

Tension pneumothorax

Set-up:	
Lines/access:	RIJ CVC, 2 peripheral cannulae
Infusions:	Sedatives, metaraminol (must be attached to peripheral cannulae – nothing attached to CVC) 1L crystalloid (hanging with giving set but not attached to patient)
Airway:	ETT
Ventilator:	V-SIMV 500/8 FiO ₂ 0.60 Rate 14 breaths/minute
Other:	Cardiac arrest trolley

Clinical setting:

- I: You are the ICU registrar and are called to assess bed 2
 S: Nurse reports difficulty in getting reliable arterial line trace
 B: 70-year-old ventilated patient with new fever, radial arterial line in situ, metaraminol running – trouble with trace
 A: Unable to aspirate
 R: Called for help

Potential Clinical Course:

- Initially **A** ETT, **B** SpO₂ 80% on FiO₂ 0.6, TV 250ml, ETCO₂ 4.5kPa (climbing), RR 14 (controlled), auscultation clear on left, quiet on right, trachea deviated to left, **C** HR 115, BP 98/52 (falling), CRT >3sec, **D** sedated
- BP continues to fall, cardiac arrest
- Initial rhythm sinus tachycardia (PEA)
- Exclude relevant reversible causes. Patient has a right-sided tension pneumothorax: continue for a further cycle if not identified and treated
- Decompressive thoracostomy
- ROSC
- Asks for equipment for a chest drain
- Post resuscitation care

Info Sheet For Faculty:

- Initial settings: SpO₂ 97% on FiO₂ 0.5
 - ETCO₂ 4.5kPa
 - RR 14
 - Clear auscultation left lung field, quiet at right apex
 - HR 88bpm SR
 - BP 114/67

- Initial deterioration: SpO₂ 94% on FiO₂ 0.5
 - ETCO₂ 4.5kPa
 - RR 14
 - Clear auscultation left lung field, quiet on right lung field
 - HR 98bpm SR
 - BP 105/52

- Progress to: SpO₂ 70% if FiO₂ not increased. If increased then 85%
 - ETCO₂ 3.0kPa
 - RR (depending upon candidate's ventilator settings)
 - HR 146bpm SR
 - BP 76/34

- Cardiac arrest: PEA
 - SpO₂ unrecordable
 - ETCO₂ 4
 - RR depends on patient ventilator settings/manual bagging
 - BP dependent on chest compressions

(Post needle thoracostomy)

- ROSC: SpO₂ 90% increasing to 94%
 - ETCO₂ 3.0kPa rising to 4.2kPa
 - HR 118bpm ST
 - BP 145/88

Scenario ends when candidate requests equipment for formal chest drain.

Faculty Roles:

Bedside Nurse 1:

- You are a senior critical care nurse
- You have received a 70 year old lady from the ED, already intubated and ventilated due to a community acquired pneumonia and worsening hypoxia.
- You are concerned that the arterial line isn't working in a ventilated patient on metaraminol
- Do not volunteer the information that the patient has recently had a central line placed – however, if they ask you to give anything down the central line ask if they have ordered a CXR to check the position. If they have not worked out that the patient has a tension pneumothorax once they have a cardiac arrest, ask if it's okay to use the central line without an x-ray

Bedside Nurse 2:

- You are a new starter
- You have basic nursing skills but no specific ICU/airway skills
- You have no idea what is going on, and seem pretty disinterested unless the candidate declares a tension pneumothorax/emergency

HILLO: 5, 6