

x congresso nazionale

**simeu**

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# Procedure nel trauma

**Giuseppe Pepe**, MD, PhD

Medicina e Chirurgia d'Urgenza, Accettazione

DEAS AOU Careggi, Firenze

## ***Da dove veniamo...***

*«Siamo partiti molti anni fa dal portone carraio dell'Ospedale, dove facevamo gli **uscieri**, a rotazione con altri medici...si trattava di **smistare** nei diversi reparti (... c'erano molti letti disponibili)...spesso i pazienti critici erano gestiti da specialisti, anche perché **noi non eravamo in grado di farlo...***

*Noi ci mettiamo la testa, le mani ed anche il cuore: ci piace studiare e siamo **artigiani...**»*



## Critical Trauma Skills and Procedures in the Emergency Department

Jorge L. Falcon-Che  
Dana Mathew, MD<sup>b</sup>  
Angelisse Almodovar

### KEYWORDS

- Chest tube thoracotomy
- Venous cutdown

### KEY POINTS

- Emergency physicians must be dexterous while performing trauma-related procedures, such as chest tube thoracotomy, emergency department thoracotomy, surgical airway, early recognition of compartment syndrome, and venous cutdown.
- It is of paramount importance for the practitioner to be dexterous while performing these procedural skills to maintain function while avoiding complications and improving trauma patient outcomes.

### INITIAL EVALUATION

In the initial evaluation between prehospital and hospital care, the creation of advanced trauma life support (ATLS) guidelines for management of trauma patients. The creation of the ABCDE mnemonic facilitates the identification of life-threatening injuries and creates a systematic approach following logical and sequential treatment priorities.

## KEY POINTS

- Emergency physicians (EP) must be familiar with trauma emergencies.
- EP must be dexterous while performing trauma-related procedures, such as chest tube thoracotomy, emergency department thoracotomy, surgical airway, early recognition of compartment syndrome, and venous cutdown.
- It is of paramount importance for the practitioner to be dexterous while performing these procedural skills to maintain function while avoiding complications and improving trauma patient outcomes.

- **Conoscenza**
- **Capacità**
- **Abilità**
- **Competenza**
- **Esperienza**

<sup>a</sup> Department of Emergency Medicine, University of Puerto Rico School of Medicine, Hospital UPR Dr Federico Trilla, 65th Infantry Avenue Km 3.8, Carolina, PR 00985, USA; <sup>b</sup> WakeMed Health & Hospitals, Emergency Services Institute, 3000 New Bern Avenue, Raleigh, NC 27610, USA; <sup>c</sup> Emergency Medicine, University of North Carolina, 170 Manning Drive, CB #7594, Chapel Hill, NC 27599-7594, USA; <sup>d</sup> Uniformed Services University of the Health Sciences, 4301 Jones Bridge Road, Bethesda, MD 20814-4799, USA

\* Corresponding author. PMB-209 PO Box 6022, Carolina, PR 00984.  
E-mail address: jfalconc@gmail.com

# Laboratorio teorico-pratico

## PROCEDURE INVASIVE



- Pepe Giuseppe
- Gamboni Alessio
- Germini Federico
- Giannazzo Giuseppe
- Palmari Nicola
- Pratesi Mauro
- Taliano Claudio
- Ricchiardi Alberto
- Bacciottini Nicola



# Il “nostro” patto d’aula

- Acquisire competenze
- Perfezionare le conoscenze
- Approfondire esperienza
- Raggiungere le capacità tecniche sino alla completa padronanza ed autonomia.
- *Ridurre al minimo il fattore emotivo (la paura di ... )*

# ***Lo strumentario***



***Cerusico***



***Medico EU***



## ***Cosa sappiamo ...***

L'assistenza di **alta qualità** riduce in modo significativo la mortalità e migliora gli esiti del paziente con trauma grave

Oltre il 70% dei decessi avviene entro le prime 4 ore dal trauma (molte riconducibili a cause evitabili e legate ad errori clinico - organizzativi)

Responsabilità della catena di eventi che garantisce qualità e continuità dal luogo dell'incidente al trattamento definitivo

Obiettivo: Organizzazione, efficienza, competenza tecnica, coordinamento inter-specialistico



# *Presidi immobilizzazione temporanea*

## **PREOSPEDALIERA**

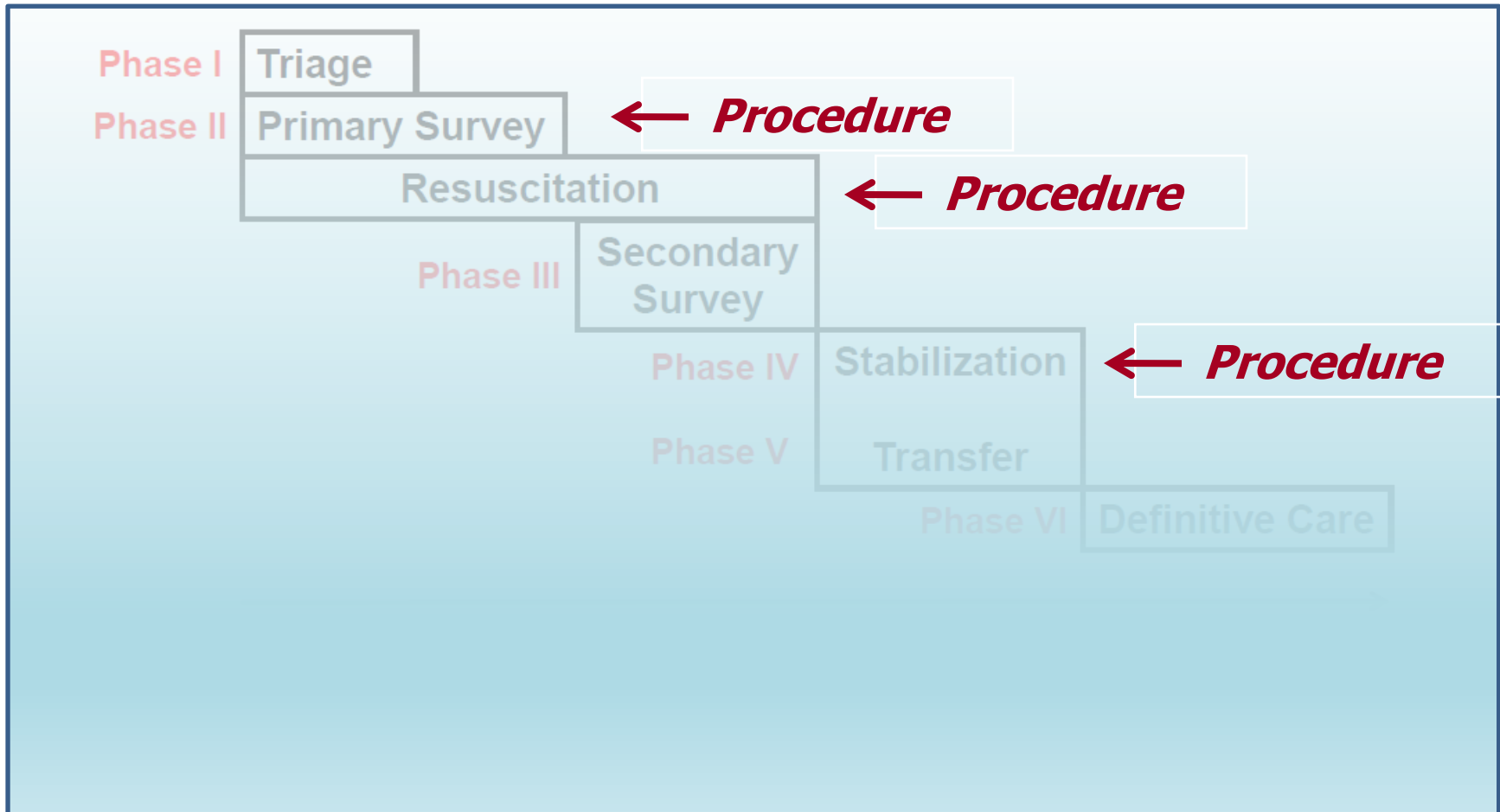




# *Sapere cosa non fare*



# *... assicurare le «corrette procedure» nel trauma*



## PHASE II: THE PRIMARY SURVEY

**A**irway

**B**reathing

**C**irculation

**D**isability or neurologic **D**amage

**E**xpose the patient

Purpose is to identify and treat life threatening injuries:

- Airway obstruction
- Breathing difficulties
- Severe external or internal haemorrhage

# *Procedure vie aeree*

## **AIRWAY DEVICES**

### **Oropharyngeal airway**

- Use if patient unconscious
- Use correct size - measure from front of ear to corner of mouth
- Slide airway over tongue
- If patient resists, gags or vomits, remove immediately!

### **Nasopharyngeal airway**

- Better tolerated if patient is semi-conscious
- Pass well lubricated into one nostril
- Direct posteriorly, towards the throat

# Procedure via aeree

Before attempting intubation

**Is there an indication?**

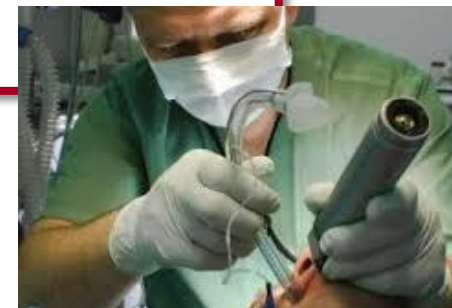
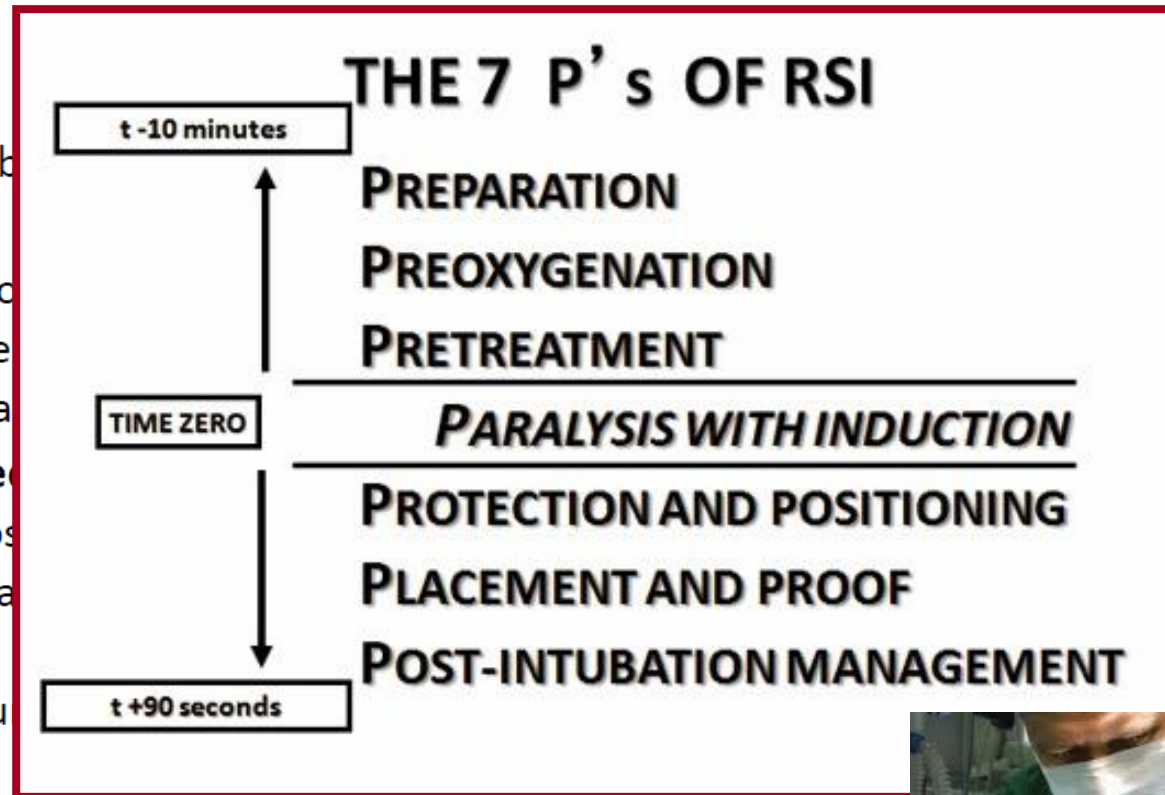
- Failure to maintain consciousness
- Failure to oxygenate
- Impending airway failure

**Do you have working equipment?**

- Functioning laryngoscope
- Appropriate endotracheal tube
- Bag-valve mask
- Working oxygen source
- Suction

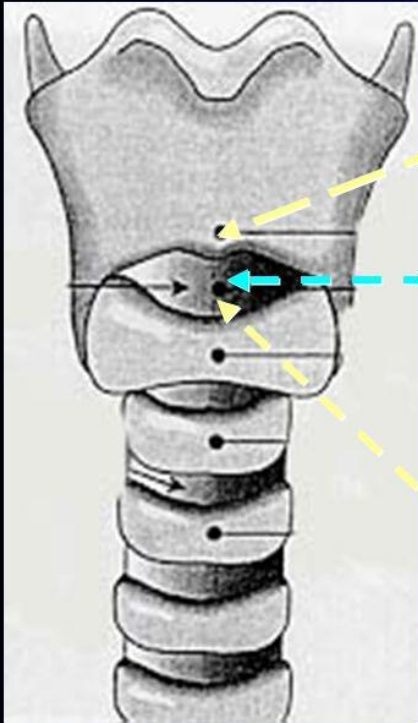
**Do you have a post-intubation plan?**

- Is a mechanical ventilator available? (unless only short-term need)
- Are sedative drugs available?



# *Trattamento vie aeree e ventilazione*

## *Cricotiroidotomia con ago*



Cartilagine

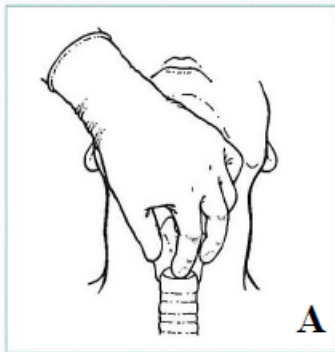
Sede  
piccola  
palpabile  
cartilaginea

Cartilagine



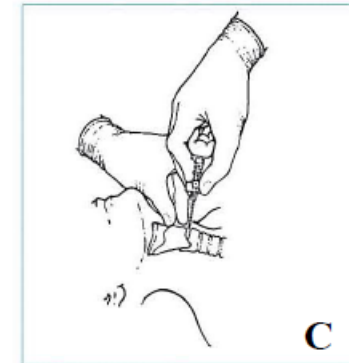
# *Trattamento vie aeree e ventilazione*

## LARGE NEEDLE CRICOTHYROIDOTOMY



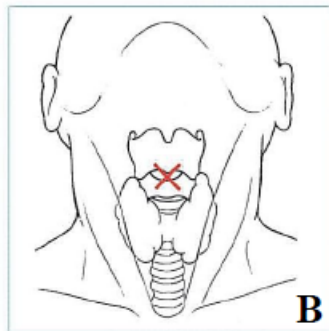
**A**

- Puncture the crico-thyroid membrane with a large bore catheter attached to syringe filled with water or saline.
- Aspirate as you insert. When entering the trachea, air bubbles will appear in the syringe.



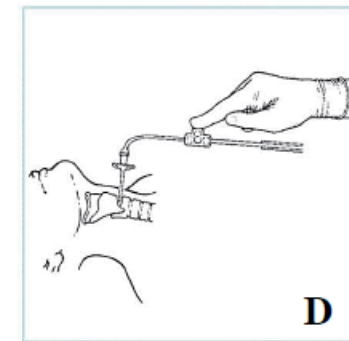
**C**

- Advance the catheter and retract the needle



**B**

- Secure the catheter
- Connect the catheter to oxygen source, set to 15 L/min
- Use I:E ration 1:4 sec (Inspiration:Expiration ratio)



**D**

# **Crico- chirurgica**

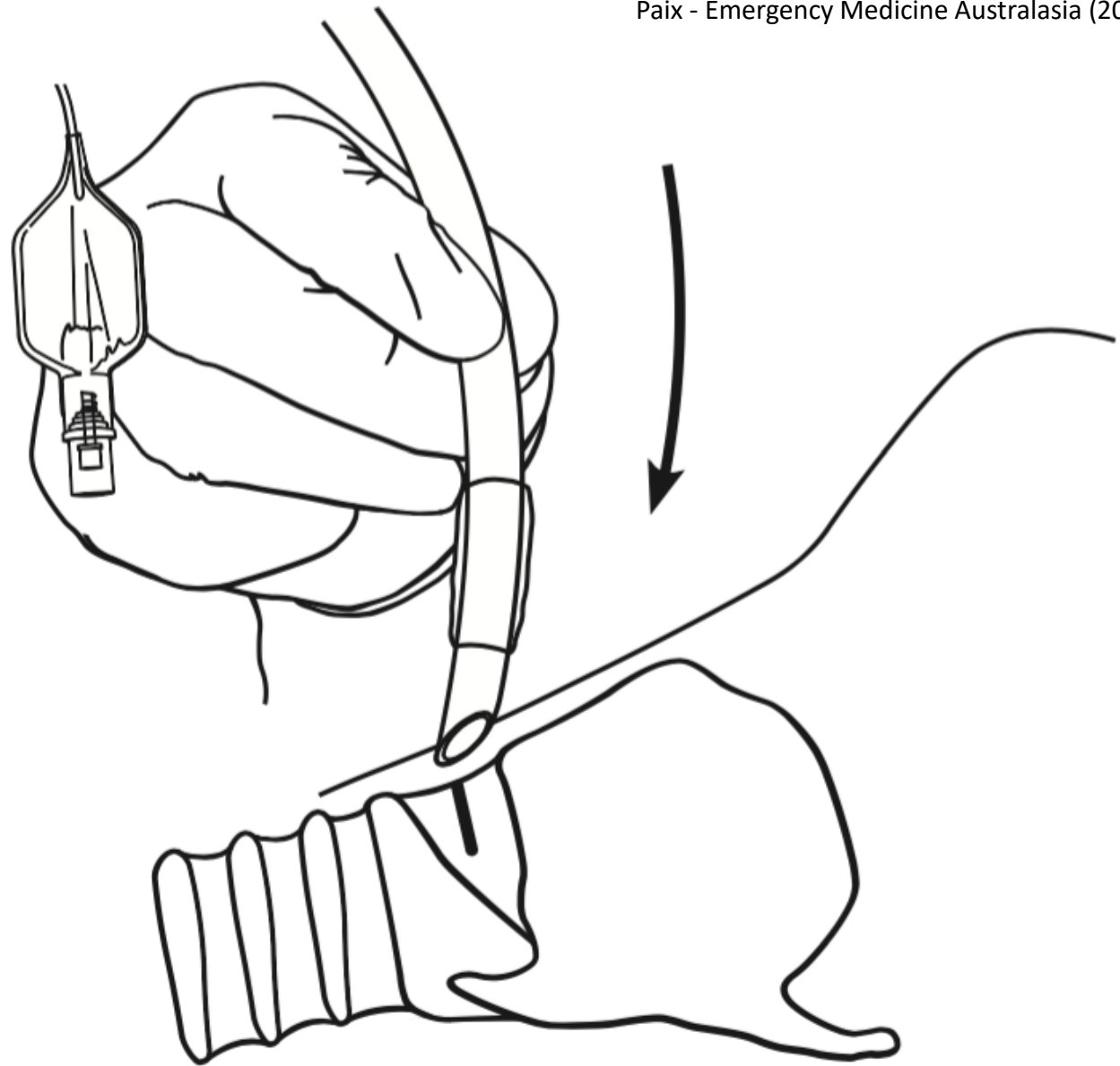
## ***Scalpel-finger-bougie***







**Figure 2.** In...  
memb...  
lumen



**Figure 3.** Insert a suitable endotracheal tube, directed...  
what caudally, until the cuff just disappears.

# BREATHING

## Assess ventilation

### Look

- For cyanosis, wound, chest movement

### Feel

- Painful areas, abnormal

### Percuss

- Dullness

### Listen

- Reduced breath sounds

## INDICATIONS FOR CHEST DECOMPRESSION

### Signs and Symptoms

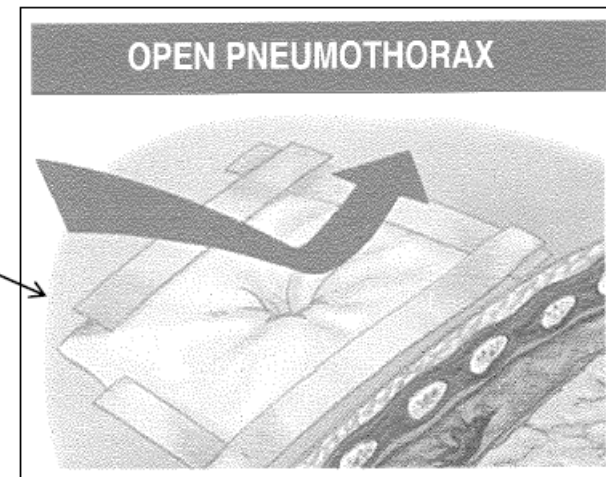
- Absent or diminished breath sounds on one side
- Evidence of chest trauma or rib fracture
- Open or "sucking" chest wound

### Diagnoses

- Pneumothorax
- Tension pneumothorax
- Hemothorax
- Hemo-pneumothorax

# OPEN CHEST WOUND

- "Sucking" sound
- Requires very prompt treatment
  - Apply an occlusive "plastic pack" dressing to wound, tape down on **three** sides, leaving one side open for air to escape
- **Place a chest drain**
- Never insert chest tube through wound
- Give high flow oxygen
- Give antibiotics
- Debride wound and consider closure

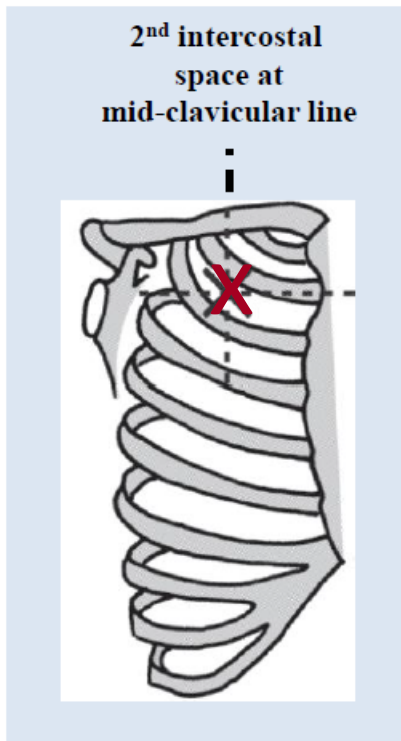


## ***Decompressione con ago***



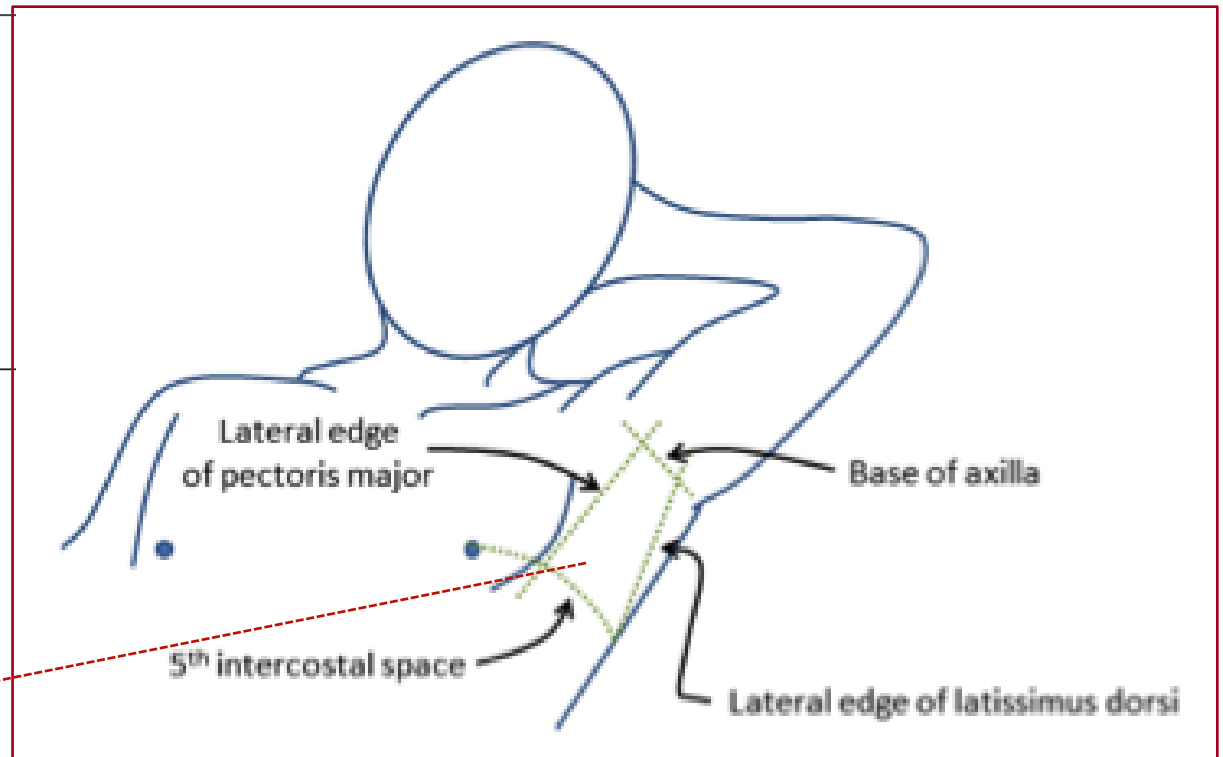
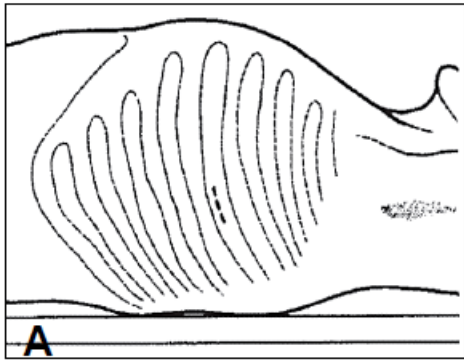
# *Decompressione con ago*

## TENSION PNEUMOTHORAX



# *Drenaggio Toracico*

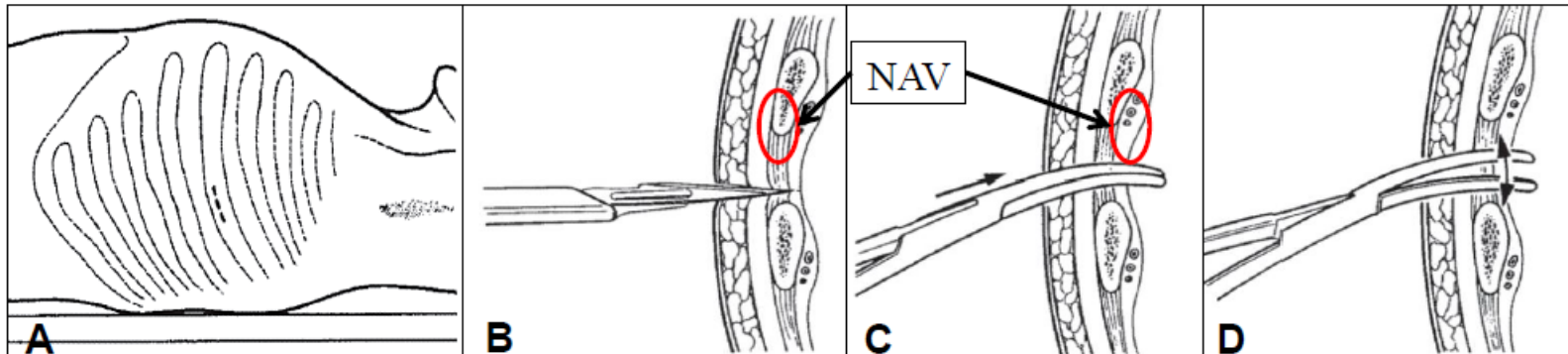
## INSERTION OF CHEST DRAIN



**Triangolo  
di sicurezza**

# *Drenaggio Toracico*

## INSERTION OF CHEST DRAIN



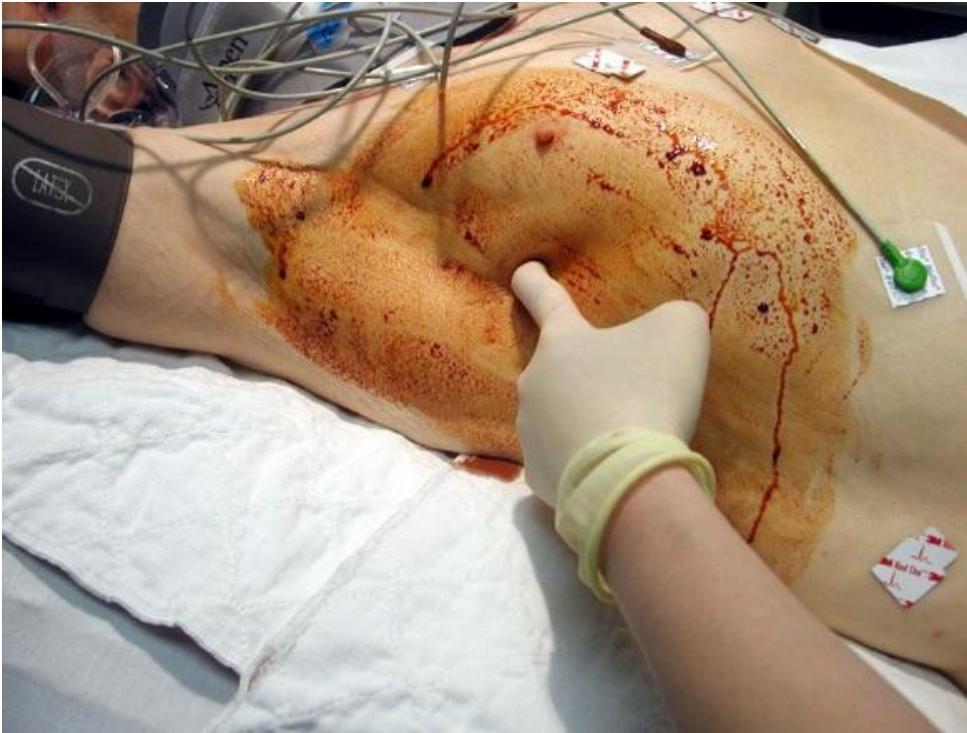
Mark incision just above rib in mid-axillary line; use nipple as a landmark so incision not too low (A)

Prepare area with antiseptic; inject local anaesthetic in area of incision down to pleura

Make small transverse incision just above rib to avoid vascular injury; (A, B)

Using a pair of large curved artery forceps, go over top of rib, penetrate pleura bluntly, enlarge opening (C, D)

# ***Drenaggio Toracico***



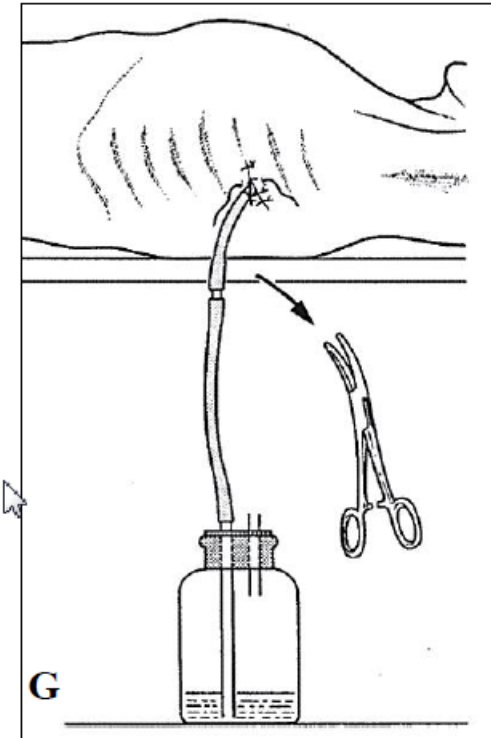
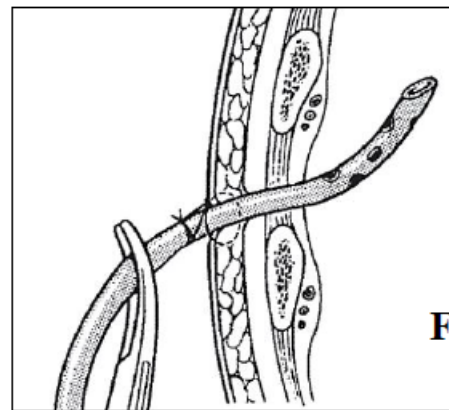
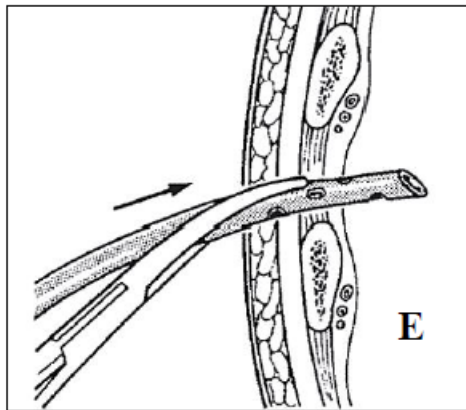
*Esploriamo accesso al cavo pleurico con il dito*





# *Drenaggio Toracico*

## Insertion of Chest Drain and Underwater Seal Drainage



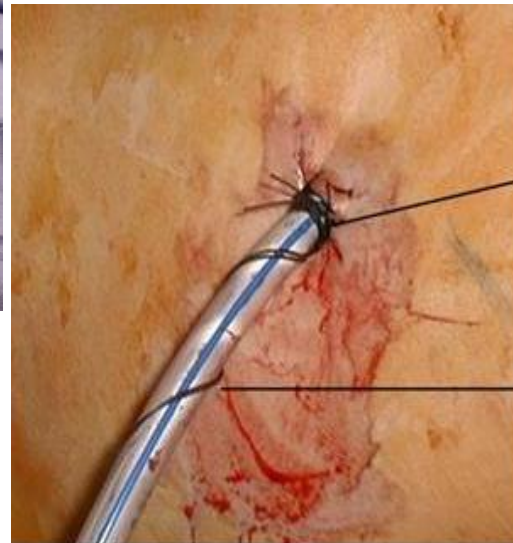
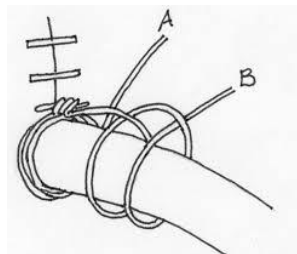
Use same forceps, grasp tube at tip, introduce into chest (E), advancing tube well past holes at end of tube

Close incision with interrupted skin sutures; use one stitch to anchor tube in place (F)

Leave additional stitch untied adjacent to tube for closing wound after tube removal (G)

Apply gauze dressing

Connect tube to underwater-seal drainage system, mark initial level of fluid in drainage bottle (G)



'STAY' Normal Suture - tied at level of the skin and not as a purse string around the drain

'CLOSE' horizontal mattress suture - leave ends long and curl round drain so it can be readily accessed to close the wound once the drain is removed

# CIRCULATION: HAEMORRHAGIC SHOCK

Large volumes of blood may be hidden in thoracic, abdominal and pelvic cavities, or from femoral shaft fractures.

## To decrease bleeding:

- Apply pressure to external wounds
- Apply splint to possible femur fracture
- Apply pelvic binder to possible pelvic fracture

If patients is pregnant, she should not be on her back, put her on her left side.

Send blood for type and crossmatch

# ***Accesso vascolare***

- *CVP grosso e doppio*
- *CVC femorale, giugulare interna*

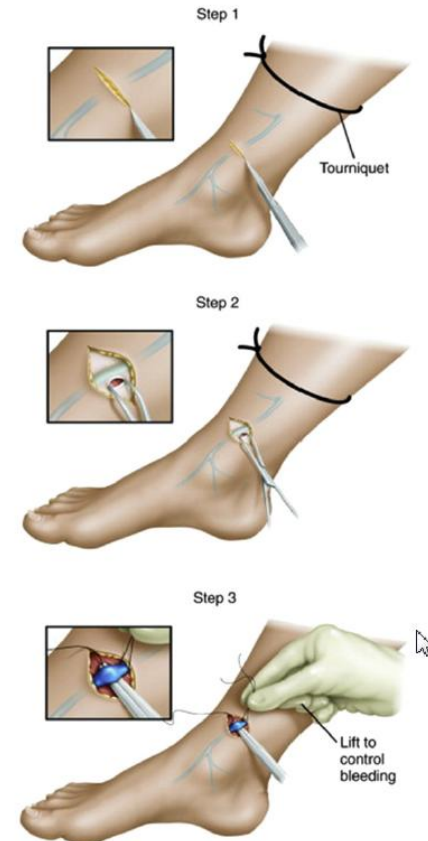
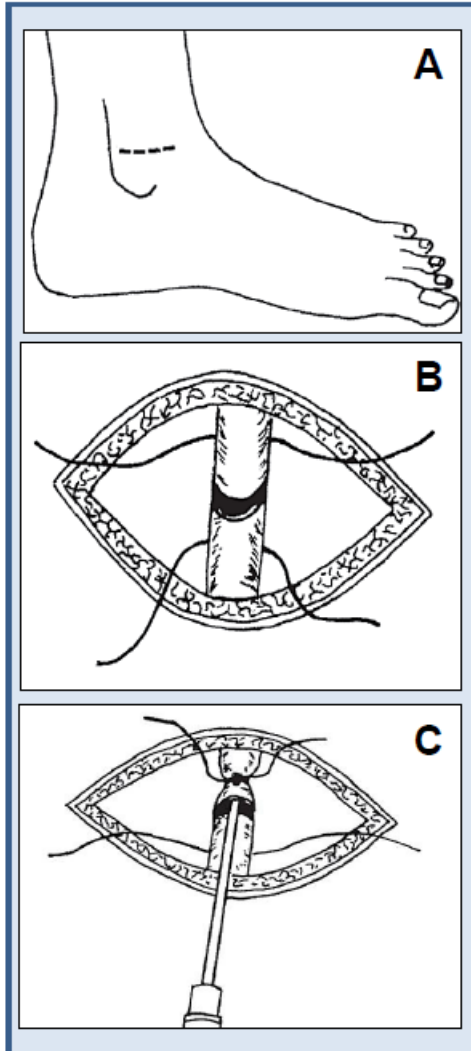
*Quando non sappiamo più dove mettere  
le mani...*

# Accesso vascolare

## VENOUS CUTDOWN

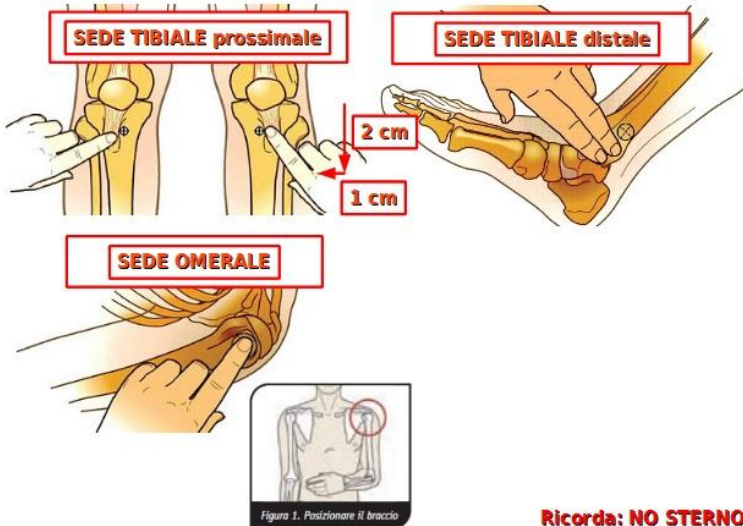
### *V. safena*

- Equipment
  - Small scalpel
  - Artery forceps
  - Scissors
  - Large catheter (or sterile infant feeding tube)
- Transverse incision 2 finger breadths above, anterior to medial malleolus (A); (use patient's own finger breadths to define incision)
- Place two sutures under vein (B)
- Once catheter in place, tie sutures (C)
- Use closing sutures to secure catheter



# Procedure per Infusione

## Intraossea



**Ricorda: NO STERNO!**

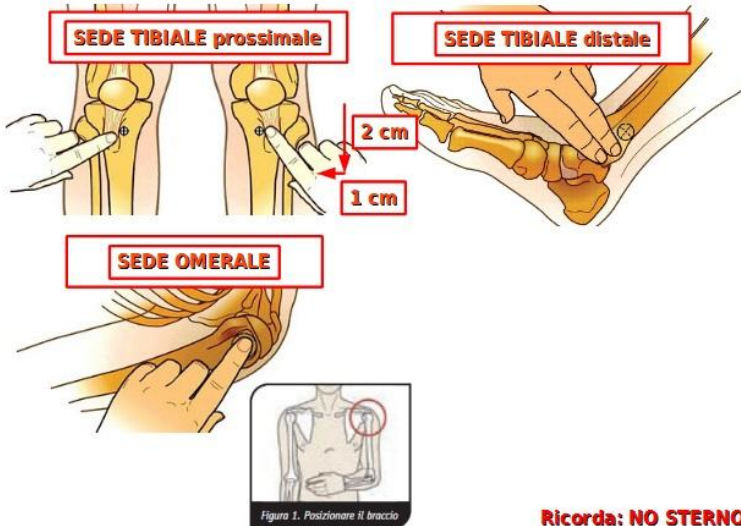


Aghi:  
FAST-ONE  
B.I.G.  
EZ.IO

- Infusione intraossea di sangue e cristalloidi
- Superficie antero-mediale della tibia prossimale, circa un dito (1-3 cm) al di sotto della tuberosità tibiale
- Raggiunto l'osso dirigere l'ago verso il basso con inclinazione di 45-60 gradi (per evitare cartilagine accrescimento)

# Procedure per Infusione

## Intraossea



**Ricorda: NO STERNO!**

Dopo il reperimento dell'accesso :

- Aspirazione 5 cc sangue per conferma
- Somministrazione lenta 40 mg lidocaina 2%
- Dopo 15 secondi lavaggio con SF 10 cc
- Somministrazione lenta di 20 mg di lidocaina

Infusioni:

- Utilizzo sacca a pressione per vincere la pressione del compartimento osseo, e secondo il principio "no flush, no flow"
- Possibile somministrare qualsiasi farmaco e tutti i tipi di fluidi, colloidi e cristalloidi (fino a 10 litri nelle 24 ore)



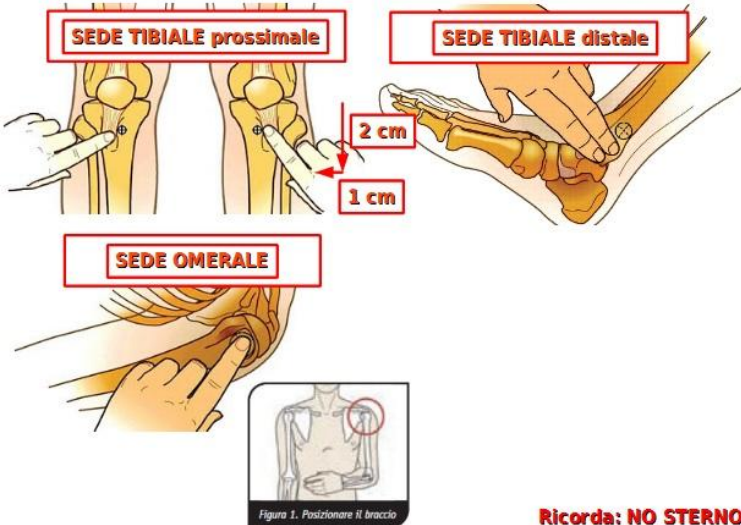
# Procedure per Infusione

## Intraossea

*Competenza indispensabile*

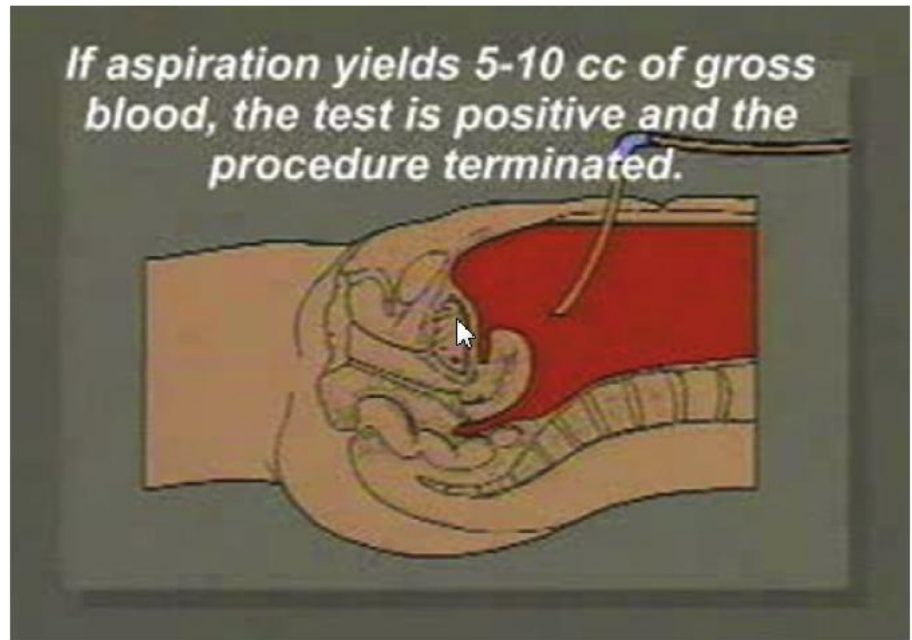
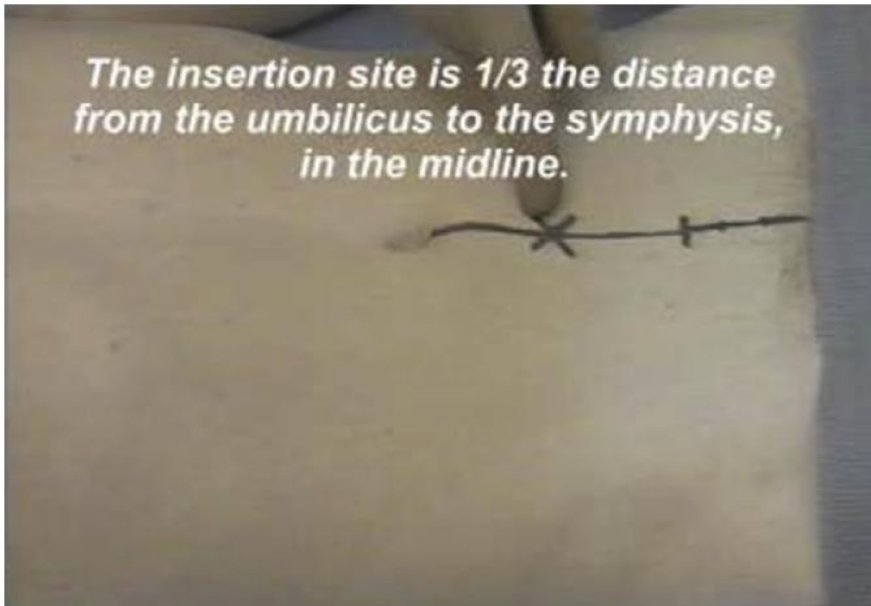
*nell'emergenza pre-ospedaliera*

*nel traumatizzato*





# *Lavaggio diagnostico peritoneale per escludere sanguinamenti addominali*



## ***Lavaggio diagnostico peritoneale***

In the middle line of abdomen, 1 or 2 cm below the umbilicus, advance the introducer needle at a 45° angle caudally and use continuous negative pressure on the syringe.

*If gross blood is not encountered,  
infuse 1 liter of lactated Ringer's  
solution.*



*Then, place the fluid bag on the floor.*



# *Lavaggio diagnostico peritoneale*

## *Vs*

# *Ultrasuoni FAST*

### Box 14

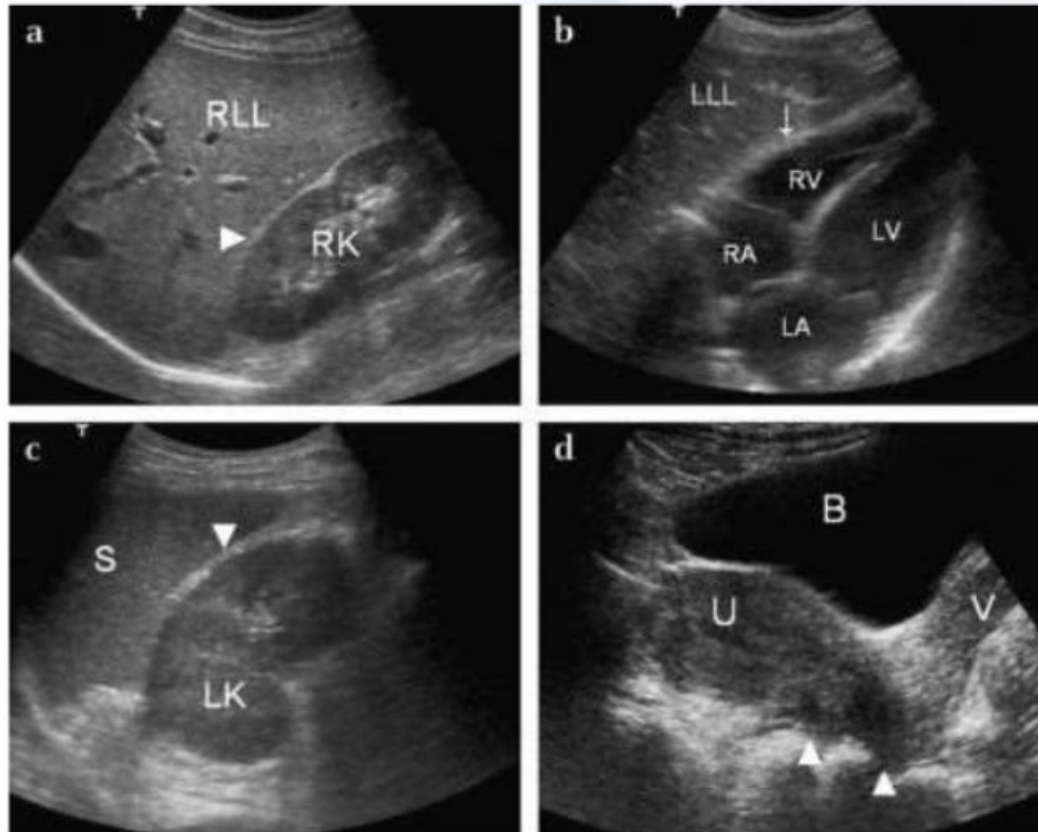
#### Comparison of DPL versus extended FAST

*Ultrasound*      *Specificità 87-100%*  
 Rapid              *Sensibilità 45-48%*  
 Noninvasive  
 No complications  
 Portable  
 High specificity of intraperitoneal fluid  
 Can evaluate for pericardial fluid  
 No radiation or contrast exposure  
 Affordable  
 Repeatable  
 Easy to learn  
 Poor evaluation of retroperitoneal injury  
 Cannot distinguish blood from ascites  
 Can detect pneumothorax

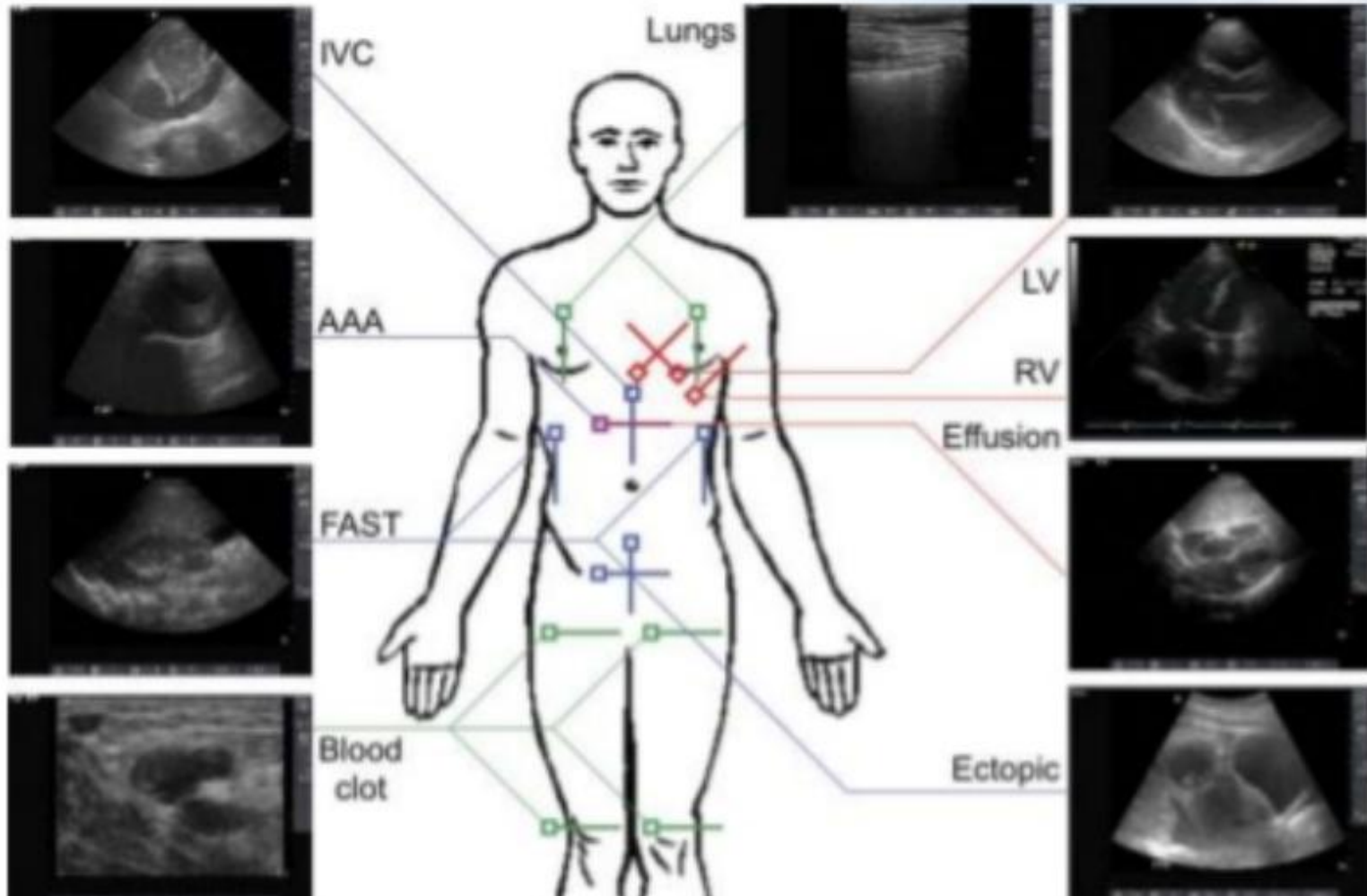
*DPL*                      *Molti Falsi Positivi*  
 Relative speed  
 Invasive  
 Approximately 1% complication rate  
 Ability to detect early viscous injury  
 No contrast or radiation  
 Rapid triage of multisystem unstable trauma patients



# *Procedura **FAST** – Focused Assessment Sonography in Trauma*



# Procedura **FAST** «allargata»



## ***Procedura FAST «allargata»***

*ad altro...*

- *Contusioni*
- *Ecchimosi*
- *Tumefazioni*
- *zone dolenti*

# ***Sindrome compartimentale***

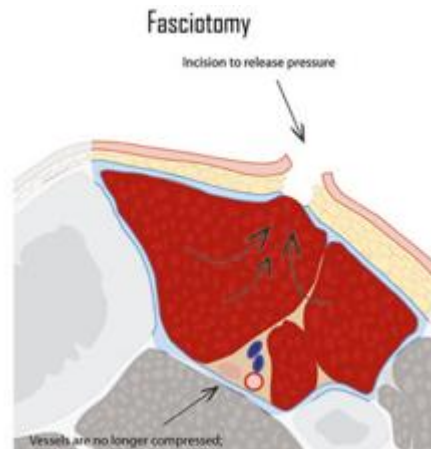
Deve essere ricercata e sospettata ogni qual volta si presenti una lesione unita ad un forte dolore.

I segni da ricercare possono essere raggruppati in “cinque P”:

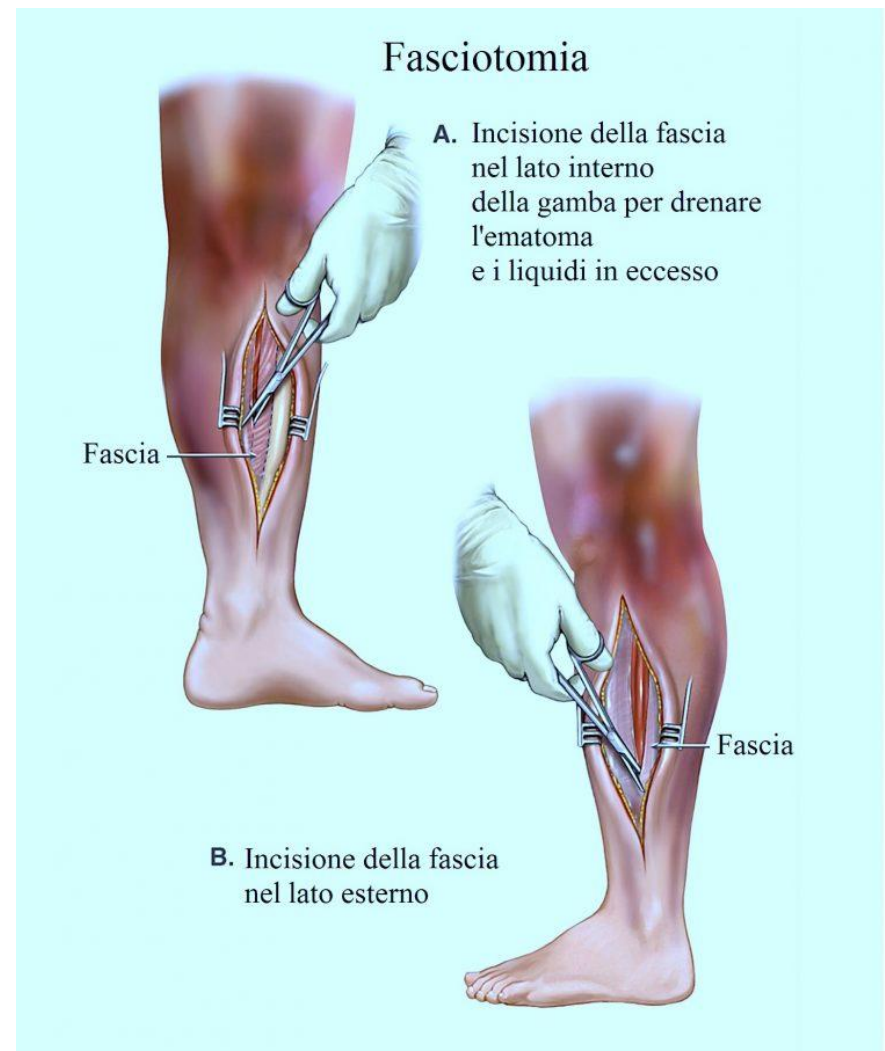
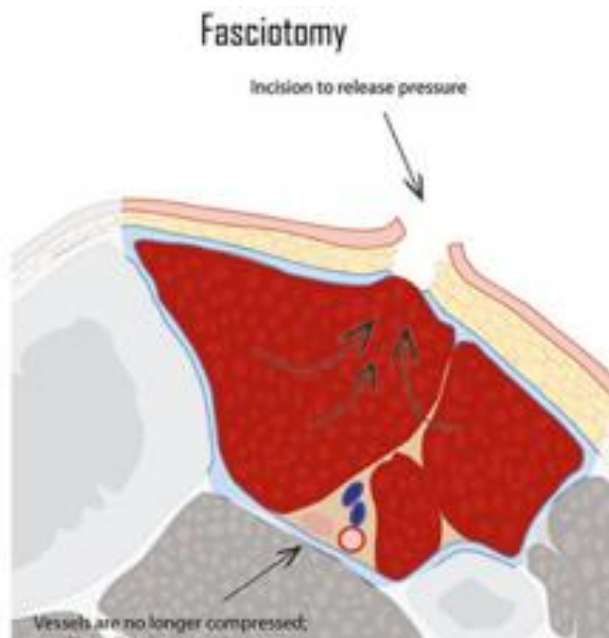
- dolore (pain)
- pallore
- polso assente
- parestesie
- paralisi



**Il tessuto gonfiandosi  
 aumenta la pressione  
 interna di vasi e nervi**



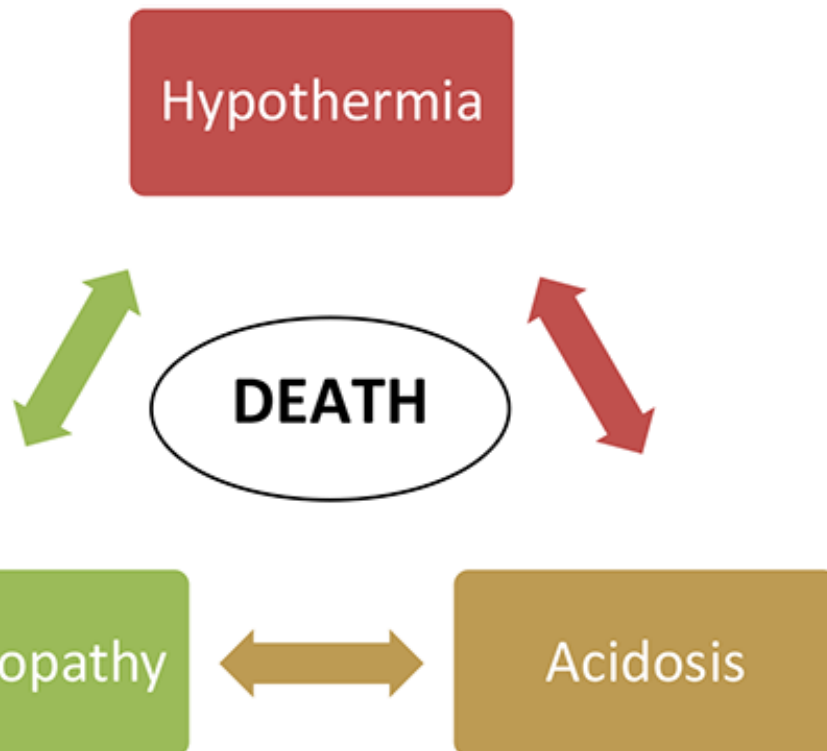
# ***Sindrome compartimentale***





# *Procedure e timing nel trauma*

## *CDS - Control Damage Surgery*



### Damage control

- Staged approach- by Rotondo and Schwab\*
  - . Stage 0 – Prehospital and early resuscitation.
  - . Stage 1 - Life saving surgery
  - . Stage 2 - Intensive resuscitation
  - . Stage 3 – Planned reoperation for definitive treatment

○ \*Rotondo MF et al J Trauma 1993;35(3):375.

# Procedura - Control Damage Surgery

**T -0**

Pre-hospital  
management

Start damage control resuscitation. Evaluation of possible bleeding points. Control of external bleeding: use of tourniquets for limbs with massive bleeding, scalp suturing, etc. Shortening of time to arrival in hospital in order to facilitate early bleeding control.

**T -1**

Emergency  
room

Re-evaluation and control of external bleeding, with identification of possible internal bleeding sites to decide surgery or interventional radiology.

**T -2**

Operating  
room

Perform procedures needed to control bleeding points, with immediate blood flow restoration and contamination control.

**T -3**

Intensive  
Care Unit

Patient stabilization, completion of the resuscitation process, warming, correction of acid-based imbalances and coagulopathy, and optimization of ventilation and hemodynamic condition.

**T -4**

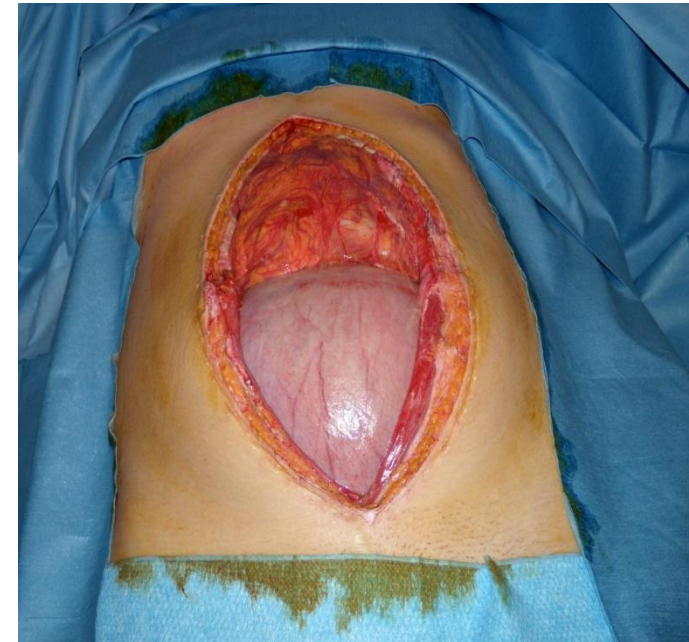
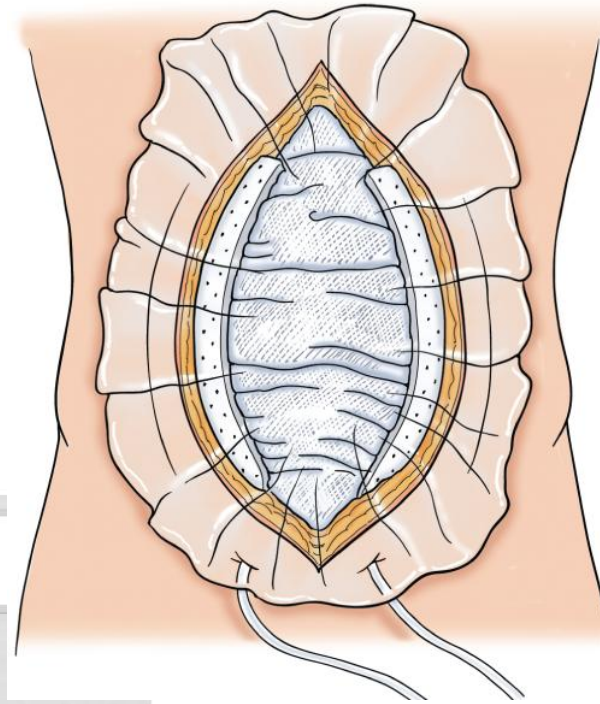
Operating  
room

Definitive surgical repair, which should be done once full patient stabilization and resuscitation has been achieved (variable time window).

Hemostatic resuscitation



# *Control Damage Surgery*



APPROACH

Before  
ER → OR → DEATH

Now  
ER → OR → ICU → OR → ICU

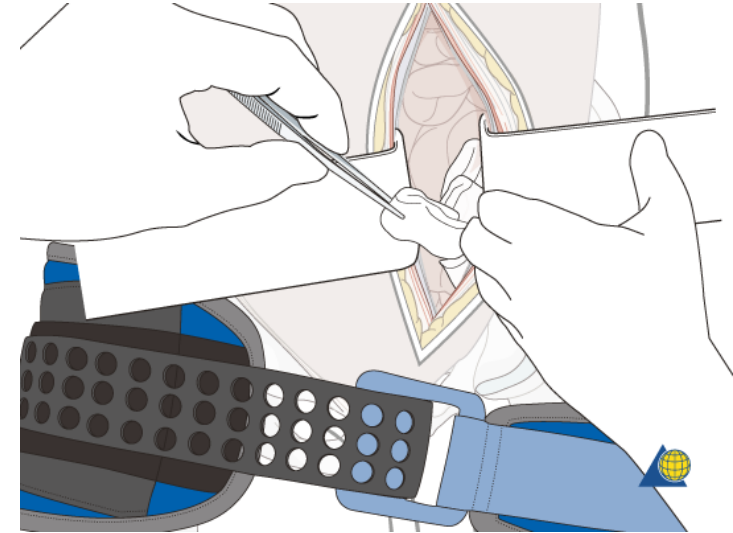
ER; emergency room, OR; operating room;

# ***CDS & packing retroperitoneale***

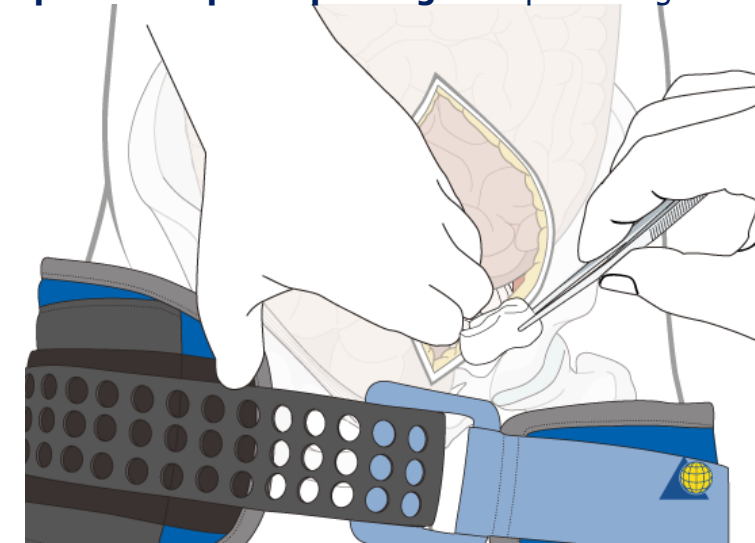


**If the patient is in need of immediate surgery for control of hemorrhage, laparotomy with DAMAGE CONTROL PACKING is performed.**

**If the pelvis is unstable, ensure that the pelvic ring is stabilized during surgery**



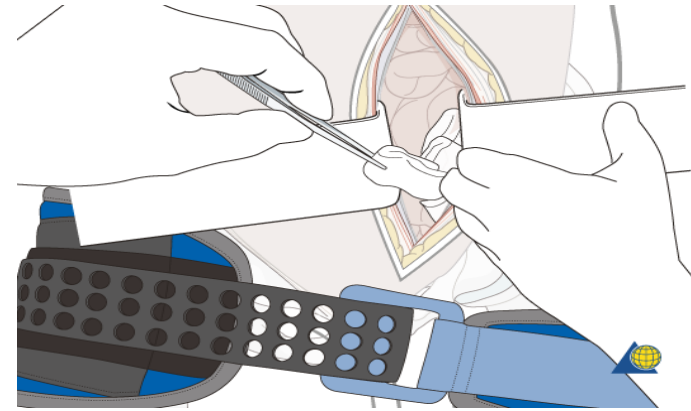
During the laparotomy, it may also be necessary to perform **extraperitoneal pelvic packing** to stop bleeding



# ***CDS & packing retroperitoneale***

## **Packing pelvico retroperitoneale**

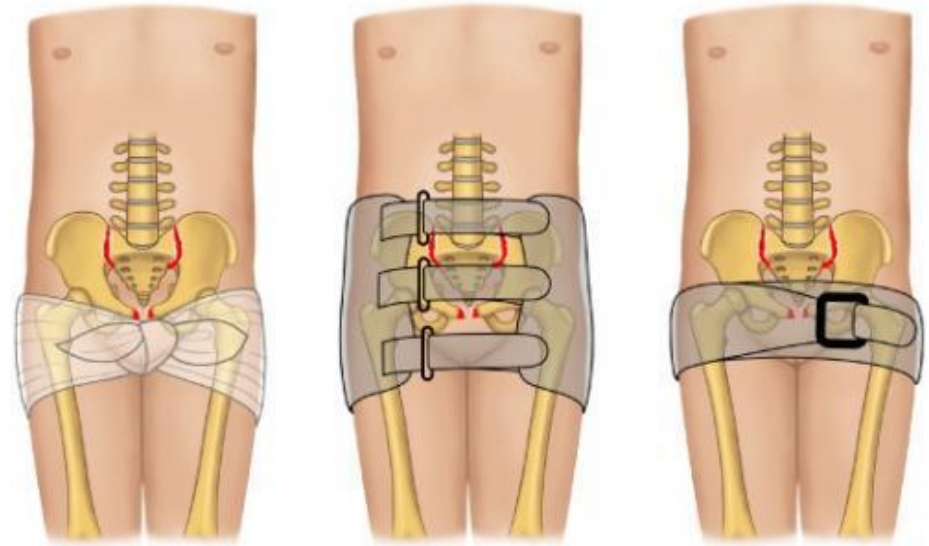
- come procedura di salvataggio dopo angioembolizzazione
- Come procedura in approccio multidisciplinare che includa fissazione pelvica (temporanea o definitiva)



During the laparotomy, it may also be necessary to perform **extraperitoneal pelvic packing** to stop bleeding



# ***CDS & Pelvic binder***

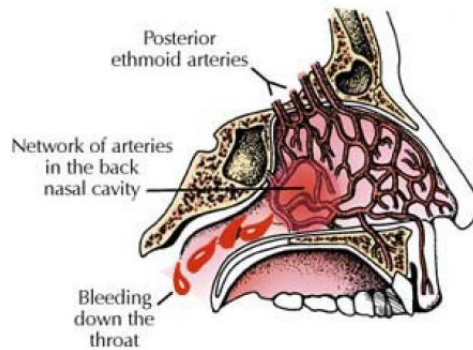
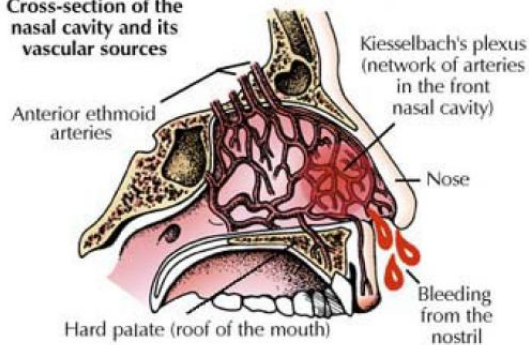


***Procedure ...spesso un gioco di  
squadra...  
ma alcune volte possibili in  
autonomia***

# Trauma cranio-facciale con epistassi ...

## **MEROCEL - Sistema di compressione anteriore**

Cross-section of the nasal cavity and its vascular sources





# *Trauma cranio-facciale con epistassi ...*

## Tamponamento antero-posteriore

Cateteri nasali tipo “BIVONA” o “EPISTAT”

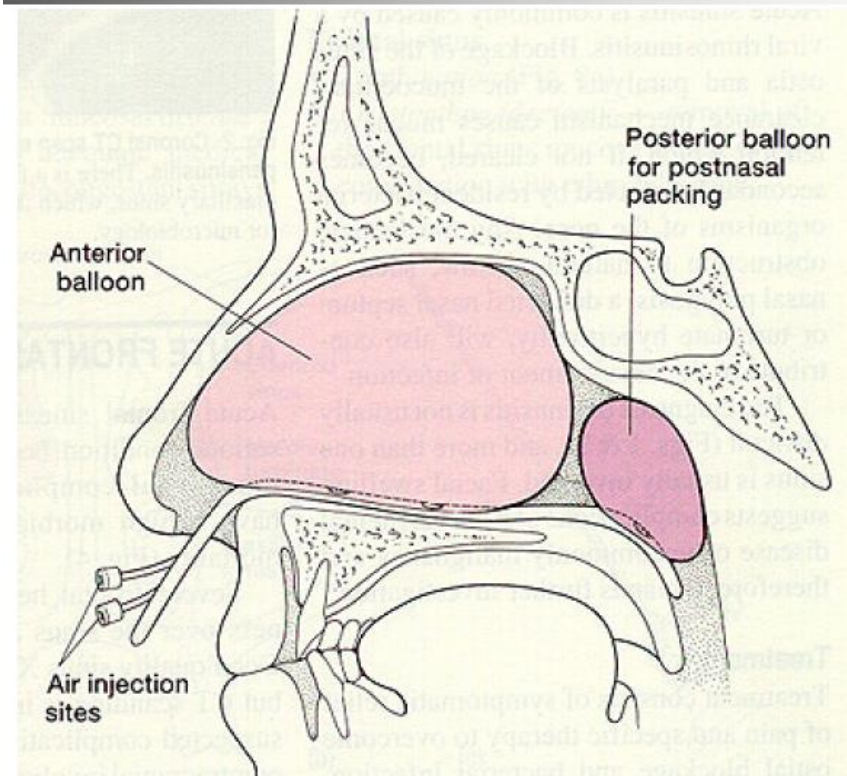
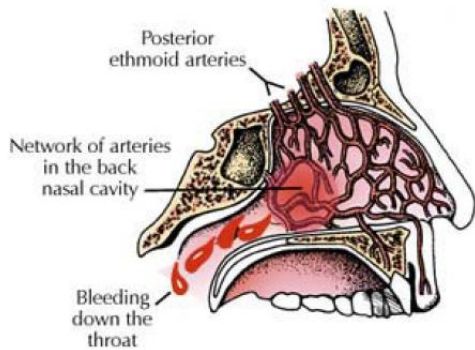
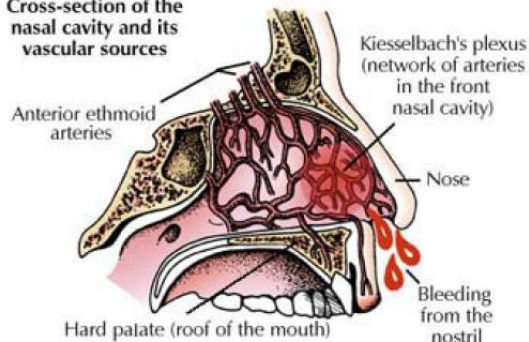
- 2 palloncini di silicone ( anteriore e coanale)
- gonfiabili con H<sub>2</sub>O
- evitano l'adesione alle pareti,
- sono meno traumatici
- pressione graduabile
- rinforzo al tamponamento in Merocel.



# Trauma cranio-facciale con epistassi ...

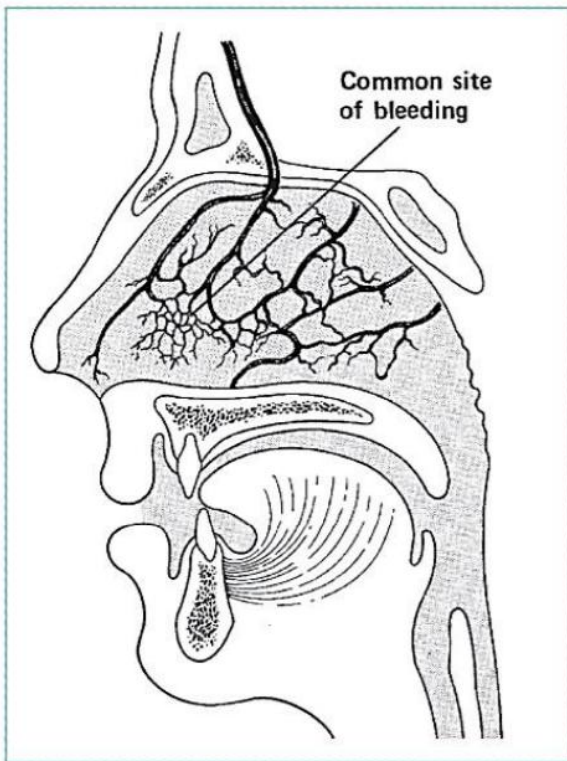
**BIVONA - Sede di compressione antero-posteriore**

Cross-section of the nasal cavity and its vascular sources

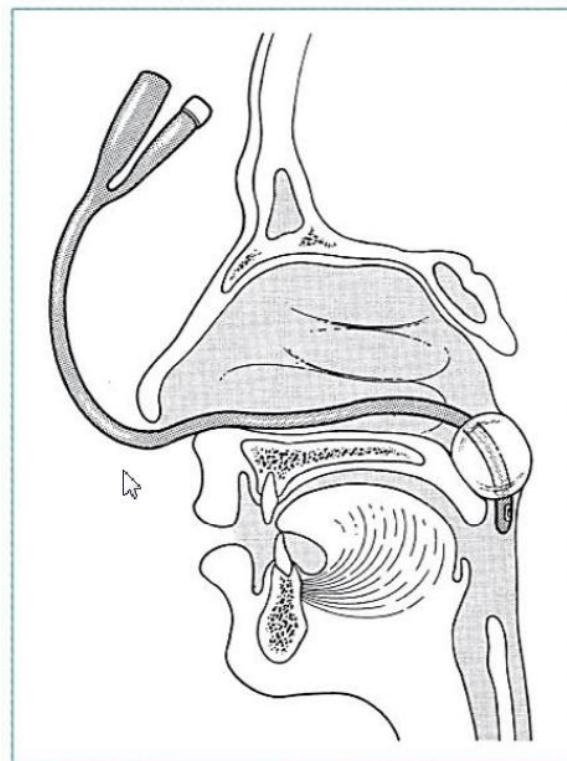


# ***Trauma cranio-facciale con epistassi ...***

## ***FOLEY – protezione vie respiratorie***



Anterior nares: pinch and apply pressure



Posterior: balloon catheter

# *Sapere quando non farlo ...*

## DECISION MAKING

Can we do procedure here?

- Is operating theatre safe, ready to use?
- Are necessary equipment, drugs, supplies available?
- Are team members available?
- Do I have knowledge and skill to perform necessary procedure safely?
- Is there back-up or extra support available if needed?
- Can we manage potential complications if problems arise?
- Do we have facilities for good post-operative care?

If the answer to any of these questions is "NO" it is inadvisable to proceed with surgery!

- ***Conoscenza***
- ***Valutaz. setting***
- ***Capacità***
- ***Abilità***
- ***Competenza***
- ***Esperienza***

x congresso nazionale  
**simeu**  
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**Il volto della Medicina  
di Emergenza-Urgenza:**

identità professionale e servizio pubblico.

**La corretta  
procedura nel  
trauma:**

***il modo di fare bene  
le cose....***



*Grazie*