
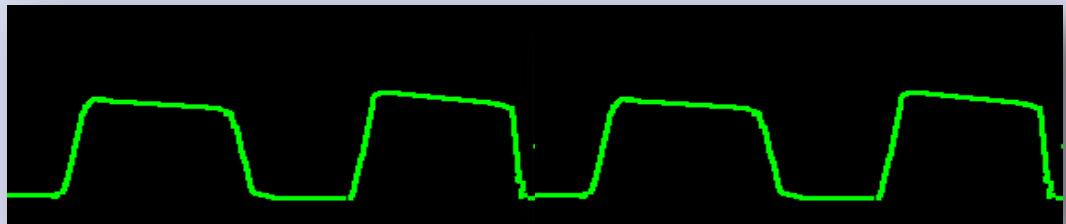
Tr

Pdx

Psn

Es

St





PIANO “A” & US

ECOGRAFIA

- Conferma “real time” IOT Tracheale Vs Esofagea
- Controllo espansione polmonare – bilaterale –
monolaterale
 - Diaframma
 - sliding, lung point...

Tracheal rapid ultrasound exam (T.R.U.E.) for confirming endotracheal tube placement during emergency intubation^{☆,☆☆}

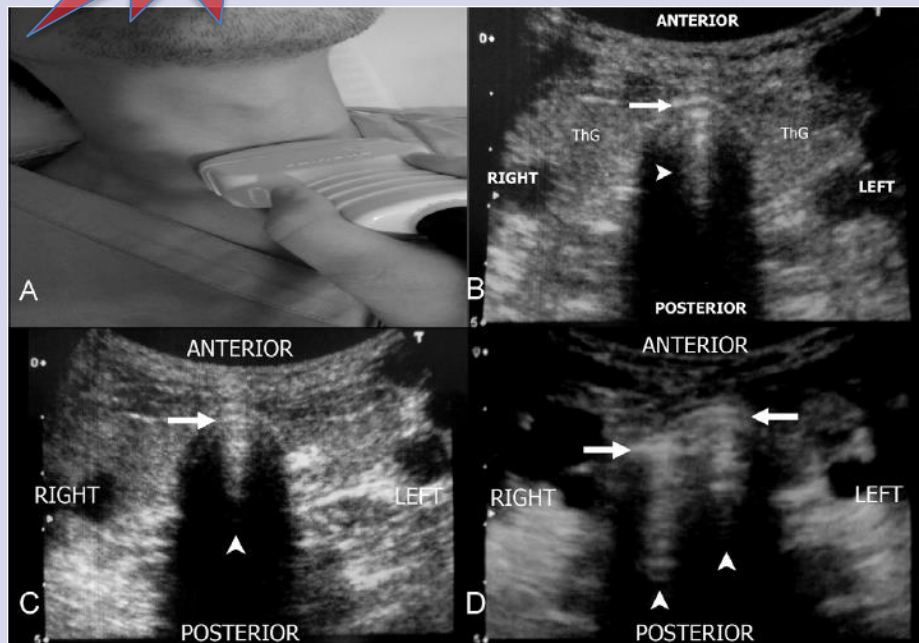
Hao-Chang Chou^a, Wen-Pin Tseng^a, Chih-Hung Wang^a, Matthew Huei-Ming Ma^a, Hsiu-Po Wang^b, Pei-Chuan Huang^a, Shyh-Shyong Sim^a, Yen-Chen Liao^a, Shey-Yin Chen^a, Chiung-Yuan Hsu^a, Zui-Shen Yen^a, Wei-Tien Chang^a, Chien-Hua Huang^a, Wan-Ching Lien^{a,*}, Shyr-Chyr Chen^a

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TRUE

Resuscitation 82 (2011) 1279–1284



112 paz, ED, Studio
osservazionale
Conferma IOT → ETCO₂ Vs
ECO
15% Int in esofago

- ETCO₂ = 5 insufl = 20–30''
- ECO
 - 9 sec
 - Accuratezza 98%

Airway Management... a teamWork!



can't intubate can't ventilate

PIANO
"C"

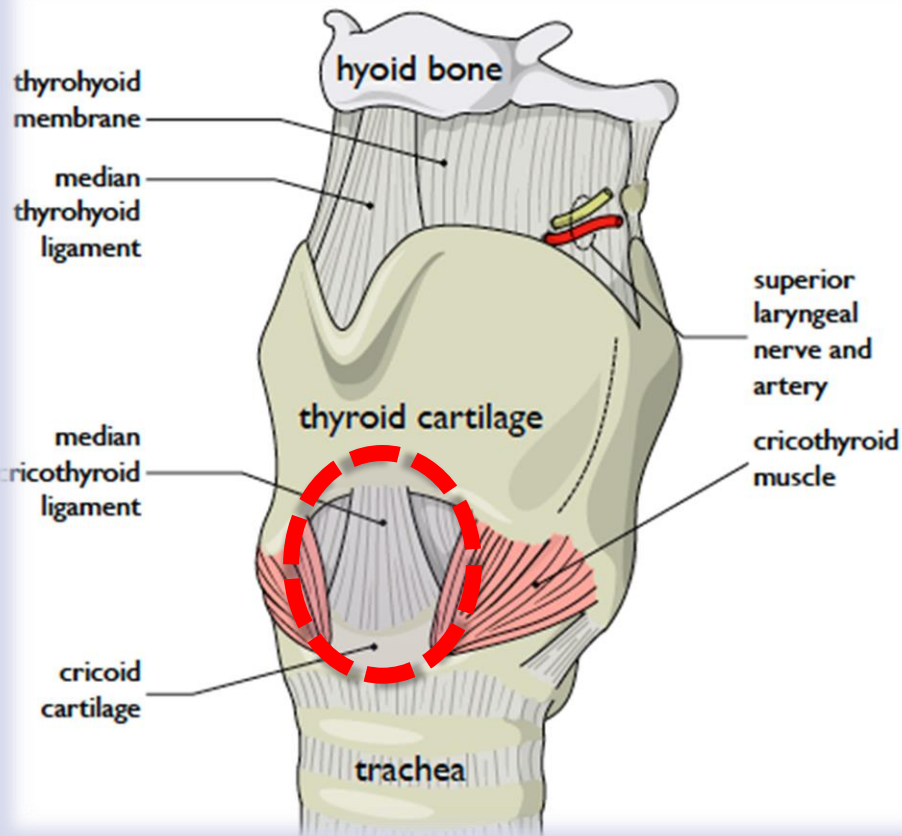
Paziente NON VENTILABILE e
NON INTUBABILE ...

→ *Accesso Cricoideo*



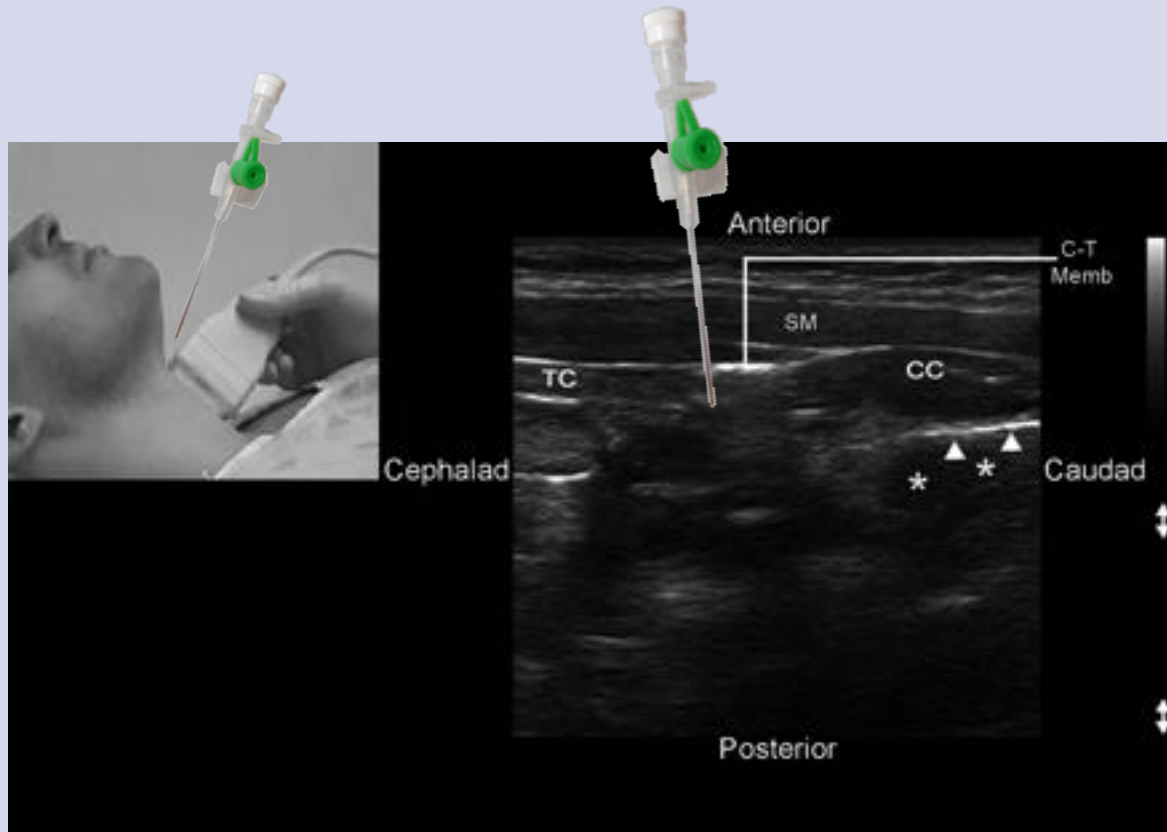
can't intubate can't ventilate

PIANO
"C"



- Cricotirotomia con ago
- Cricotirotomia chirurgica

Membrana Crico-Tiroidea

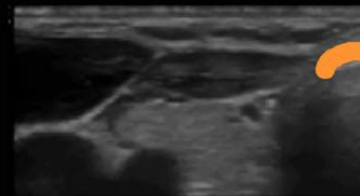




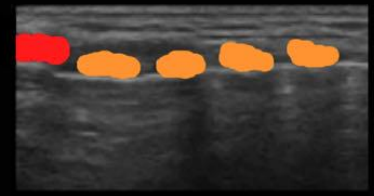
a



b



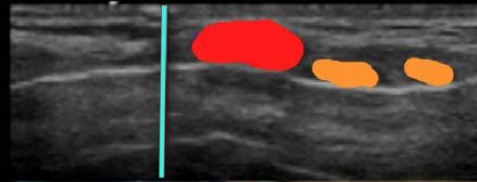
c



d



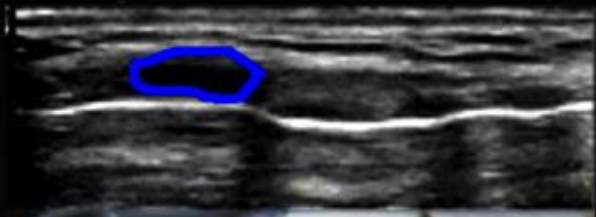
e



f



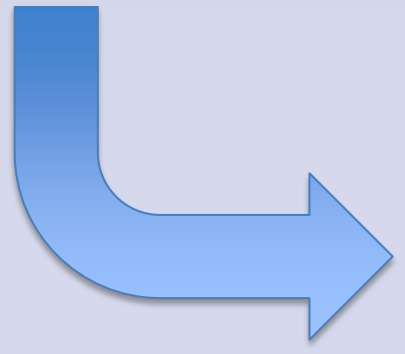
g



E



F



C

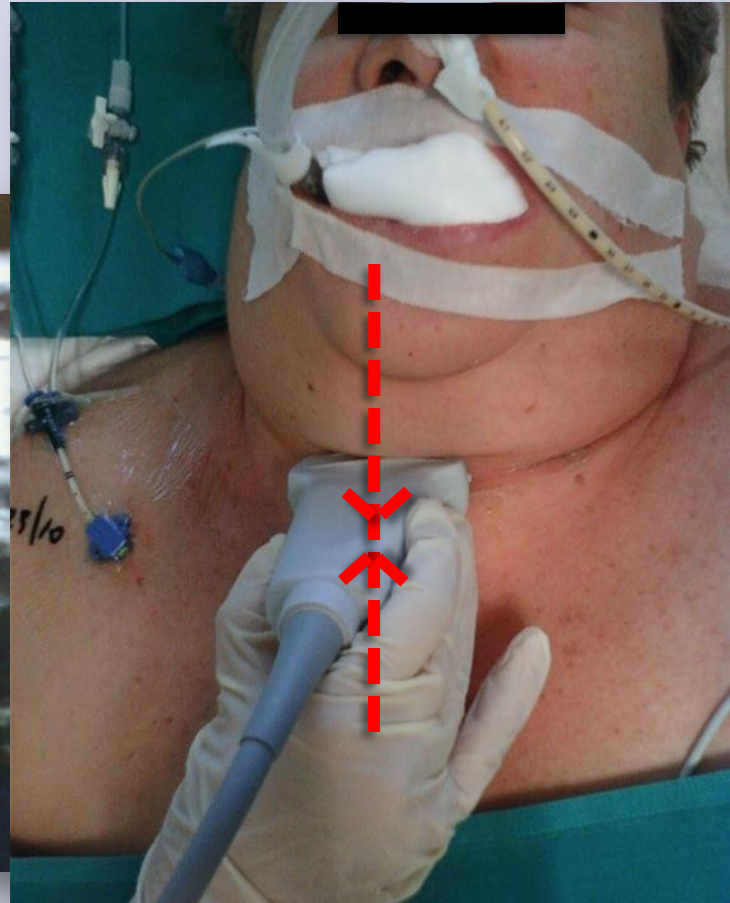
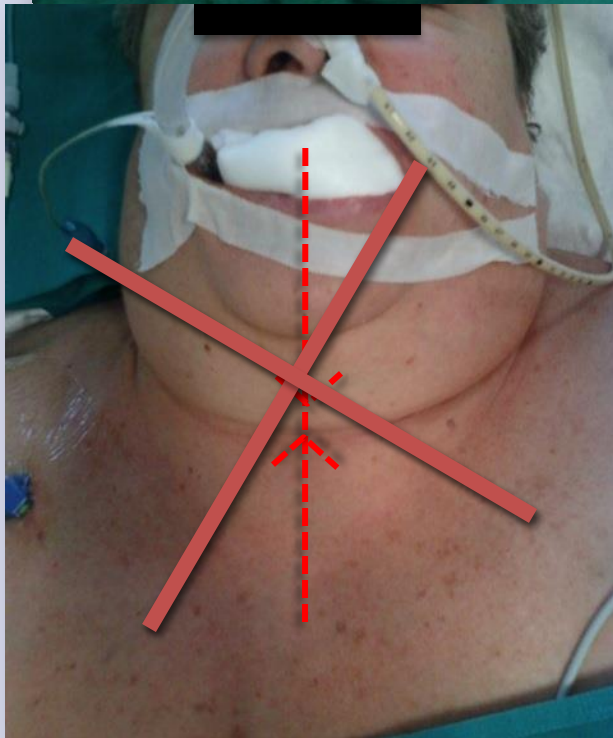
Can't intubate, can't ventilate...



Dov' è la membrana cricoidea?



Eco – guida...
make it easy...





Domande ?

CONCLUSIONI

- US nella valutazione Airway
- Ausilio Complementare
 - Intubazione tracheale
 - Cricotirotomia in emergenza