Polytrauma - Case

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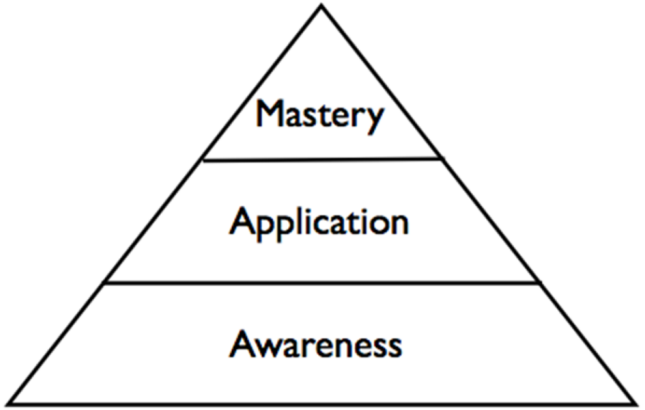
Pre-planning (Contingency + Pre-Alert)

- Logistics
- Personnel
- Training



‘Pint of sweat saves a gallon of blood’ General Patton WW2

‘Every man has a plan until he is punched in the face’ Mike Tyson

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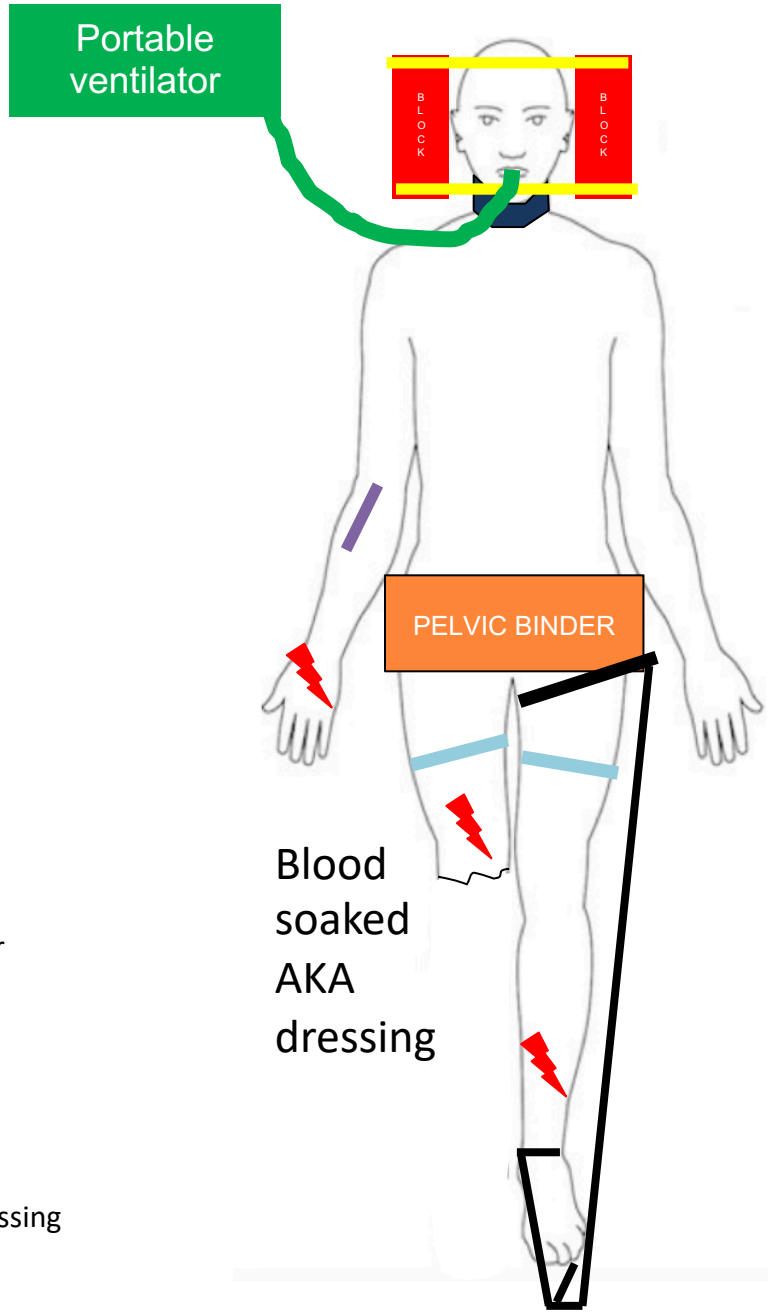
ATMIST Handover

- A – Age – 20 something
- T – Time – 2hrs ago
- M - Mechanism – Bakery explosion, trapped by collapsed building
- I – Injuries
  - Head injury / Burnt + deformed left arm / Right leg traumatic above knee amputation / Left leg open fracture / Right hand wound
- S – Signs
  - GCS 9 (E2 pressure, V2 sounds, M4 flexion)
  - Pulse 130 BP 92/49 O_2 Sat 96% (10L/min) Temp 34°
- T – Treatment
  - Intubation (RSI) / R ACF venflon / 1x PRC 1xFFP / Bilateral lower leg tourniquets / Bilateral FFDs / Left traction splint

IV access
RIGHT ACF



= ET tube
= c-spine collar
= IV access
= tourniquet
= Kendrick
= wound + dressing

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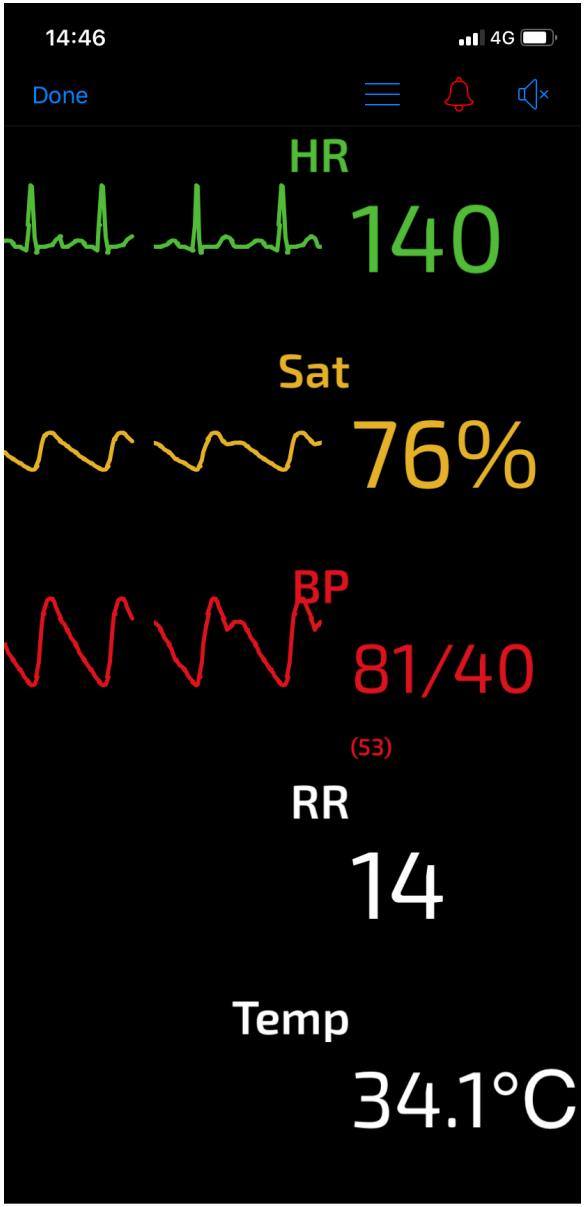
Observations

Total

PRC	FFP	Plat	Cryo	TXA
1	1			1g



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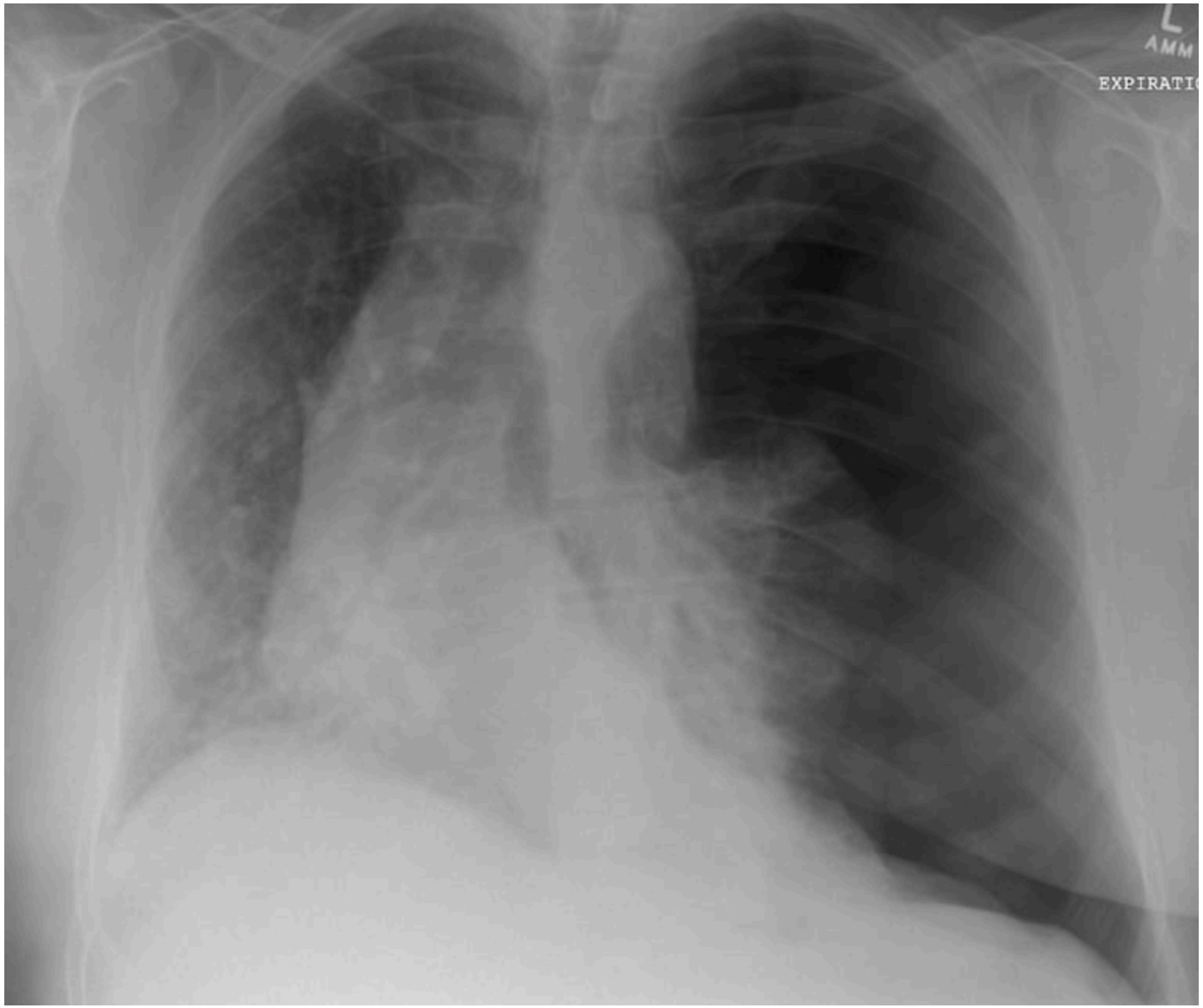

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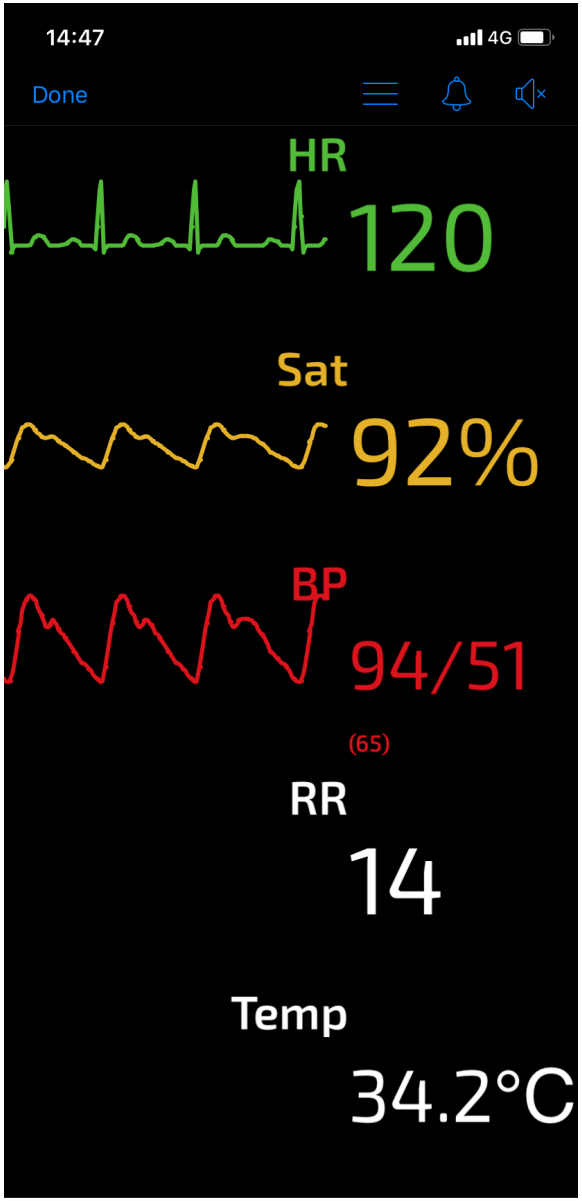

OxiRAUMA

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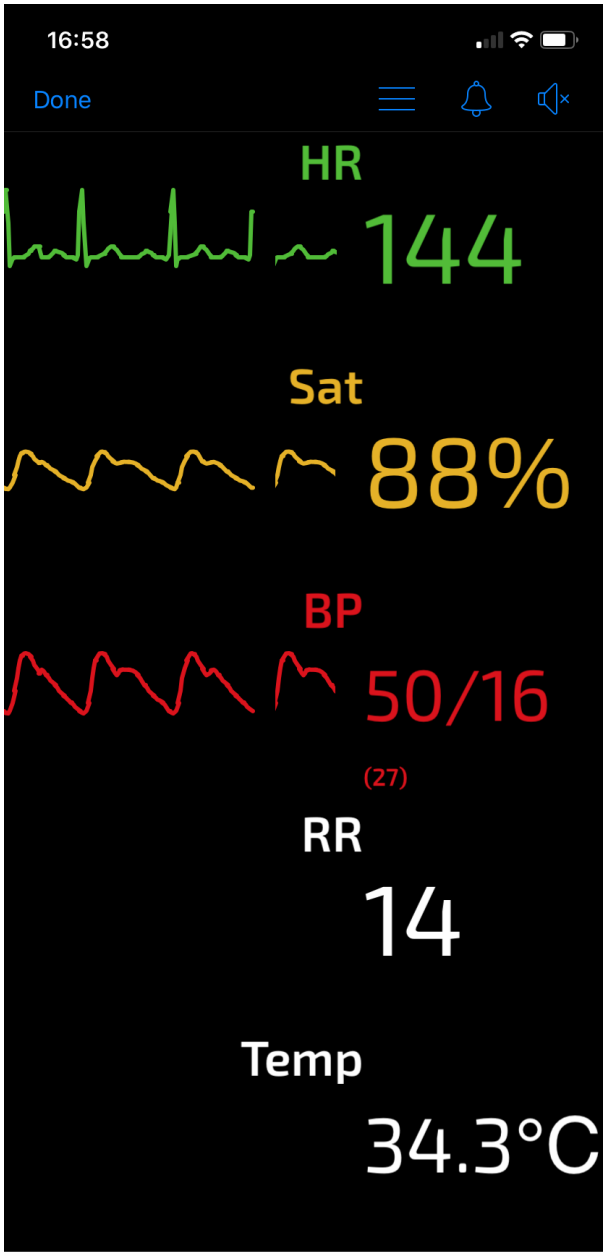

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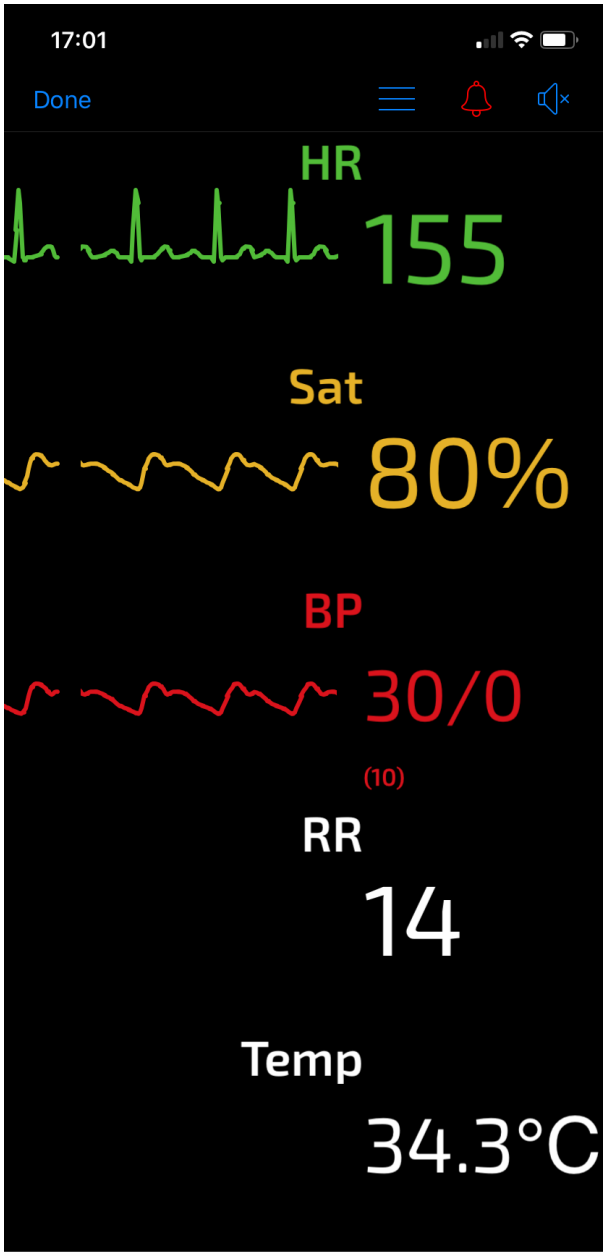

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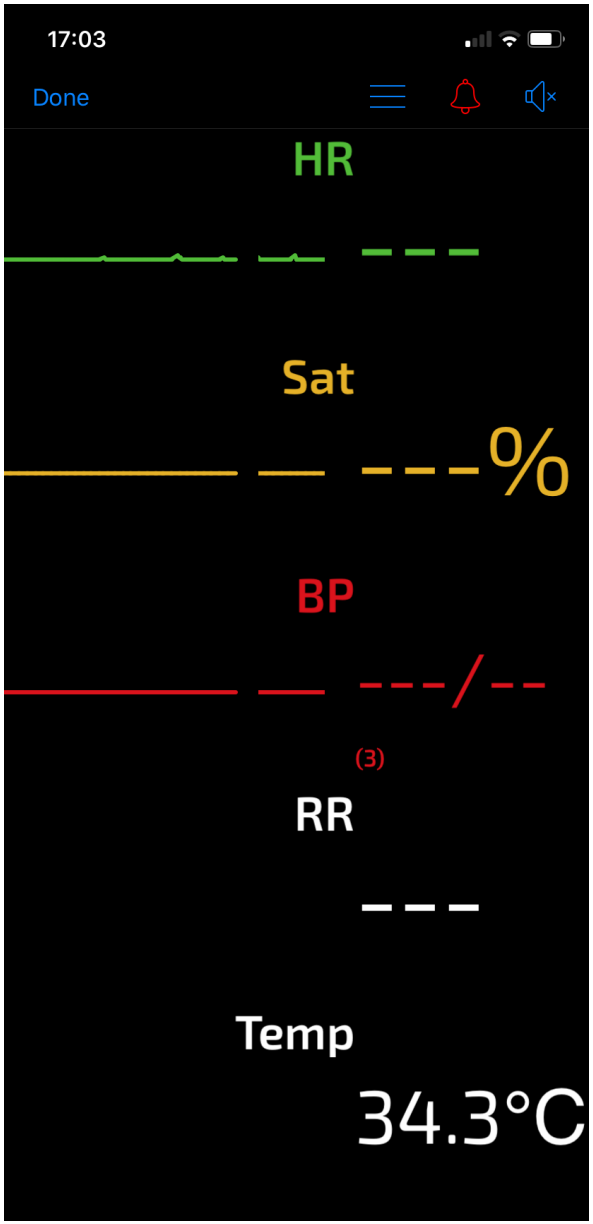
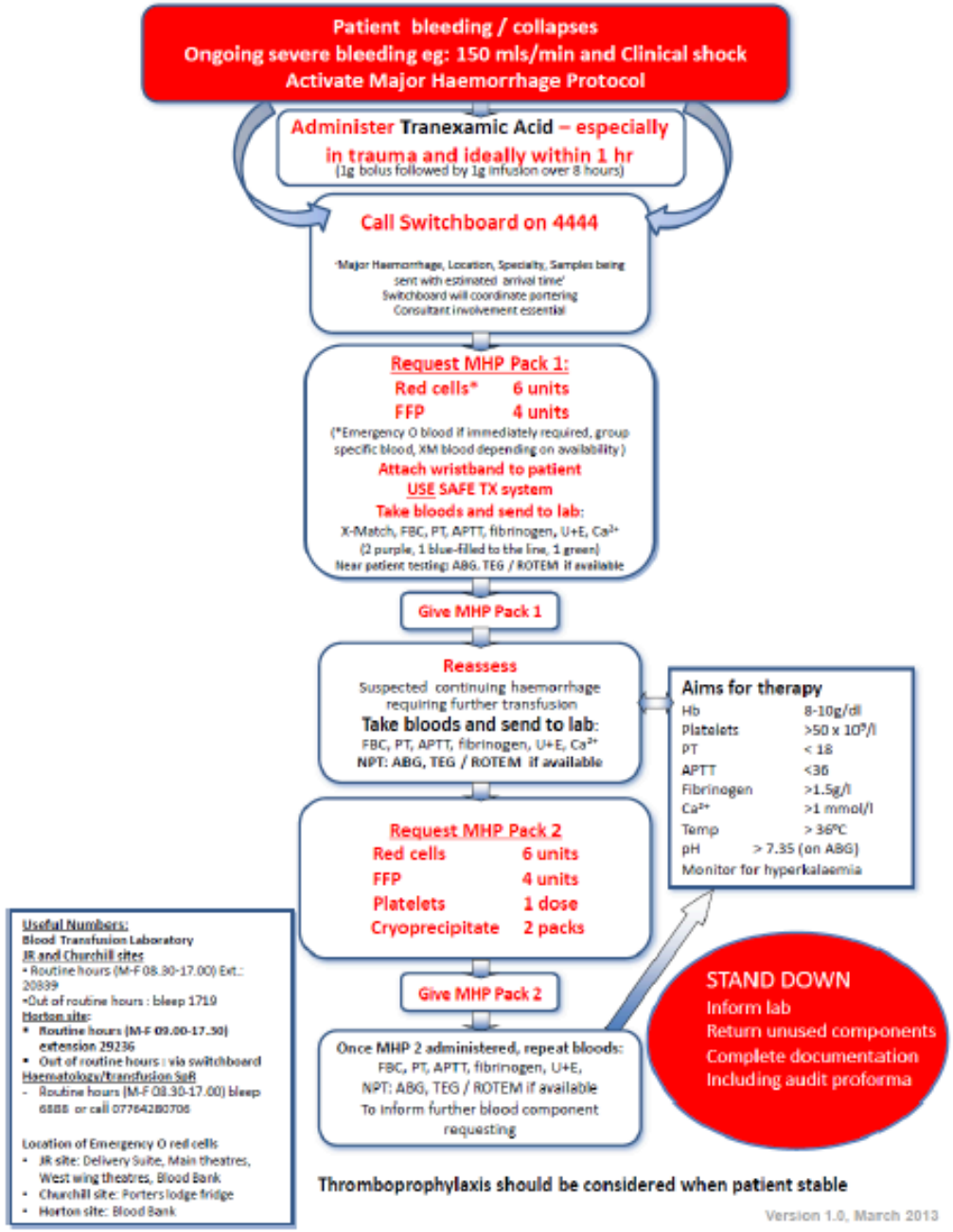


Traumatic Thoracototmy

- Discuss
  - Indications
  - Objectives
    - Correctable intra thoracic injury
    - Proximal control

Transfusion Management of Major Haemorrhage in Adults



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Challenge of IV access

- Collar / binder
- BP cuff
- Injured arm
- Lack of experience
- US

Intraosseous Access

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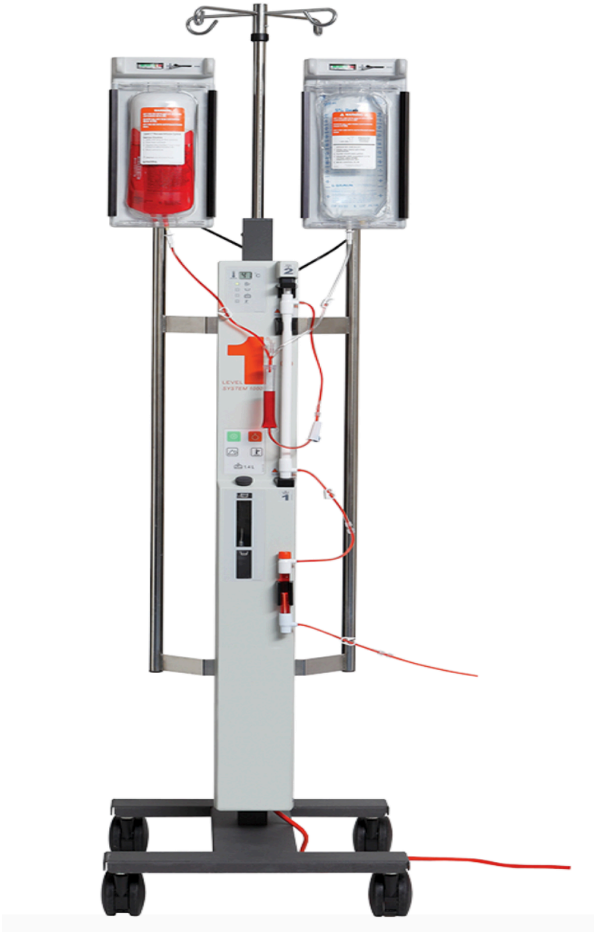
Level 1 Transfuser



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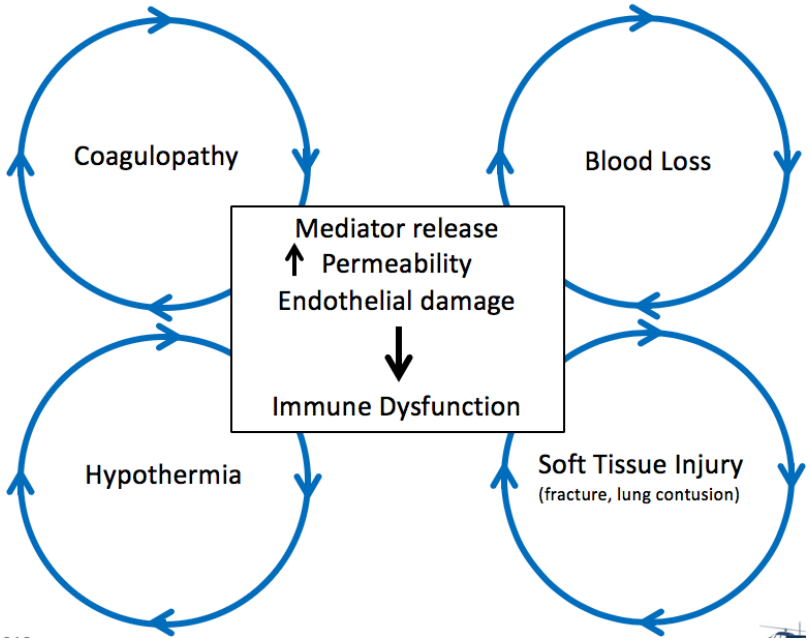
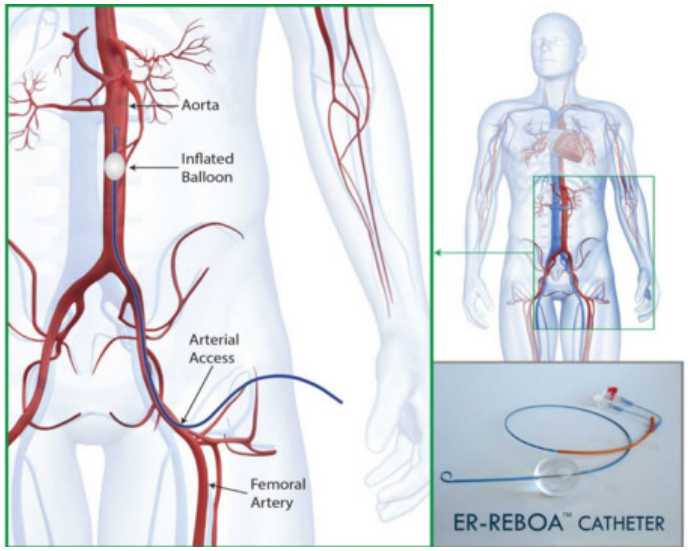
Terrible triad / quad - truths

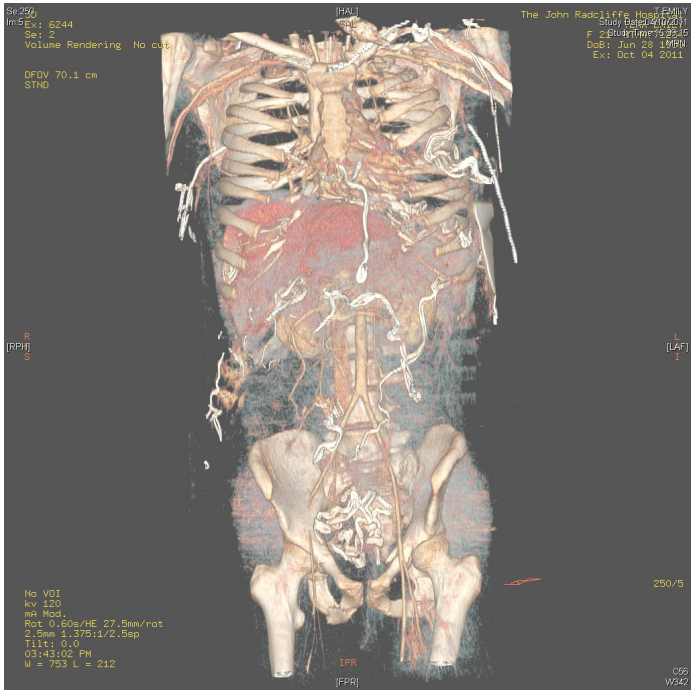
- All bleeding stops eventually
- It stops quicker if there is the ability to generate clot
- Arterial bleeding needs direct intervention
- Venous bleeding can stop with pressure and stabilization of the clot
  - As long as there is an ability to form clot



Turning off the tap in ED

- ReBOA
- Damage control intervention (surgery) - not dictated by geography





Interventional Radiology vs Pelvic Packing

- Discuss
  - Indications
  - Efficacy
  - Speed

Damage Control - Trolley

- Ortho basic
- 10 large and 10 small swabs
- 1 L warm Hartman's
- Bladder syringe
- 4 x 22 blades
- Blue liga clips + long applicator
- Vascular slings
- 10 artery clips
- 4 x no 1 nylon
- 2 x 2/0 vicryl ties
- Skin staples
- 1 x large Ioban

- Sterile gloves:
  - 2 pairs x Size 7
  - 2 pairs x Size 7.5
  - 2 pairs x Size 8
- Swab count sheet
- Reminder: take own "lead coat" from theatre to Resus

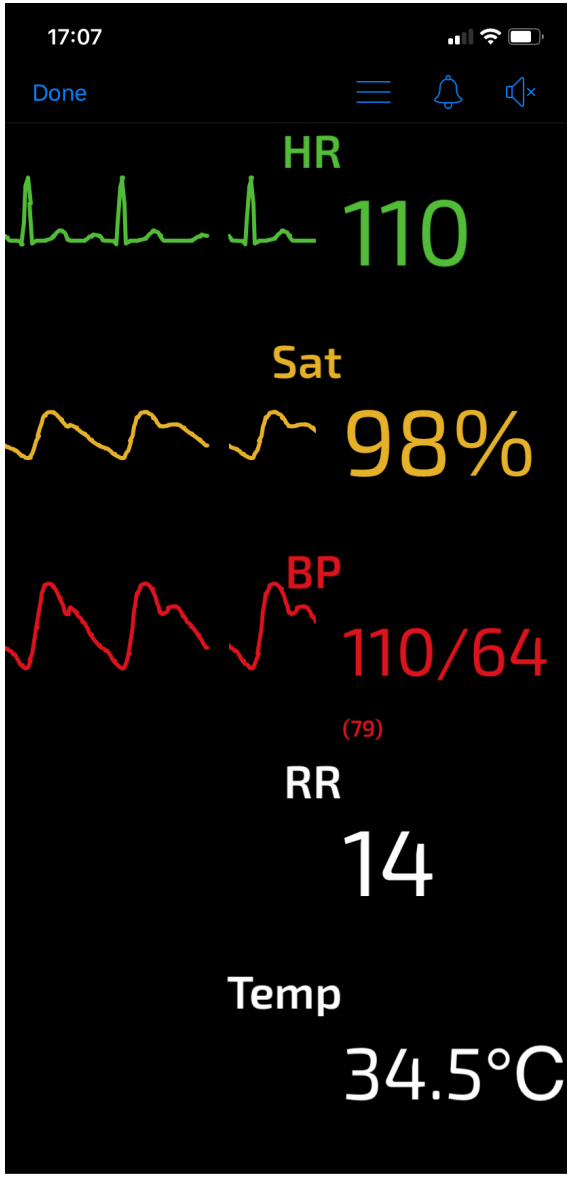
Basic specialty specific equipment (vascular, laparotomy, thoracotomy) on a separate trolley in theatre unopened, to remain within the Theatre complex.

Observations

Total

PRC	FFP	Plat	Cryo	TXA
6	4			1g

Gas	Normal – Arterial	Venous
pH	7.35-7.45	**7.084**
pCO_2	4.5-6.0 kPa	
pO_2	11.1-14.4 kPa	
Hb	135-146 g/l	**119**
Lactate	0.5-1.6 mmol/l	**6.8**
Base Excess	22-30 mmol/l	**-9.7**
HCO_3	-2-2 mmol/l	**15.5**



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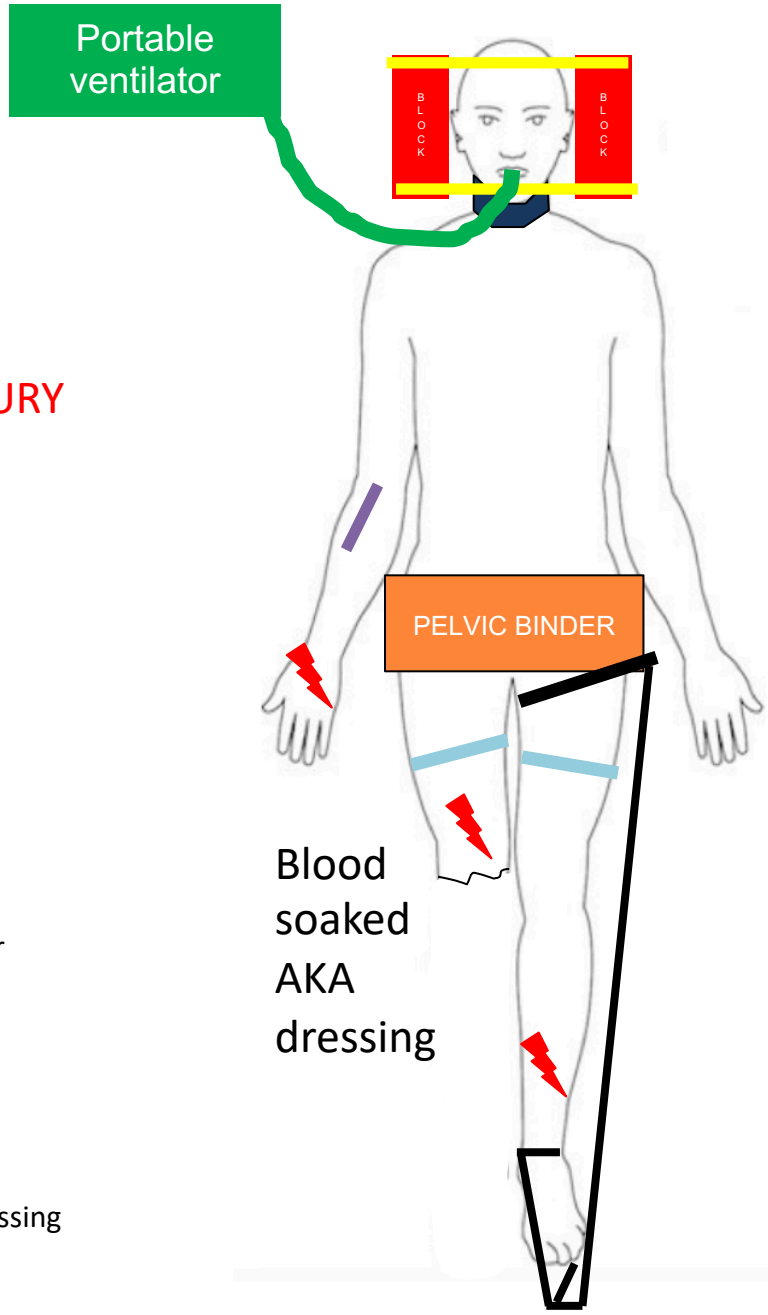
Time Out

- Verbalise
- Summarise
- Share mental model
- Empower followers
- Distracting injuries
- Unseen injuries
- Secondary survey
- Role for surgeons?

2.5hrs POST INJURY



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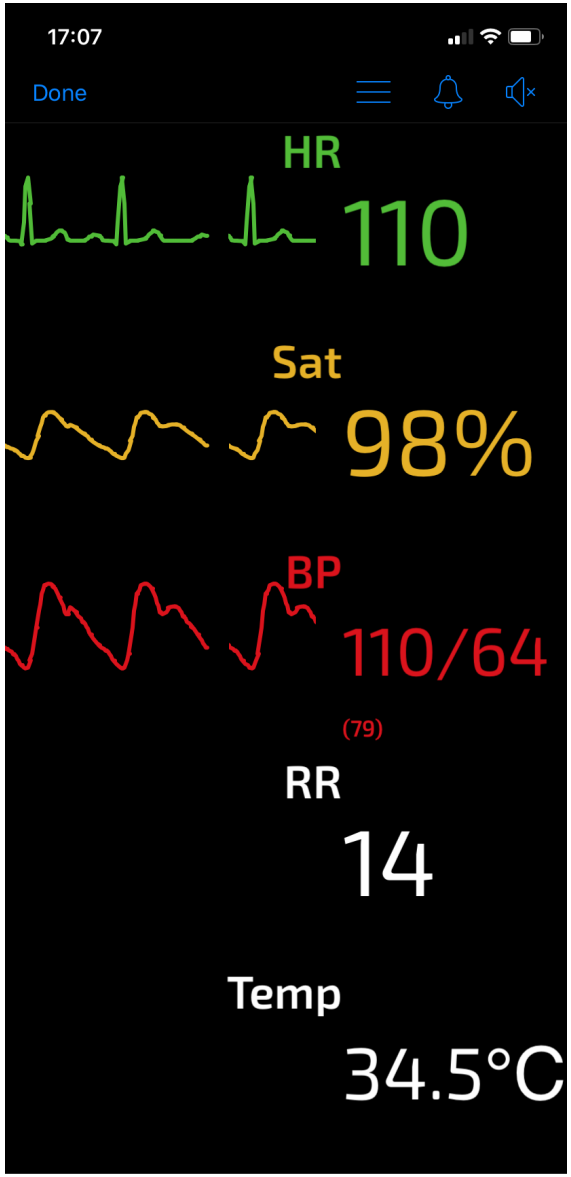

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Where next ?

- ED
- Diagnostic Imaging
- CT
- Theatre
- Interventional radic
- ITU
- Transfer
- Ward
- Home

Observations

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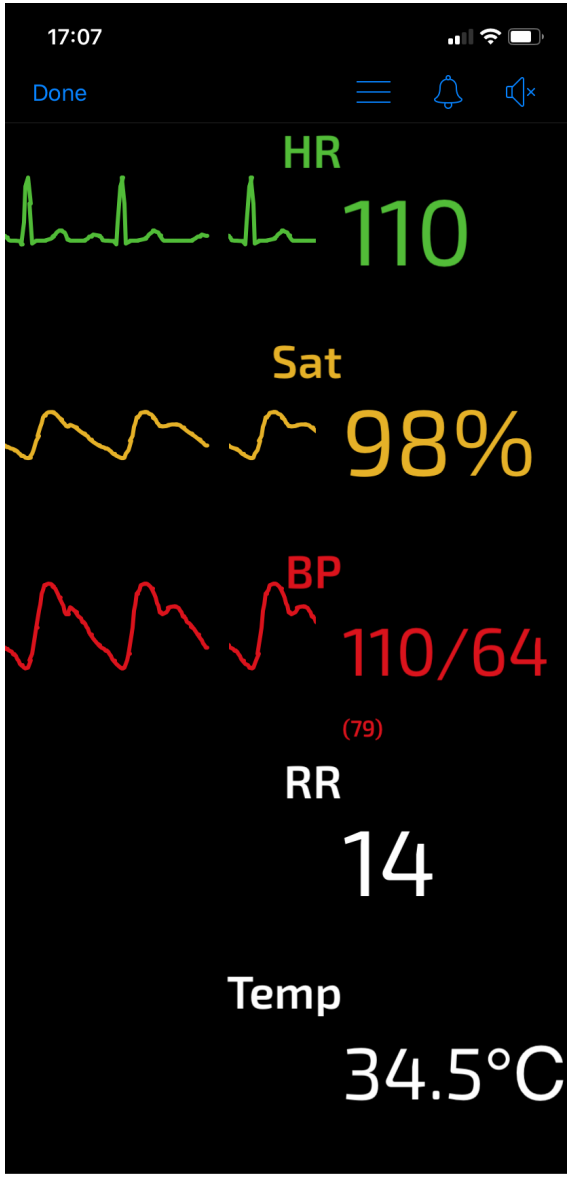

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R
MOBILE

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Se: 5/11
Im: 1/1
EXTREMITY
LT
2008 May
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W:4095 L:2047
SIZES ARE APPROXIMATE


Se: 10/11
Im: 1/1
EXTREMITY
LT
AP
Id:DCM / Lin:DCM / Id:ID
SIZES ARE APPROXIMATE

CT findings

- No intra- cranial pathology
- Bilateral lung contusions (L>R)
- Splenic rupture – with contrast blush
- Mesenteric contusions
- Pelvis – no abnormality
- Spine – no abnormallity

Emergency Department

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Where next?

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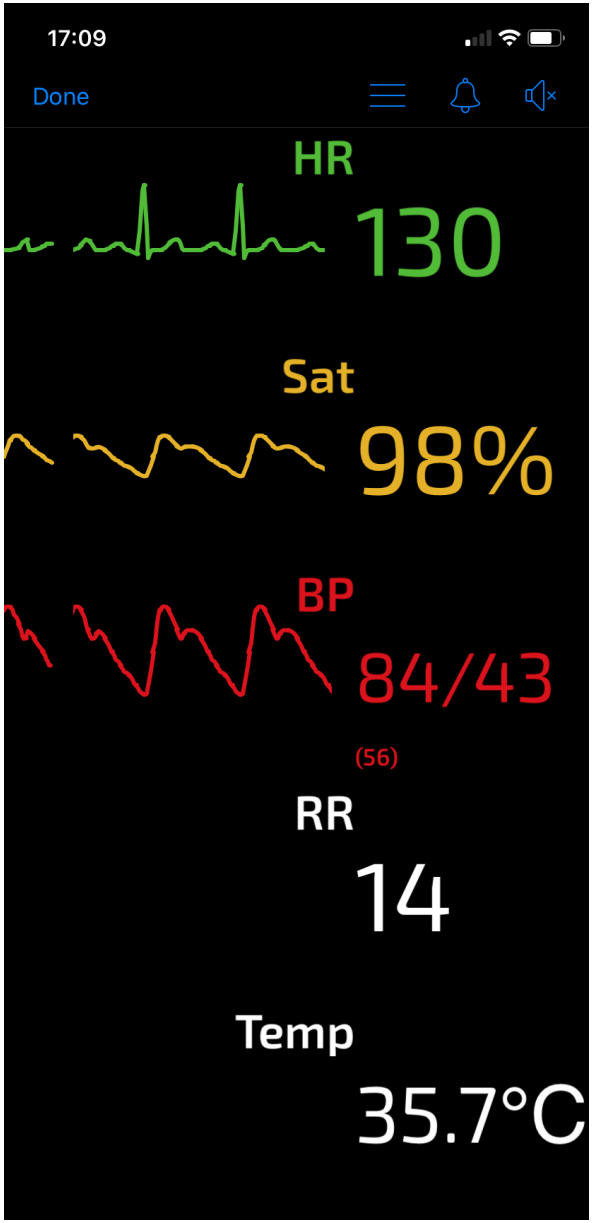

Where next ?

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Mind the gap!

- Who is the clinical lead?
  - Resus
  - CT
  - Angio suite
  - On return to Resus
  - On the way to theatre
  - While the anaesthetist is preparing the anaesthetic
  - During the operation

Damage Control - Trolley

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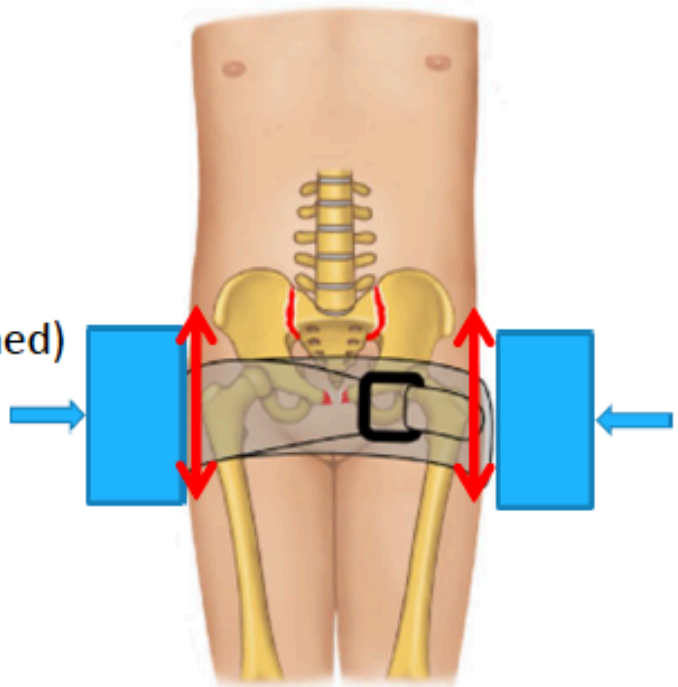
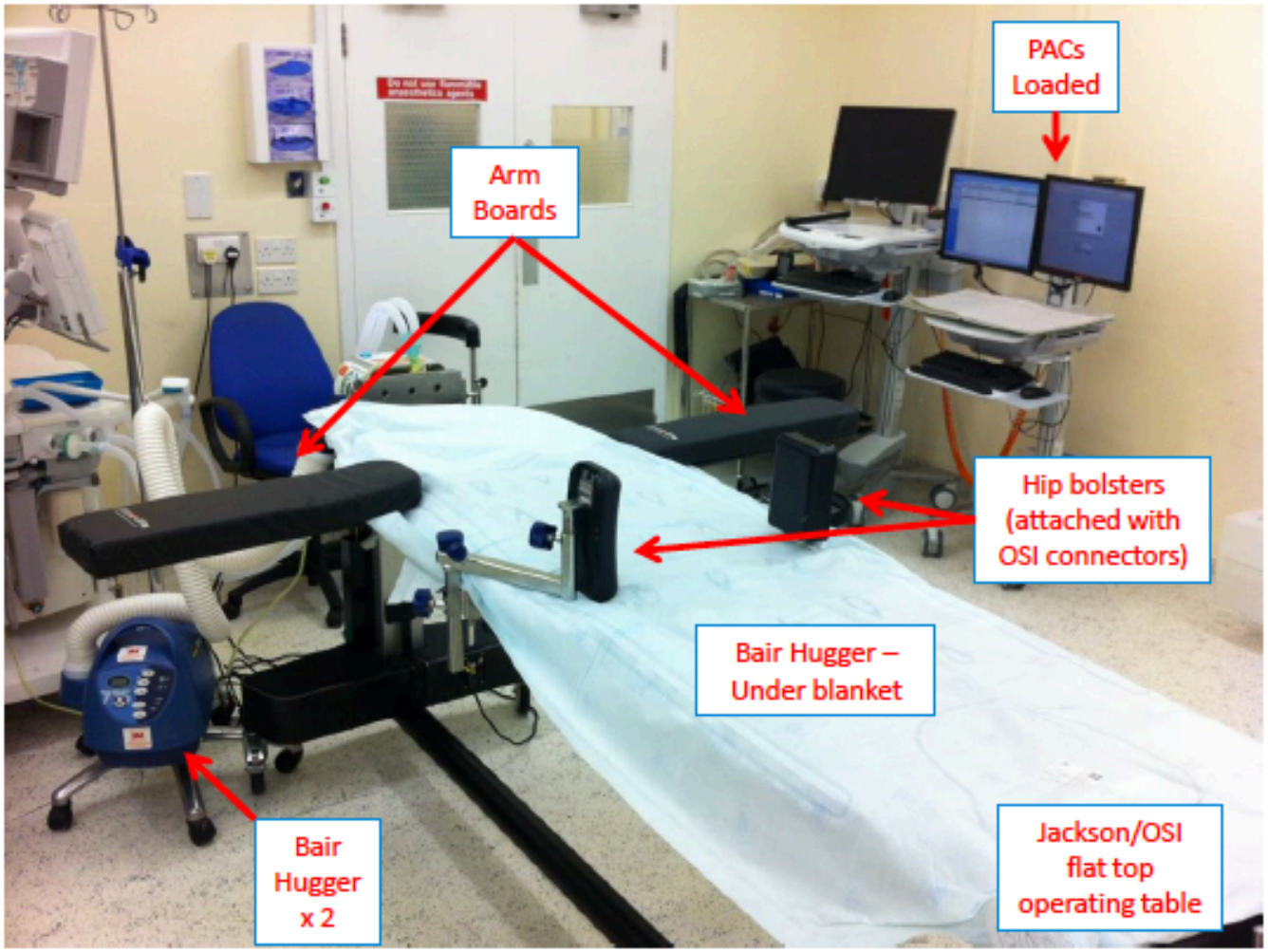
Damage Control - Theatre Set Up

- Theatre 1 (if available) - **Thermostat set to max**
- 1 x large basin with diluted chlorhexidine, LABELLED
- 2 scrubbing brushes and 2 x Huck towel packs
- Image Intensifier
- Pat slide
- Jackson table (flat top)
  - 2 x Jackson arm supports
  - 2 x Jackson side connectors
  - 2 x hip bolsters (Patient Right attached)
- 2 x Bair Huggers (over and under)
- 2 suction units
- Diathermy
- Heel jellies
- Flowtron calf compression devices
- 4 x plastic u-drapes



APPLY HIP BOLSTERS + THEN CUT AWAY FRONT OF BINDER

Damage Control - Theatre Set Up



Damage Control – Anaesthetic Set Up

- Ultrasound for vascular access
- Trolley with (unopened) MAC (large bore central venous catheter) or Swan sheath AND central line (preferably 4 lumen line)
- Gown and sterile gloves (2 x pair Size 6, 2 pair x Size 7, 2 pair x Size 8)
- Belmont (primed with 0.9% Saline).
- Infusion pumps (GH) x 2

What is your Plan?

Injuries
Haemorrhagic shock
Head injury (CT -ve)
Left retrobulbar haematoma
Left arm burns
Left arm segmental forearm
Left arm vascular injury / compromise
Right hand open injury
Tension pneumothorax
Abdominal injury Splenic rupture Mesenteric contusions
Right traumatic AKA
Left open tibia

Injuries	Completed Management
Haemorrhagic shock	IO access, subclavian access, MHP, TXA, proximal control
Head injury (CT -ve)	CT
Left retrobulbar haematoma	CT
Left arm burns	
Left arm segmental forearm	
Left arm vascular injury / compromise	
Right hand open injury	FFD, tetanus, Ig, antibiotics
Tension pneumothorax	Left thoracostomy, CT
Abdominal injury Splenic rupture Mesenteric contusions	CT
Right traumatic AKA	Tourniquet, 2nd tourniquet
Left open tibia	Tourniquet, FFD (aBx, tetanus – as above)

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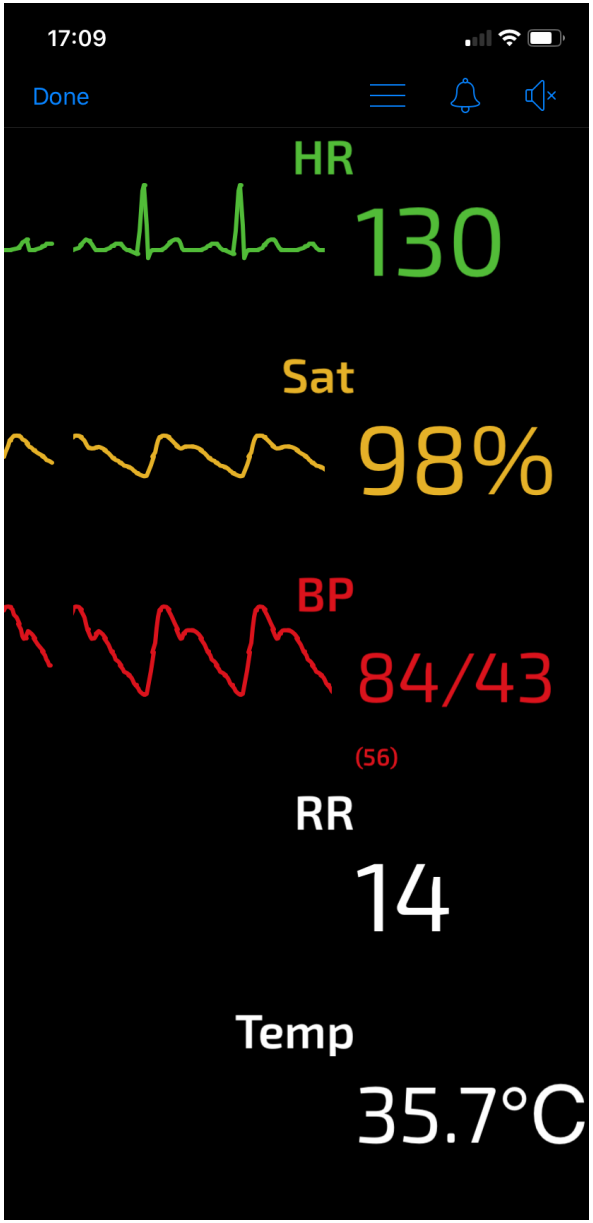


What is your strategy?

- DCS vs ETC = EAC

- Prioritise
- Share strategy
- Bail out points
- Trend
- Tempo
- Timeouts

Injuries	Completed Management	Planned Management
Haemorrhagic shock	IO access, subclavian access, MHP, TXA, proximal control	Warming, targeted resuscitation, 2nd dose of TXA
Head injury (CT -ve)	CT	
Left retrobulbar haematoma	CT	Lateral canthotomy
Left arm burns		Escharotomies Tetanus
Left arm segmental forearm		Temporary stabilization, definitive fixation
Left arm vascular injury / compromise		Restore perfusion
Right hand open injury	FFD, tetanus, Ig, antibiotics	D+W, closure, splintage, elevation
Tension pneumothorax	Left thoracostomy, CT	Chest drain, chest closure, CXR
Abdominal injury Splenic rupture Mesenteric contusions	CT	Laparotomy
Right traumatic AKA	Tourniquet, 2nd tourniquet	Social wash, exchange tourniquets, proximal control, decision on level
Left open tibia	Tourniquet, FFD (aBx, tetanus – as above)	Remove tourniquet, occlusive dressing, splintage, D+W, ex-fix, restore perfusion, NPWT

Damage Control – Pre-knife to skin Checklist

- Allocation of surgical leadership
- Discuss strategy with team
  - Damage Control vs Early Total care
  - Order of procedures
  - Consider lactate < or > 2.5 mmol/L and trend
  - Surgical escape points
- Are other surgeons required?
- Is interventional radiology required?
- Agreed maximum surgical duration
  - 60 mins for DCS
- Pre-knife to skin timeout (+ repeat every 15mins)

Pre-knife to skin + 15 minute timeouts

- Ventilation
- Fluid requirements
- Pulse
- BP
- Lactate
- Clotting
- Inotropic support
- ICP
- Temperature

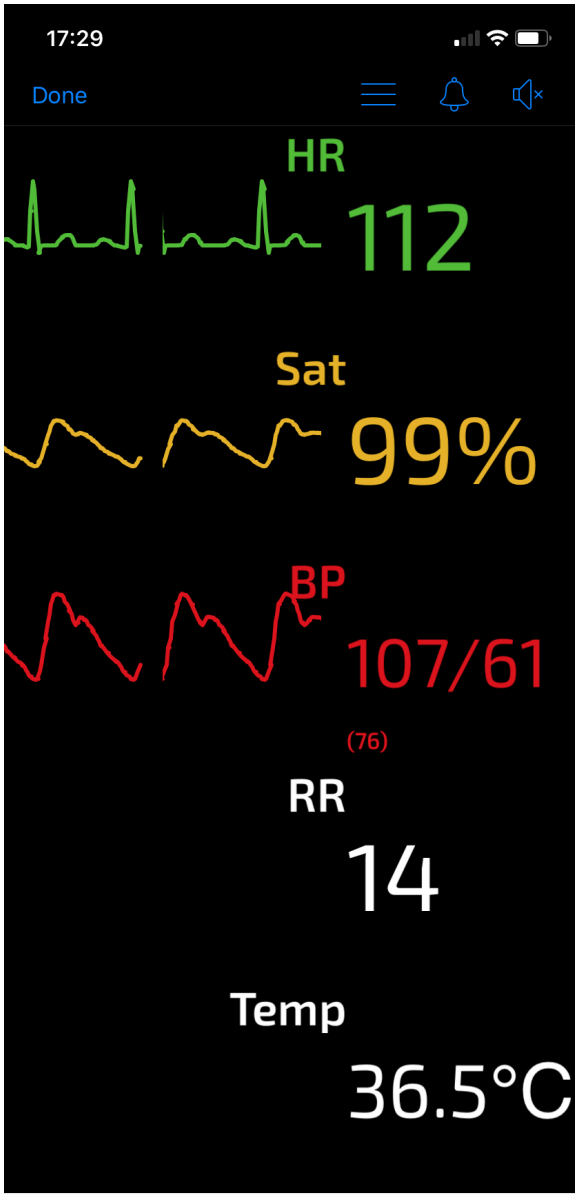
Consider stopping surgery and transfer to Critical Care for physiological normalisation

Observations

Gas	Normal	Arterial
pH	7.35-7.45	**7.221**
pCO_2	4.5-6.0 kPa	**5.9**
pO_2	11.1-14.4 kPa	**26.0**
Hb	135-146 g/l	**94**
Lactate	0.5-1.6 mmol/l	**3.4**
Base	22-30 mmol/l	**-5**
HCO_3	-2-2 mmol/l	**20.3**

Total

PRC	FFP	Plat	Cryo	TXA
10	8	1	1	1g / 1g



Where next ?

- ED
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- ITU
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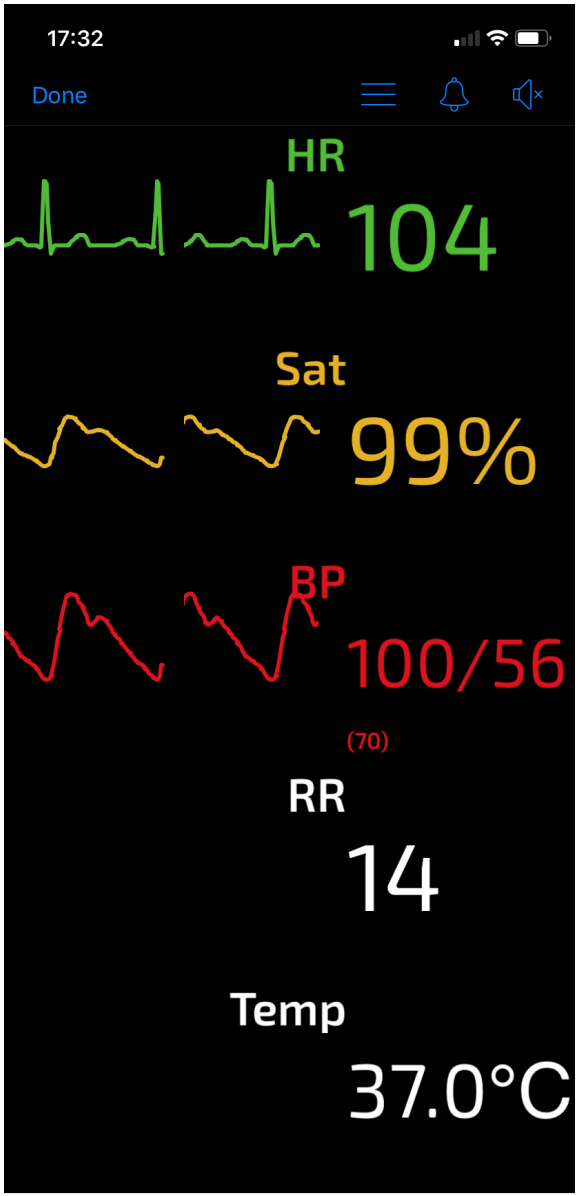
- Home

Observations

Gas	Normal	Arterial
pH	7.35-7.45	**7.145**
pCO_2	4.5-6.0 kPa	**6.63**
pO_2	11.1-14.4 kPa	**25.4**
Hb	135-146 g/l	**79**
Lactate	0.5-1.6 mmol/l	**5.9**
Base	22-30 mmol/l	**-11.2**
HCO_3	-2-2 mmol/l	**15.5**



Total

PRC	FFP	Plat	Cryo	TXA
14	12	2	2	1g / 1g

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