

# IRC 2021

CONGRESSO  
NAZIONALE

16•17•18 DICEMBRE

NUOVE LINEE GUIDA 2021:  
RIANIMAZIONE CARDIOPOLMONARE  
POST-LOCKDOWN



Italian  
Resuscitation  
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# PRIMO SOCCORSO 2021

## ANAFILASSI & ASMA

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# ANAFILASSI

- Rara ma grave reazione allergica sistemica, insorgenza rapida, potenzialmente mortale
- Con o senza reazione immunologica
- Rapido inizio con coinvolgimento di più organi

## IgE-mediated allergic mechanism

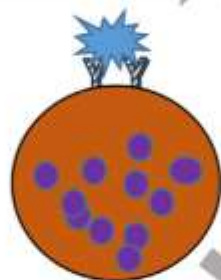
Allergen



Mature B cells produce specific IgE-antibodies to that allergen. IgE antibodies bind to mast cells and basophils receptors. This initial phase of sensitisation is clinically silent.

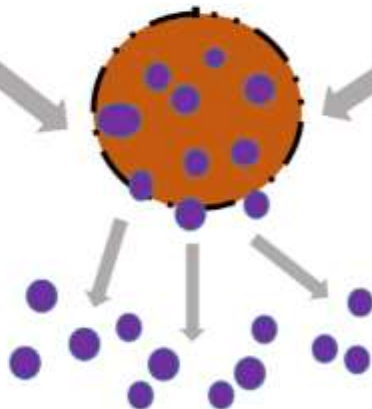


On re-exposure, the allergen cross-links two specific IgE receptors, creating a bridge and resulting in mast cell degranulation.



**Mast cell**

**Degranulation**



Release of preformed (e.g. histamine, tryptase) followed by newly formed mediators (e.g. prostaglandin D<sub>2</sub>, leukotrienes, thromboxane A<sub>2</sub>) results in clinical manifestations of IgE-mediated anaphylaxis.

## Non-allergic mechanisms

### Mast cell activation

- Direct non-specific activation: histamine-releasing agents (usually mild or moderate immediate hypersensitivity)
- Calcium and phospholipase (C and A<sub>2</sub>)-dependent mechanism: (e.g. vancomycin and red man syndrome)
- MRGPRX2 activation: NMBA (remains to be proven in humans)
- Mastocytosis

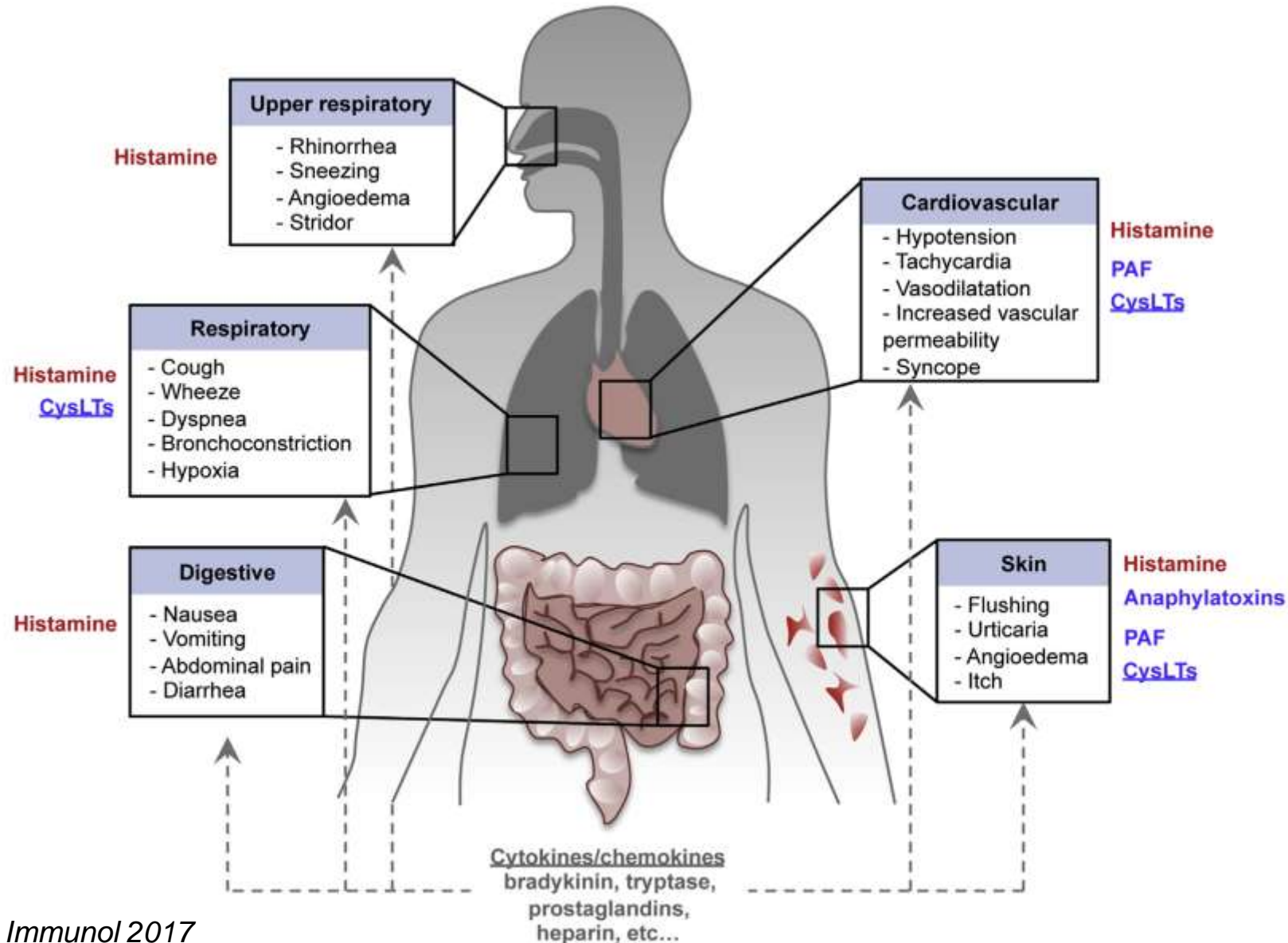
### Mast cell-independent mechanism

- COX-1 inhibition: NSAIDs (bronchospasm, angioedema, or both)

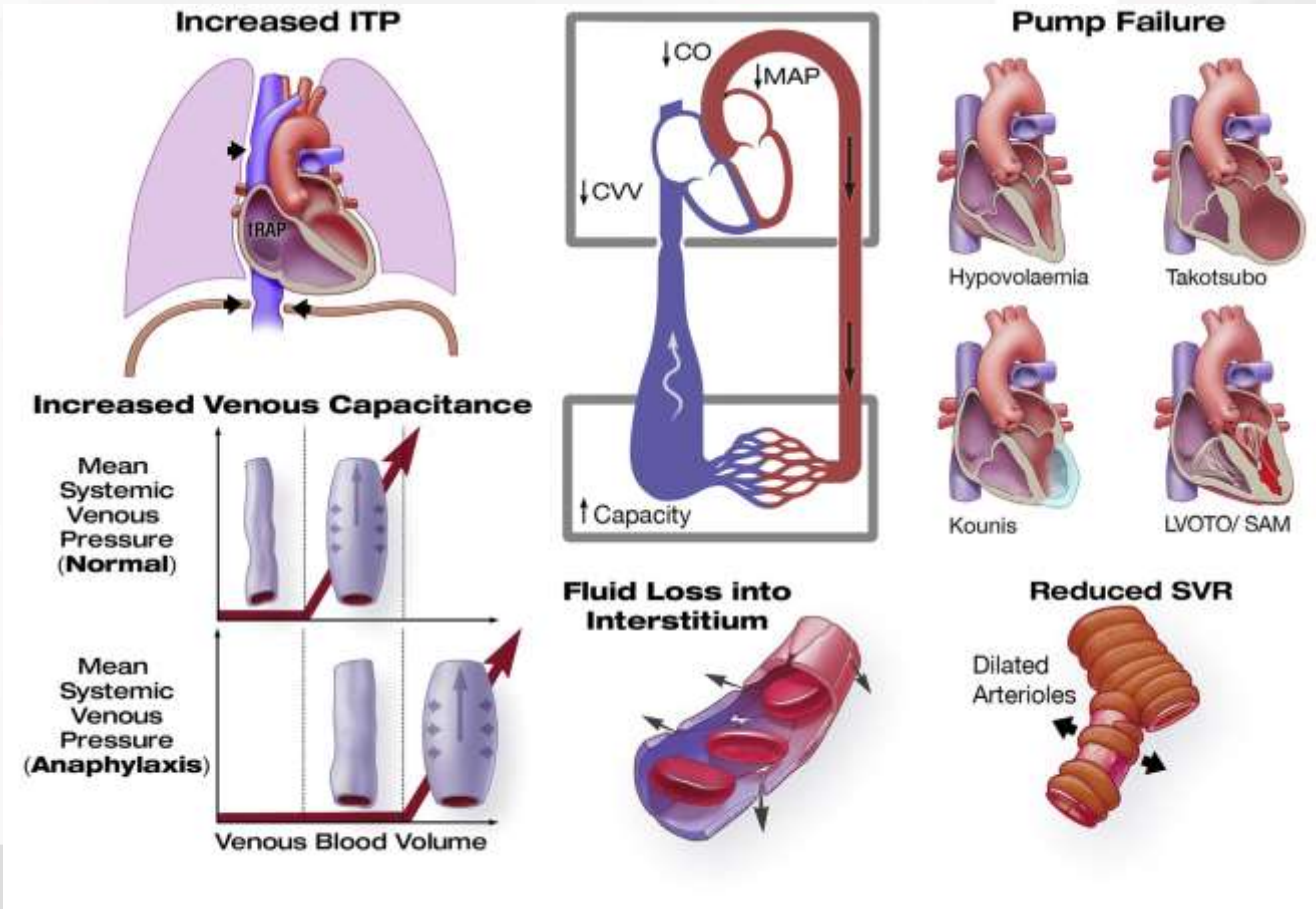
### Cofactors that may modulate the onset of allergic and non-allergic immediate hypersensitivity

- Stress
- Infection
- Dose of allergen
- Rate of drug injection
- Chemical property and molecular weight of drugs
- Host factors

# ANAFILASSI



# ANAFILASSI



## Cause di arresto cardiaco

- ❑ Shock distributivo / cardiogeno
- ❑ Ipossia (broncospasmo, edema polmonare)
- ❑ Farmaci
- ❑ Alterazioni elettrolitiche

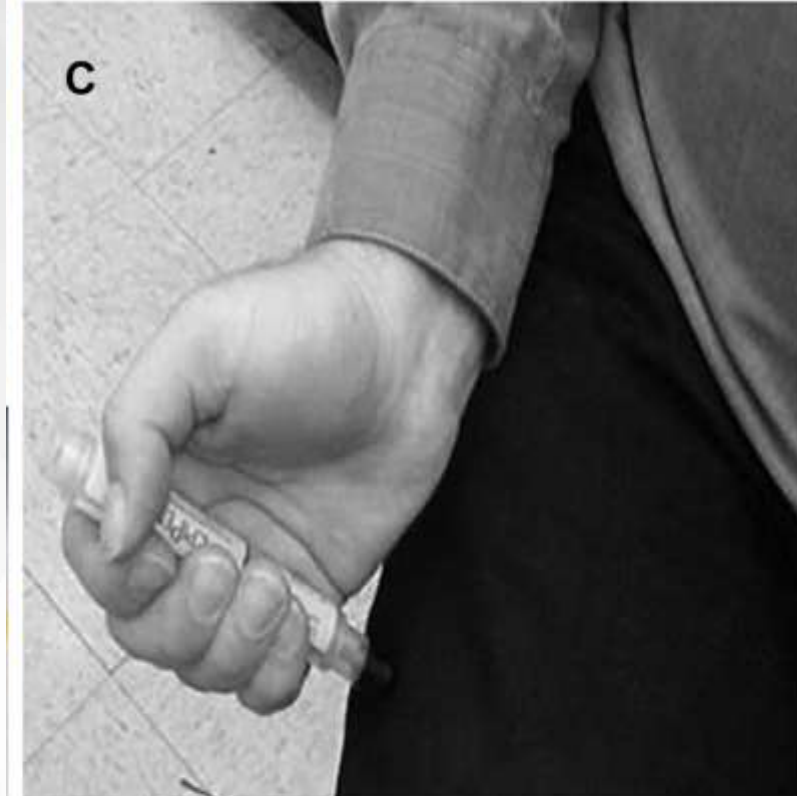
# EVIDENCE UPDATE 2021

- ❑ First Aid ILCOR COSTR
- ❑ World Allergy Organisation Anaphylaxis Committee
- ❑ European Academy of Allergy and Clinical Immunology
- ❑ North American Practice Parameter
- ❑ Australasian Society of Clinical Immunology and Allergy
- ❑ Guidance on perioperative allergic reactions
- ❑ UK National Audit Project of perioperative anaphylaxis

MAGGIOR PARTE DELLE RACCOMANDAZIONI SONO BASATE SU STUDI OSSERVAZIONALI, BUONA PRATICA CLINICA E CONSENSO DI ESPERTI

# PRIMO SOCCORSO

- Nessun aggiornamento rispetto alle Consensus on Science with Treatment Recommendations 2015
  - Somministrare immediatamente adrenalina IM
  - Nei pazienti che non migliorano, somministrare una seconda dose di adrenalina IM dopo 5-15 minuti dalla dose iniziale (raccomandazione debole, evidenza di qualità molto bassa)





# TERAPIA SALVAVITA



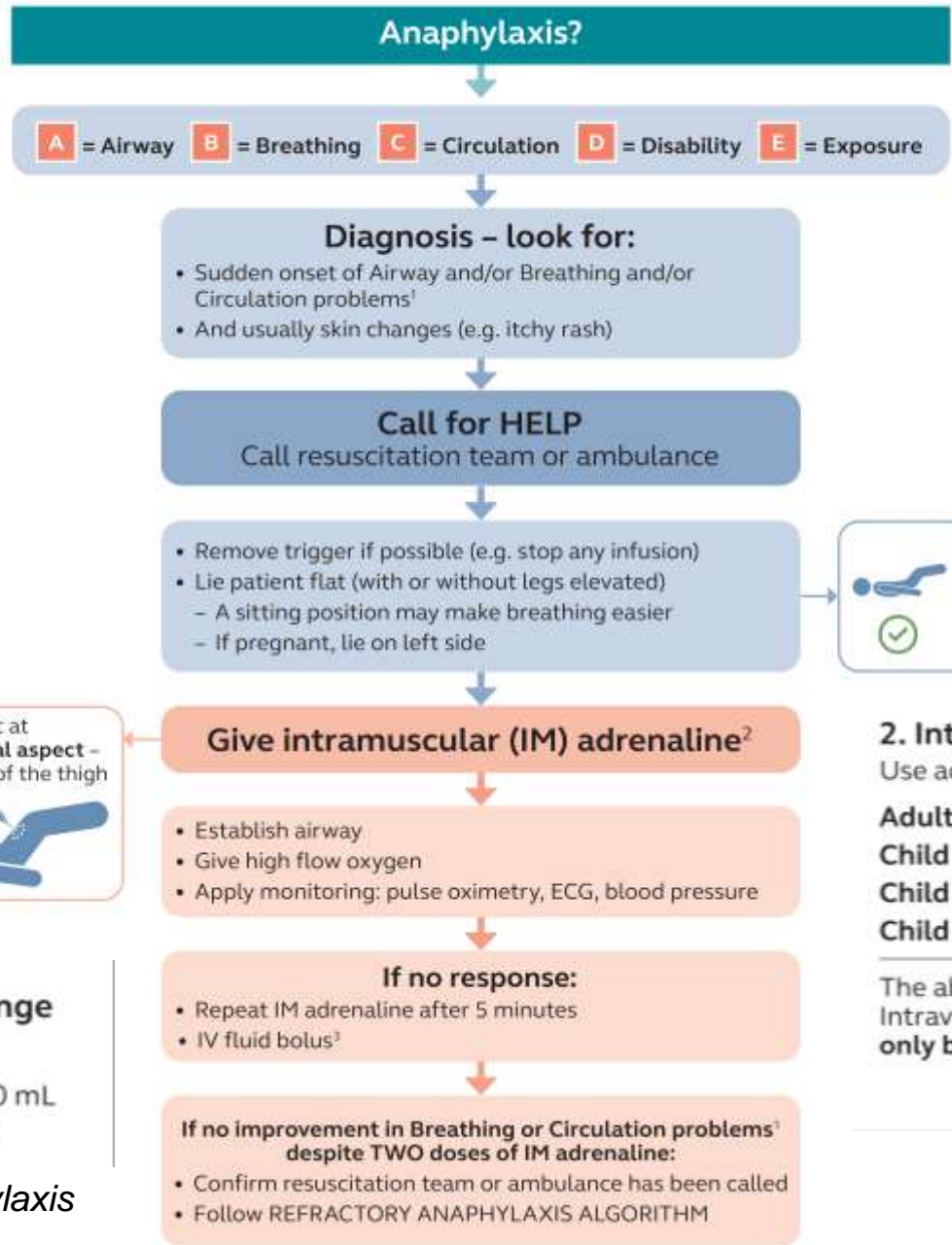
- Adrenalina 0.5 mg IM, faccia anterolaterale del 1/3 medio della coscia
- Autoiniettori adrenalina IM (Epi-Pen), 0.5, 0.3 e 0.15 mg

Necessità di una seconda dose nel 10-30% dei casi

Ripetere dopo 5-15 minuti



# Anaphylaxis



## 1. Life-threatening problems

### Airway

Hoarse voice, stridor

### Breathing

↑work of breathing, wheeze, fatigue, cyanosis, SpO<sub>2</sub> <94%

### Circulation

Low blood pressure, signs of shock, confusion, reduced consciousness



## 2. Intramuscular (IM) adrenaline

Use adrenaline at 1 mg/mL (1:1000) concentration

**Adult and child >12 years:** 500 micrograms IM (0.5 mL)

**Child 6–12 years:** 300 micrograms IM (0.3 mL)

**Child 6 months to 6 years:** 150 micrograms IM (0.15 mL)

**Child <6 months:** 100–150 micrograms IM (0.1–0.15 mL)

The above doses are for IM injection **only**. Intravenous adrenaline for anaphylaxis to be given **only by experienced specialists** in an appropriate setting.

## 3. IV fluid challenge

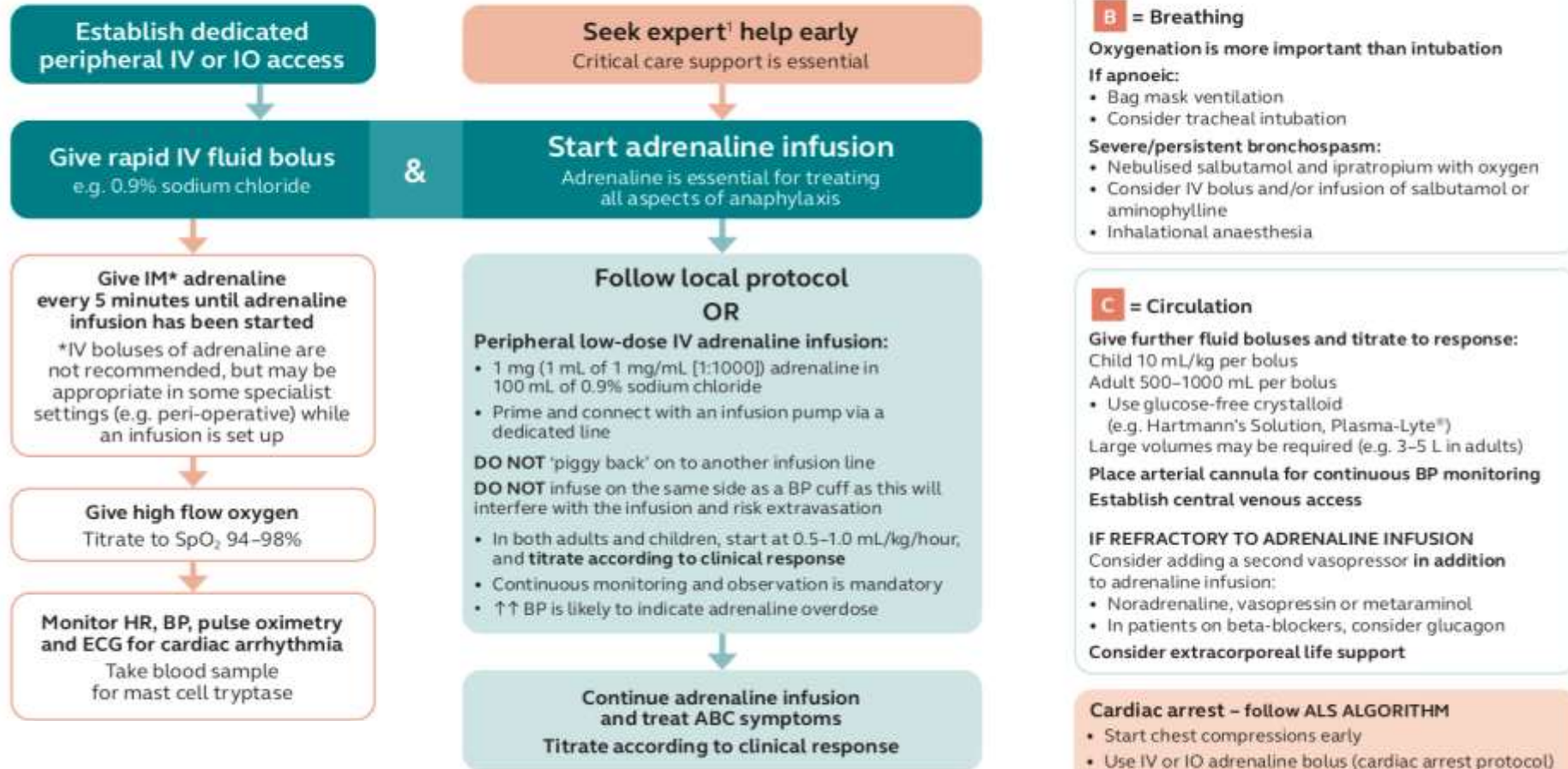
Use crystalloid

**Adults:** 500–1000 mL

**Children:** 10 mL/kg

# Refractory anaphylaxis

No improvement in respiratory or cardiovascular symptoms despite 2 appropriate doses of intramuscular adrenaline



## A = Airway

Partial upper airway obstruction/stridor:  
Nebulised adrenaline (5mL of 1mg/mL)

Total upper airway obstruction:

Expert help needed, follow difficult airway algorithm

## B = Breathing

Oxygenation is more important than intubation

If apnoeic:

- Bag mask ventilation
- Consider tracheal intubation

Severe/persistent bronchospasm:

- Nebulised salbutamol and ipratropium with oxygen
- Consider IV bolus and/or infusion of salbutamol or aminophylline
- Inhalational anaesthesia

## C = Circulation

Give further fluid boluses and titrate to response:

Child 10 mL/kg per bolus

Adult 500–1000 mL per bolus

- Use glucose-free crystalloid (e.g. Hartmann's Solution, Plasma-Lyte®)

Large volumes may be required (e.g. 3–5 L in adults)

Place arterial cannula for continuous BP monitoring

Establish central venous access

IF REFRACTORY TO ADRENALINE INFUSION

Consider adding a second vasopressor in addition to adrenaline infusion:

- Noradrenaline, vasopressin or metaraminol
- In patients on beta-blockers, consider glucagon

Consider extracorporeal life support

Cardiac arrest – follow ALS ALGORITHM

- Start chest compressions early
- Use IV or IO adrenaline bolus (cardiac arrest protocol)
- Aggressive fluid resuscitation
- Consider prolonged resuscitation/extracorporeal CPR

<sup>1</sup> Only by experienced specialists in an appropriate setting.

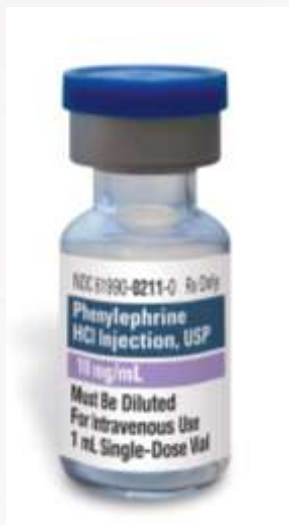
## TIMING TRIPTASI

1. Appena possibile dopo rianimazione
2. 1-2 h dall'inizio dei sintomi
3. 24 h dall'inizio dei sintomi (BASELINE)



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# TERAPIA SECONDA LINEA



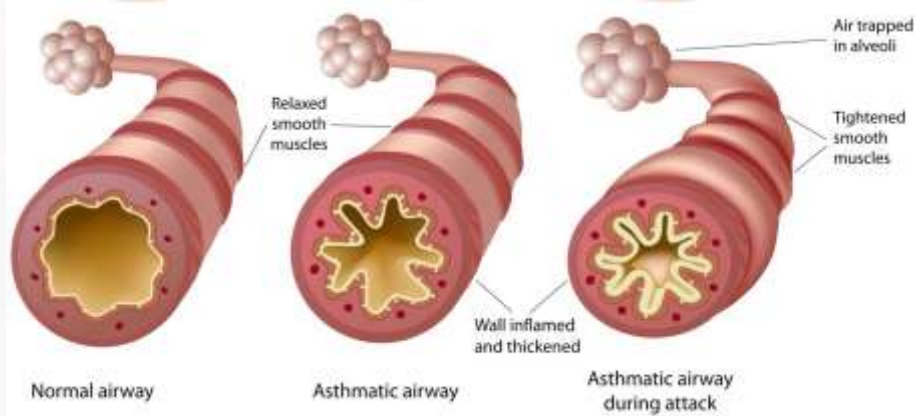
Italian Resuscitation Council

# TRATTAMENTO ARRESTO CARDIACO

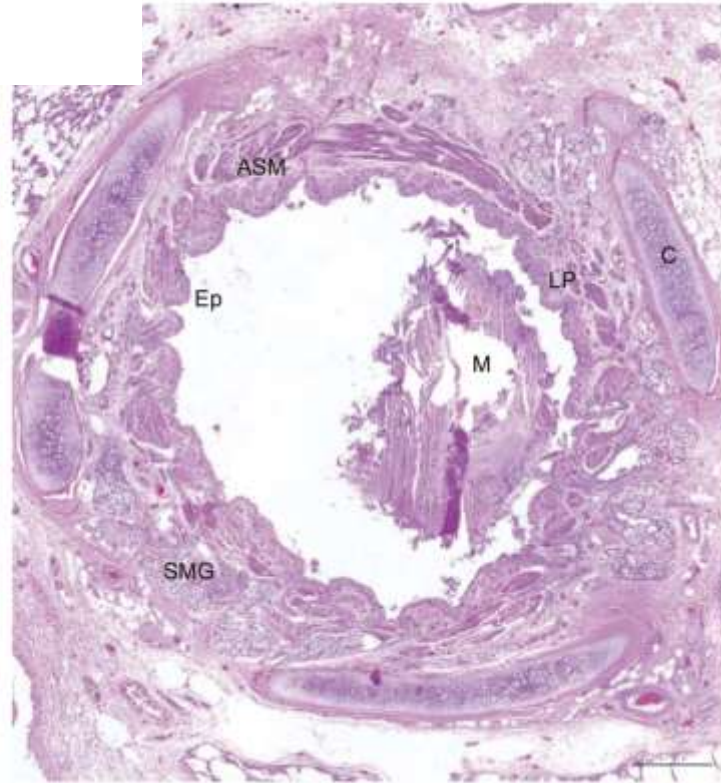
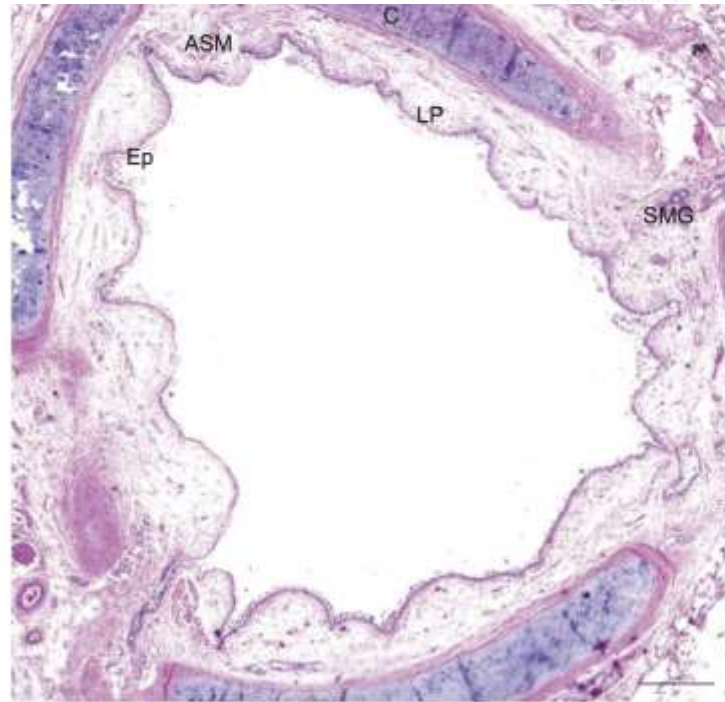
Seguire indicazioni algoritmo ALS standard

- A Considera intubazione orotracheale, se competenti
- B O2 100%
- C Considera fluidi IV





# ASMA



**Table 1** Summary of the main points of pathophysiology in severe asthma

## Airway inflammation

1. Highly heterogeneous and complex in type; impacts clinical manifestation of asthma and treatment responses
2. Both innate and adaptive immunities may be involved to explain steroid resistance
3. Eosinophilic (type 2) inflammation accounts for only approximately 50% of severe asthma
4. The complex interactions between inflammation and remodelling likely explain abnormal lung mechanics, but the mechanisms are poorly understood

## Airway remodelling

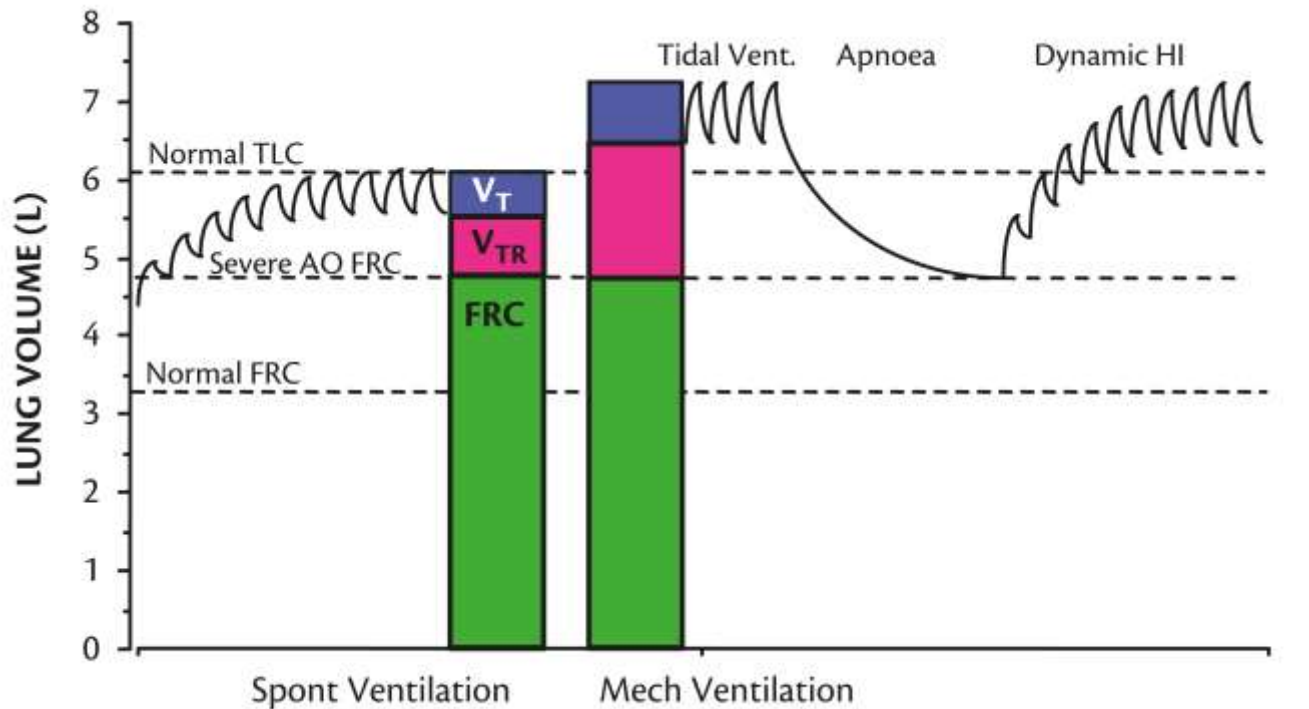
1. Airway remodelling is more severe in severe asthma
2. Its distribution is heterogeneous and associated with eosinophils
3. Inflammation could cause or drive airway remodelling but the reverse could also be easily true—the interaction remains unclear

## Airway and lung mechanics

1. Severe asthma is characterized by greater ventilation heterogeneity and airway closure, which involves both small and large airways
2. Abnormal lung parenchyma and adventitial attachments may worsen AHR and partly explain irreversible airway obstruction
3. There are complex mechanical interactions between small and large airways, which in turn interact with airway inflammation that may be important in explaining symptoms and AHR in severe asthma
4. There are likely strong influences in early life, with ageing and with co-morbidities such as obesity

AHR, airway hyperresponsiveness.

# ASMA



## Cause di arresto cardiaco

- ❑ Ipossia
- ❑ Ipovolemia
- ❑ Farmaci
- ❑ Alterazioni elettrolitiche
- ❑ Pneumotorace iperteso
- ❑ Shock ostruttivo



# PRIMO SOCCORSO

Nessun aggiornamento rispetto alle Consensus on Science with Treatment Recommendations 2015

É suggerito che il primo soccorritore addestrato assista l'individuo asmatico con difficoltà respiratoria somministrando un broncodilatatore inalatorio

- Più veloce ritorno alle condizioni di base con un  $\beta 2$  agonista
- Miglioramento FEV1 e PEFr

# EVIDENCE UPDATE 2021

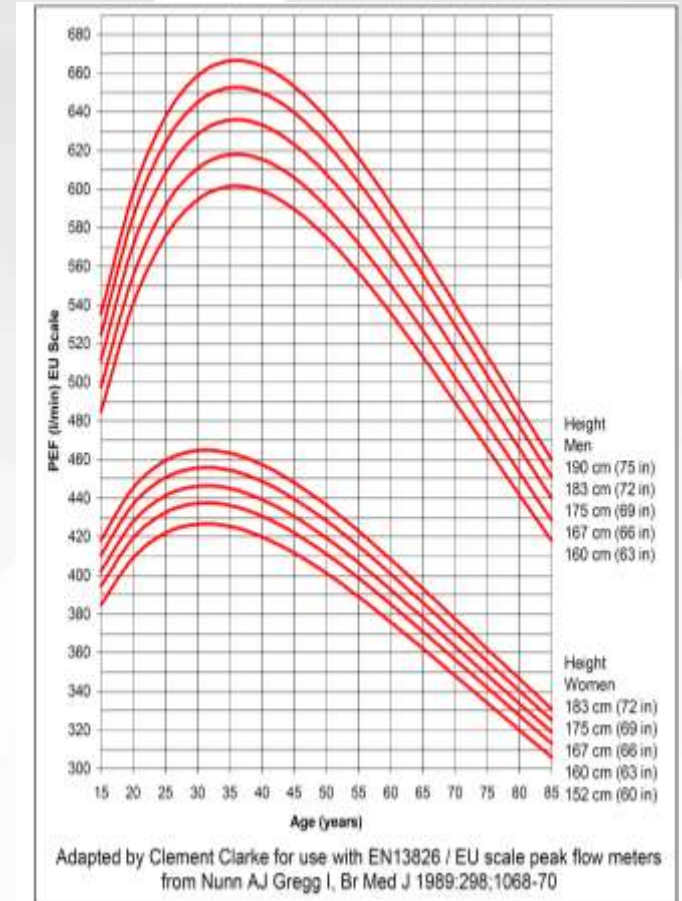
- British Thoracic Society and Scottish Intercollegiate guidelines Network
- Scoping review 352 pubblicazioni → 19 rilevanti → nessun RCT, opinione di esperti sulla base di studi osservazionali

# TRATTAMENTO

Prevezione dell'arresto → identificazione precoce del paziente che deteriora, approccio sistematico ABCDE

Valutare:

- Picco di flusso espiratorio (PEF)
- Sintomi e risposta alla terapia
- Frequenza respiratoria e cardiaca
- Saturazione d'ossigeno



***Pazienti con riacutizzazioni gravi o pericolose per la vita possono non apparire in distress o mostrare alterazioni di tutti i parametri sopraelencati. La presena di anche uno solo di questi deve mettere in allerta!***

## Measure peak expiratory flow and arterial saturations

### PEF >50–75% best or predicted Moderate asthma

SpO<sub>2</sub> ≥92%

PEF >50–75% best or predicted

No features of acute severe asthma

### PEF 33–50% best or predicted Acute severe asthma

Features of severe asthma

- PEF <50% best or predicted
- Respiration ≥25/min
- SpO<sub>2</sub> ≥92%
- Pulse ≥110 beats/min
- Cannot complete sentence in one breath

### PEF <33% best or predicted Life-threatening asthma

- SpO<sub>2</sub> <92%
- Silent chest, cyanosis, poor respiratory effort
- Arrhythmia, hypotension
- Exhaustion, altered consciousness

**If a patient has any life-threatening feature, measure arterial blood gases. No other investigations are needed for immediate management.**

**Blood gas markers of a life-threatening attack:**

- 'Normal' (4.6–6 kPa, 35–45 mmHg) PaCO<sub>2</sub>
- Severe hypoxia: PaO<sub>2</sub> <8 kPa (60 mmHg) irrespective of treatment with oxygen
- A low pH (or high H<sup>+</sup>)

***Caution: Patients with severe or life-threatening attacks may not be distressed and may not have all these abnormalities. The presence of any should alert the doctor.***

## IMMEDIATE TREATMENT

- Oxygen to maintain SpO<sub>2</sub> 94–98%
- β<sub>2</sub> bronchodilator (salbutamol 5 mg) via an oxygen-driven nebuliser
- Ipratropium bromide 0.5 mg via an oxygen-driven nebuliser
- Prednisolone tablets 40–50 mg or IV hydrocortisone 100 mg
- No sedatives of any kind
- Chest X-ray if pneumothorax or consolidation are suspected or patient requires mechanical ventilation

### IF LIFE-THREATENING FEATURES ARE PRESENT:

- Discuss with senior clinician and ICU team
- Consider IV magnesium sulphate 1.2–2 g infusion over 20 minutes (unless already given)
- Give nebulised β<sub>2</sub> bronchodilator more frequently eg salbutamol 5 mg up to every 15-30 minutes or 10 mg per hour via continuous nebulisation (requires special nebuliser)



## SUBSEQUENT MANAGEMENT

### IF PATIENT IS IMPROVING continue:

- Oxygen to maintain SpO<sub>2</sub> 94–98%
- Prednisolone 40–50mg daily or IV hydrocortisone 100 mg 6 hourly
- Nebulised  $\beta_2$  bronchodilator with ipratropium 4–6 hourly

### IF PATIENT NOT IMPROVING AFTER 15–30 MINUTES:

- Continue oxygen and steroids
- Use continuous nebulisation of salbutamol at 5–10 mg/hour if an appropriate nebuliser is available. Otherwise give nebulised salbutamol 5 mg every 15–30 minutes
- Continue ipratropium 0.5 mg 4–6 hourly until patient is improving

### IF PATIENT IS STILL NOT IMPROVING:

- Discuss patient with senior clinician and ICU team
- Consider IV magnesium sulphate 1.2–2 g over 20 minutes (unless already given)
- Senior clinician may consider use of IV  $\beta_2$  bronchodilator or IV aminophylline or progression to mechanical ventilation

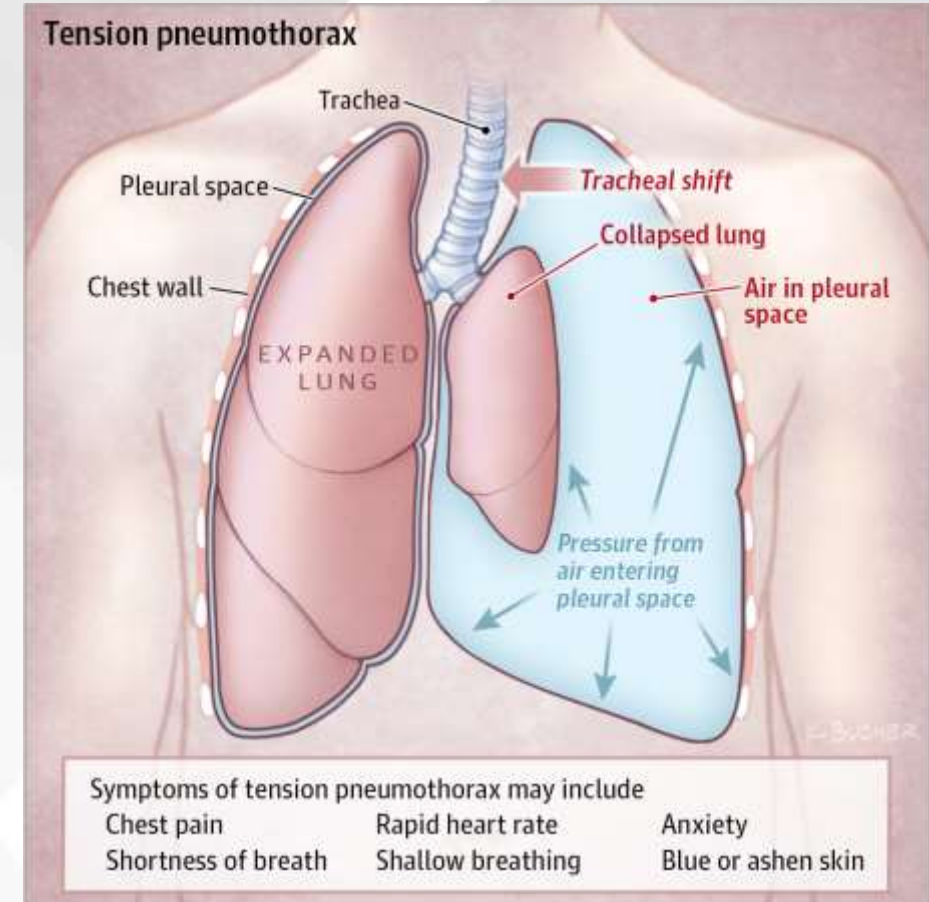
# PNEUMOTORACE ± IPERTESO

## □ Diagnosi

- Esame clinico
- Rx torace
- Ecocardiografia

## □ Trattamento:

- Decompressione con ago
- Drenaggio toracico





## MONITORING

- Repeat measurement of PEF 15–30 minutes after starting treatment
- Oximetry: maintain SpO<sub>2</sub> >94–98%
- Repeat blood gas measurements within 1 hour of starting treatment if:
  - initial PaO<sub>2</sub> <8 kPa (60 mmHg) unless subsequent SpO<sub>2</sub> >92% or
  - PaCO<sub>2</sub> normal or raised or
  - patient deteriorates
- Chart PEF before and after giving β<sub>2</sub> bronchodilator and at least 4 times daily throughout hospital stay

### **Transfer to ICU accompanied by a doctor prepared to intubate if:**

- Deteriorating PEF, worsening or persisting hypoxia, or hypercapnia
- Exhaustion, altered consciousness
- Poor respiratory effort or respiratory arrest

# TRATTAMENTO ARRESTO CARDIACO

A **Intubazione orotracheale**, se competenti

B O<sub>2</sub>, elevato rischio di PNX iperteso

Rischio di air-trapping e iperinflazione dinamica → disconnessione e riduzione manuale dell'iperinflazione

C Considera fluidi IV

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VENTILAZIONE	
Vt	Sufficiente ad espandere il torace
RR	8-10 atti/min
I:E	↓ (soprattutto se VE > 10 L/min)
FiO <sub>2</sub>	1.0

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# ECPR – ANAFILASSI E ASMA

- Trattamento rescue nel caso le terapie convenzionali falliscano
- Strutture con protocolli e percorsi consolidati
- Accesso immediato





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