



TRAUMA UPDATE

TRAUMA UPDATE 14/4/22

West Midlands Trauma Network -TARN and TRIDs

Trauma refresher

Trauma scenario & case-based discussion (1)

Coffee break

Trauma scenario & case-based discussion (2)

Penetrating trauma – lessons from London

Departmental Update
(Hamilton drop in session)

Trauma Triage Tool

Entry criteria for this triage tool is a judgement that the patient may have suffered significant trauma



1. VITAL SIGNS

- Sustained respiratory rate **<10** or **>29***
- Sustained Systolic Blood Pressure **<90mmHg***
- GCS **MOTOR** Score **4 or less**

*Consult JRCALC for expected age specific paediatric thresholds

No

Yes to any of these

MTC

Discuss with Trauma Desk

2. ANATOMY OF INJURY

- **Significant chest injury and hypoxia**
- Major pelvic fracture
- Penetrating injury to head, neck, torso, armpit, gluteal region, or groin
- Open or depressed skull fracture
- Spinal injury with paralysis
- 2 or more humerus or femur fractures
- Open fracture, amputation or mangled extremity proximal to forefoot or wrist

No

Yes to any of these

MTC

Discuss with Trauma Desk

3. OTHER CONDITIONS

- **Clinician judgement of significant injury**
- Significant burns/scalds, circumferential or facial
- Anticoagulants, a death in scene, pregnancy, morbid obesity
- Patients >65 years consider Silver Trauma Safety Net

→

Yes to any of these

Discuss with Trauma Desk

for Destination Advice

Trauma Desk Contact Details

ARP Talk Group: unchanged

Emergency Contact: unchanged | Hospital Line: unchanged

V3

Oct 2021

Silver Trauma Safety Net Aged 65 years and over?

With any of the following:

PHYSIOLOGY

- Systolic BP <110mmHg following an accident

ANATOMY

- Injury to 2 or more body regions (excluding injuries distal to wrist/ankle joints)
- Suspected shaft of femur fractures
- Open fracture proximal to wrist / ankle

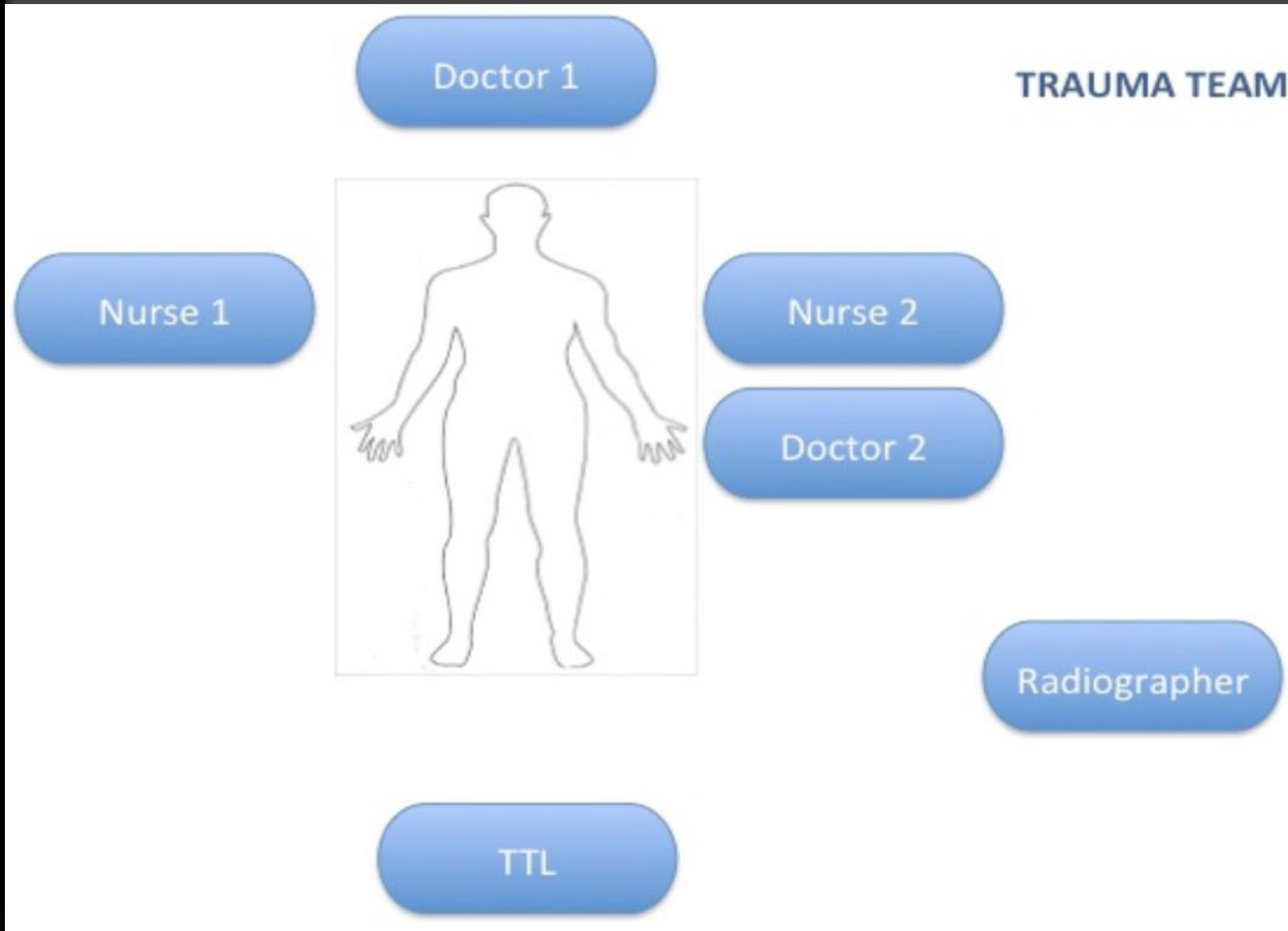
MECHANISM

- Fall downstairs
- From an RTC:
 - Entrapment >30mins
 - Ejection
 - Death in same incident
 - Pedestrian vs Car – direct to MTC
 - Cyclist vs Car – direct to MTC

Discuss the case with the RTD who will then 'SILVER TRAUMA PRE-ALERT' the appropriate Emergency Department

Be aware of patients on anticoagulants as the destination may need upgrading from a TU to an MTC.

TRAUMA TEAM



Leadership

Team Behaviour

Situational Awareness

**Trauma
Teams**

Resource Utilisation

Communication



TREATMENT GOALS

- Correct location? Tertiary centre required (secondary transfer or hyperacute)
- Ventilatory assessment
- Analgesia
 - +/-SAP block
 - Fascia Iliaca block
- Specialist review
 - Pain team
 - T+O

HYPERACUTE TRANSFER

Patients eligible to undergo hyper acute (delayed primary) transfer are those needing immediate life / limb saving intervention at a Major Trauma Centre where it cannot be delivered in a trauma unit (TU) / local emergency hospital (LEH)

Patients in TU / LEH meeting hyper acute (delayed primary) transfer criteria may have arrived at hospital in this condition or deteriorate soon after arrival (i.e. they are still within the Emergency Department investigative / resuscitative phase of treatment).

The TU / LEH TTL will contact the Regional Trauma Desk (**RTD: 01384 215696**); who will then contact the MTC TTL as a conference call.

*N.B The RTD will **not** take calls regarding **non-hyper acute adult transfers.***

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V3

Oct 2021



TRAUMA QUICK WINS

Effects of tranexamic acid on death, vascular occlusive events, and blood transfusion in trauma patients with significant haemorrhage (CRASH-2): a randomised, placebo-controlled trial

CRASH-2 trial collaborators*

TXA

Effect of treatment delay on the effectiveness and safety of antifibrinolytics in acute severe haemorrhage: a meta-analysis of individual patient-level data from 40 138 bleeding patients



Angèle Gayet-Ageron, David Prieto-Merino, Katharine Ker, Haleema Shakur, François-Xavier Ageron, Ian Roberts, for the Antifibrinolytic Trials Collaboration*

Lancet 2018; 391: 125-32

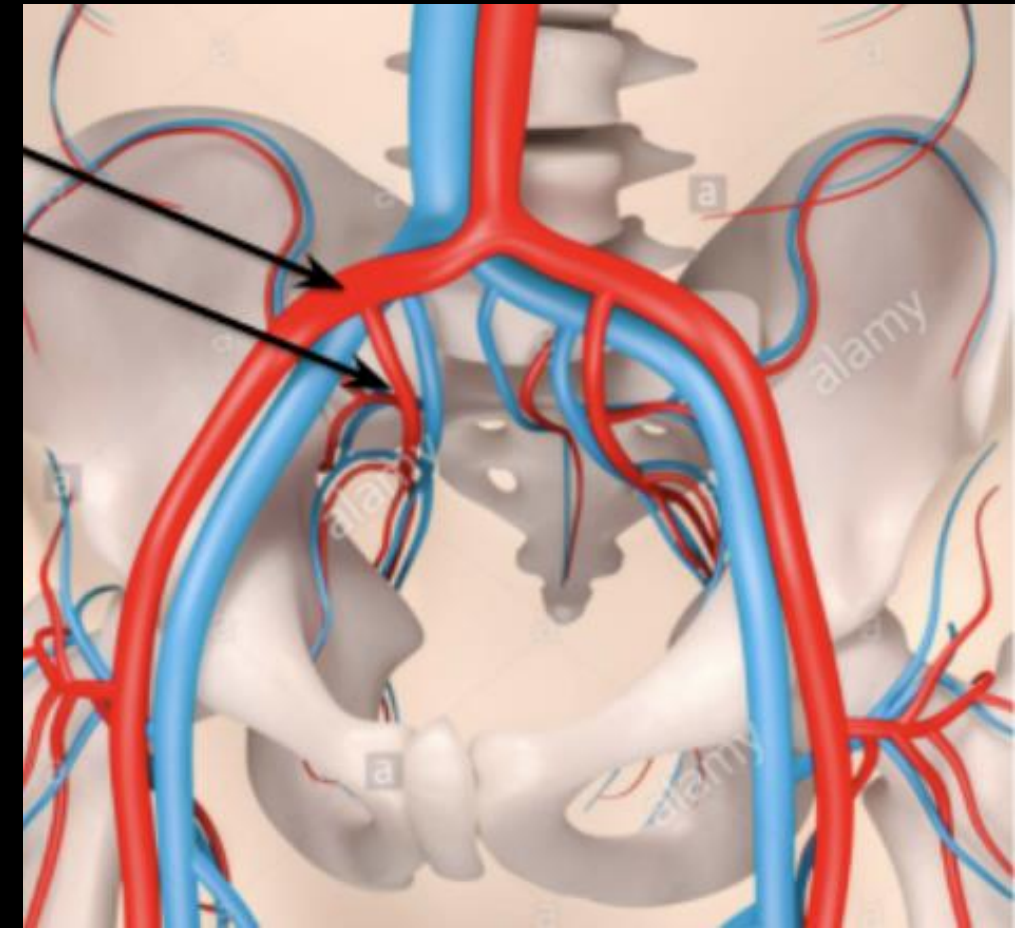
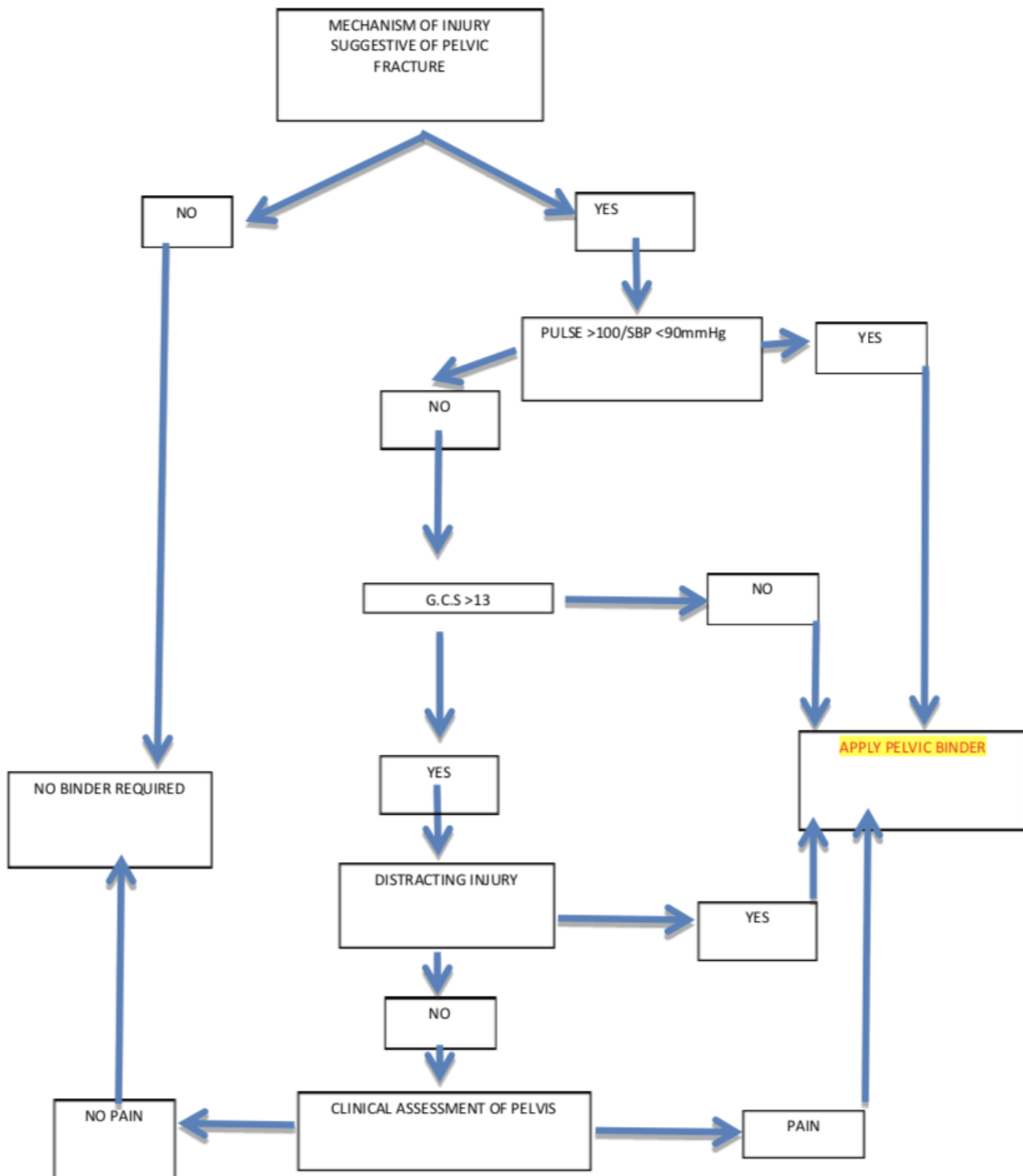
Published Online

Summary

Background Antifibrinolytics reduce death from bleeding in trauma and post-partum haemorrhage. We examined the effect of treatment delay on the effectiveness of antifibrinolytics.

Effects of tranexamic acid on death, disability, vascular occlusive events and other morbidities in patients with acute traumatic brain injury (CRASH-3): a randomised, placebo-controlled trial

PELVIC BINDER



MAJOR HAEMORRHAGE

Major Trauma? Major Haemorrhage? Then...

T	Tranexamic Acid	<ul style="list-style-type: none"> • If not administered already: • 1g bolus, followed by • 1g infusion over 8 hours
R	Resuscitation	<ul style="list-style-type: none"> • Activate Major Haemorrhage Protocol • Aim Transfusion Ratio 1:1:1 and consider: <ul style="list-style-type: none"> • Rapid infuser and cell salvage • Hypotensive resuscitation • Pelvic binder / splint fractures / tourniquet • Limit crystalloid and colloid use
A	Avoid Hypothermia	<ul style="list-style-type: none"> • Target temperature > 36°C • Remove wet clothing and sheets • Warm blood products / fluids • Use warming blanket / mattress
U	Unstable? Damage Control Surgery	<ul style="list-style-type: none"> • If unstable, coagulopathic, hypothermic or acidotic, perform damage control surgery • Aim surgery time < 90 minutes • Haemorrhage control, decompression, decontamination and splintage
M	Metabolic	<ul style="list-style-type: none"> • Avoid acidosis • Base excess guides resuscitation • If lactate > 5mmol/L or rising, consider stopping surgery, splint and transfer to ICU
A	Avoid Vasoconstrictors	<ul style="list-style-type: none"> • Inappropriate use of vasoconstrictors doubles mortality • However, use may be required in cases of spinal cord or traumatic brain injury
T	Test Clotting	<ul style="list-style-type: none"> • Check clotting every 90 mins / 4 units RBCs • Aim platelets > 75x10⁹/L • Aim INR & aPTTR ≤ 1.5 • Aim fibrinogen > 1.5g/L • Consider TEG
I	Imaging	<ul style="list-style-type: none"> • Consider: <ul style="list-style-type: none"> • FAST • CT: <ul style="list-style-type: none"> • Most severely injured / haemodynamically unstable patients gain most from CT • Interventional radiology
C	Calcium	<ul style="list-style-type: none"> • Maintain ionised Ca²⁺ > 1.0 mmol/L • Administer 10mls 10% Calcium Chloride over 10 mins, as required

ACCESS

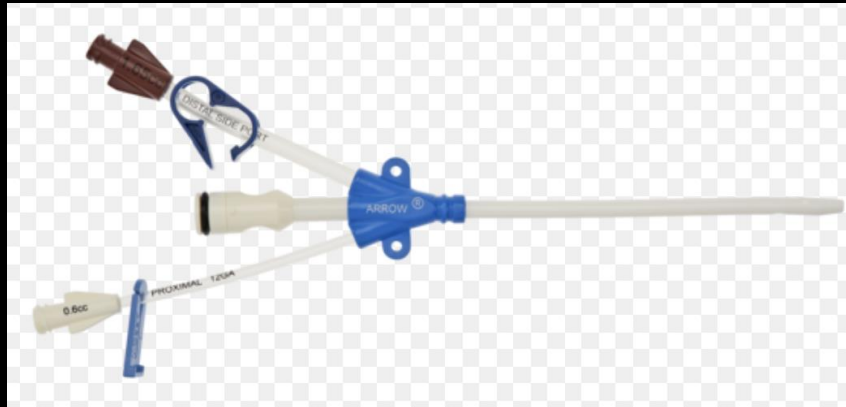
- 2 x wide bore cannula
- Trauma line-subclavian wide bore
- IO -humeral



ACCESS FLOW RATES WITH PRESSURE

ACCESS TYPE	FLOW RATE (mL/min)	TIME TO INFUSE 1L (min)
PERIPHERAL IV		
20G	140	7
18G	210	5
16G	390	3
14G	480	2
RIC	600	2
IO		
15G Tibia	30	33
15G Humerus	60	17
15G Sternum	90	11
CENTRAL LINE		
Triple Lumen (18G Proximal Port)	80	13
Triple Lumen (16G Distal Port)	120	8
8.5Fr Introducer Sheath	600	2

PAEDIATRIC ACCESS



PERMISSIVE HYPOTENSION...

- Syst: $70 + (2 * \text{age in years})$

NEUROPROTECTIVE STRATEGIES

- What's going to kill them first...
- Neuroprotective strategies

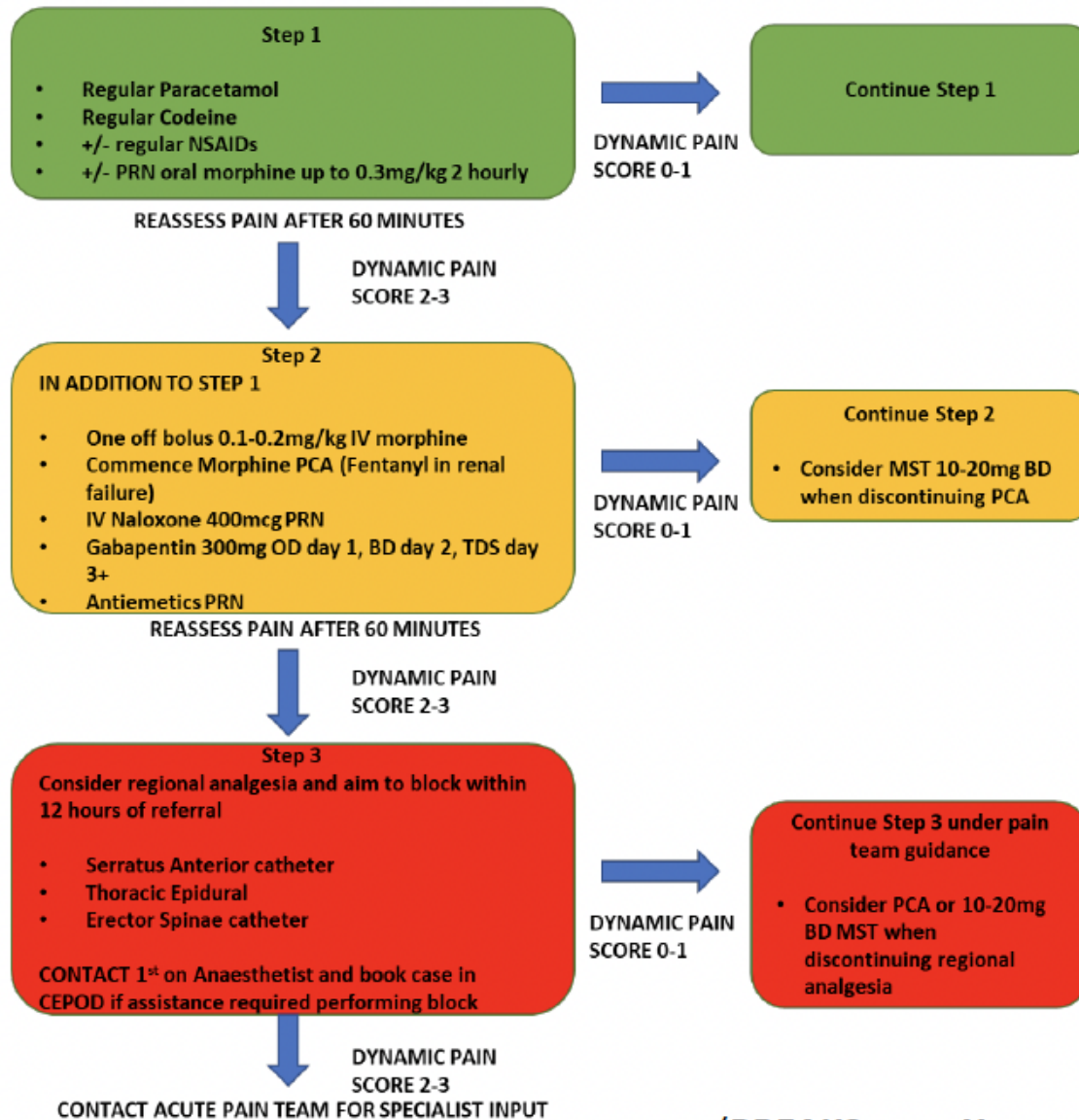
TBI MAP TARGETS

Age	MAP
<2 years	60-65mmHg
2-6 years	70-75mmHg
>6 years	80-85mmHg

RIB FRACTURE REGIONAL BLOCKS

- Thoracic Epidural –less frequent
- Paravertebral –likely gold standard but not regularly performed
- Erector Spinae: posterior fractures
- Serratus Anterior: lateral fractures – easier due to positioning +/- **landmark**
- Fractures: fascial plane disruption- likely increasing spread
- Insert catheters

RIB FRACTURE PAIN ASSESSMENT AND MANAGEMENT PATHWAY



Rib Fracture Scoring

(BREAKS X SIDES) + AGE FACTOR

Breaks: Number of discrete breaks (2 breaks in 1 rib = 2 breaks)
Sides: Unilateral vs Bilateral

Age Factor:

0	If age ≤40 years
1	If 41-50 years
2	If 51-60 years
3	If 61-70 years
4	If >70 years

Initial Management:

Score 3-6 = Step 1
 Score 7-10 = Step 2
 Score ≥11 = Step 3

Dynamic Pain Scoring

Refers to pain when deep breathing or coughing

Pain Score

0	None
1	Mild
2	Moderate
3	Severe

Uncontrolled pain = Dynamic Pain Score 2-3

Physiotherapy

- Refer all patients for physiotherapy assessment
- Regular incentive spirometry
- If unable to complete incentive spirometry or deteriorating incentive spirometry due to pain, contact acute pain team

- Remember NSAID and Gabapentin cautions and contraindications
- Consider earlier regional analgesia in elderly or patients with significant lung disease
- Refer ALL patients to the Acute Pain Team in hours (WRH Bleep 238, ALX Bleep 1266)
- ALL PATIENTS RECEIVING PCA OR REGIONAL BLOCK MUST HAVE RELEVANT REFERRAL SLIP COMPLETED AND SENT TO PAIN TEAM

RIB FRACTURE SCORE

(_____ X _____) + _____ = _____



TRAUMATIC CARDIAC ARREST

TRAUMA EQUIPMENT



ODP

Anaesthetist

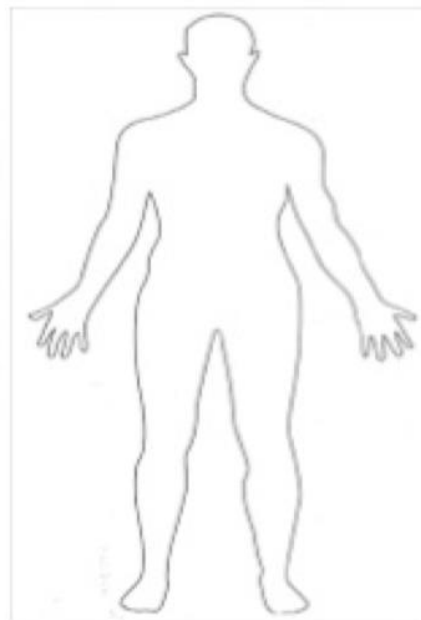
CODE RED TRAUMA
TEAM

Nurse 1

Nurse 2

Doctor 1

Doctor 2



Radiographer

TTL

Scribe

Surgical Reg

Ortho Reg

Nurse in
Charge

ICU Reg

Traumatic cardiac arrest treatment algorithm

HOTT ALGORITHM

Simultaneously address reversible pathology

Hypovolaemia

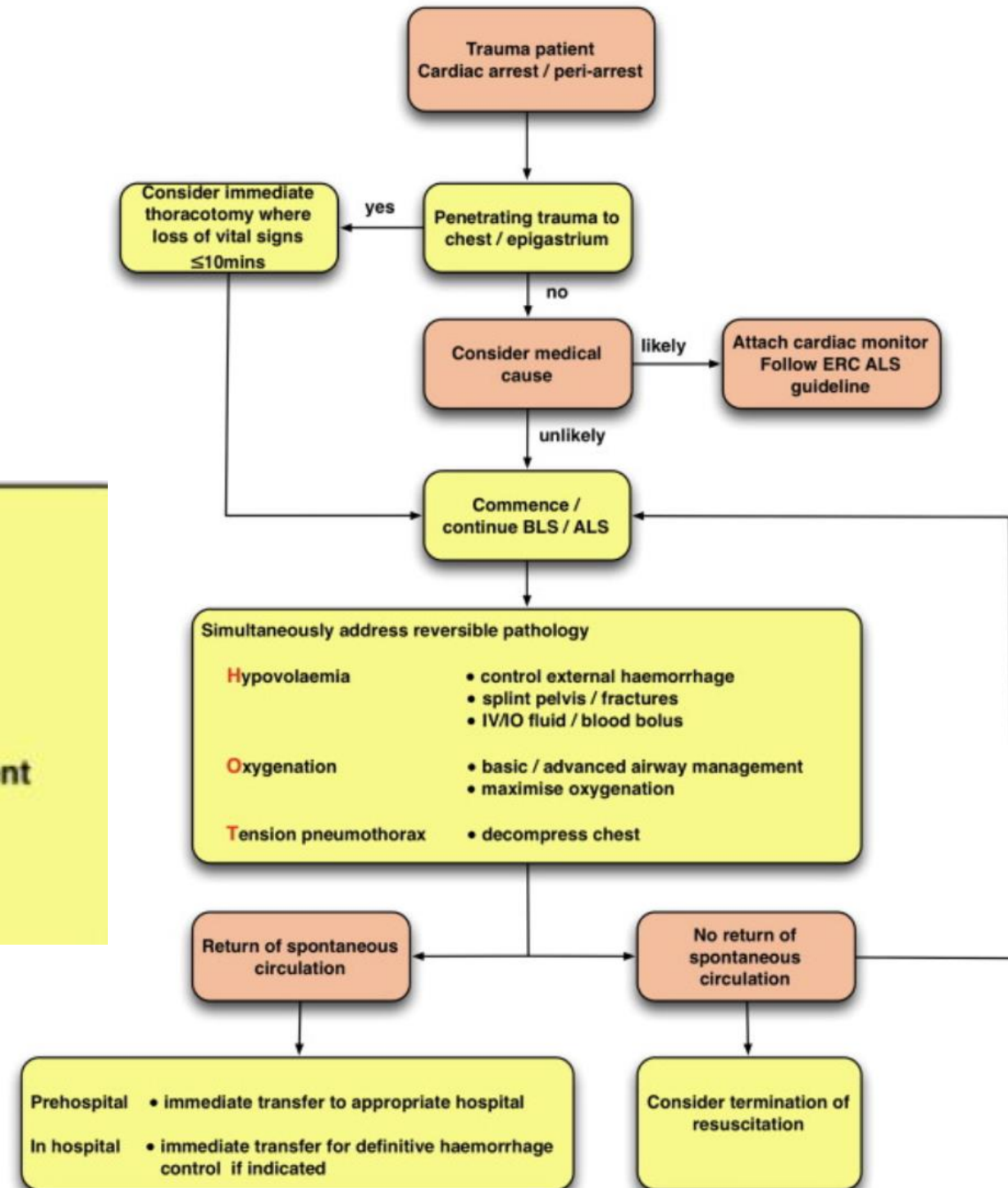
- control external haemorrhage
- splint pelvis / fractures
- IV/IO fluid / blood bolus

Oxygenation

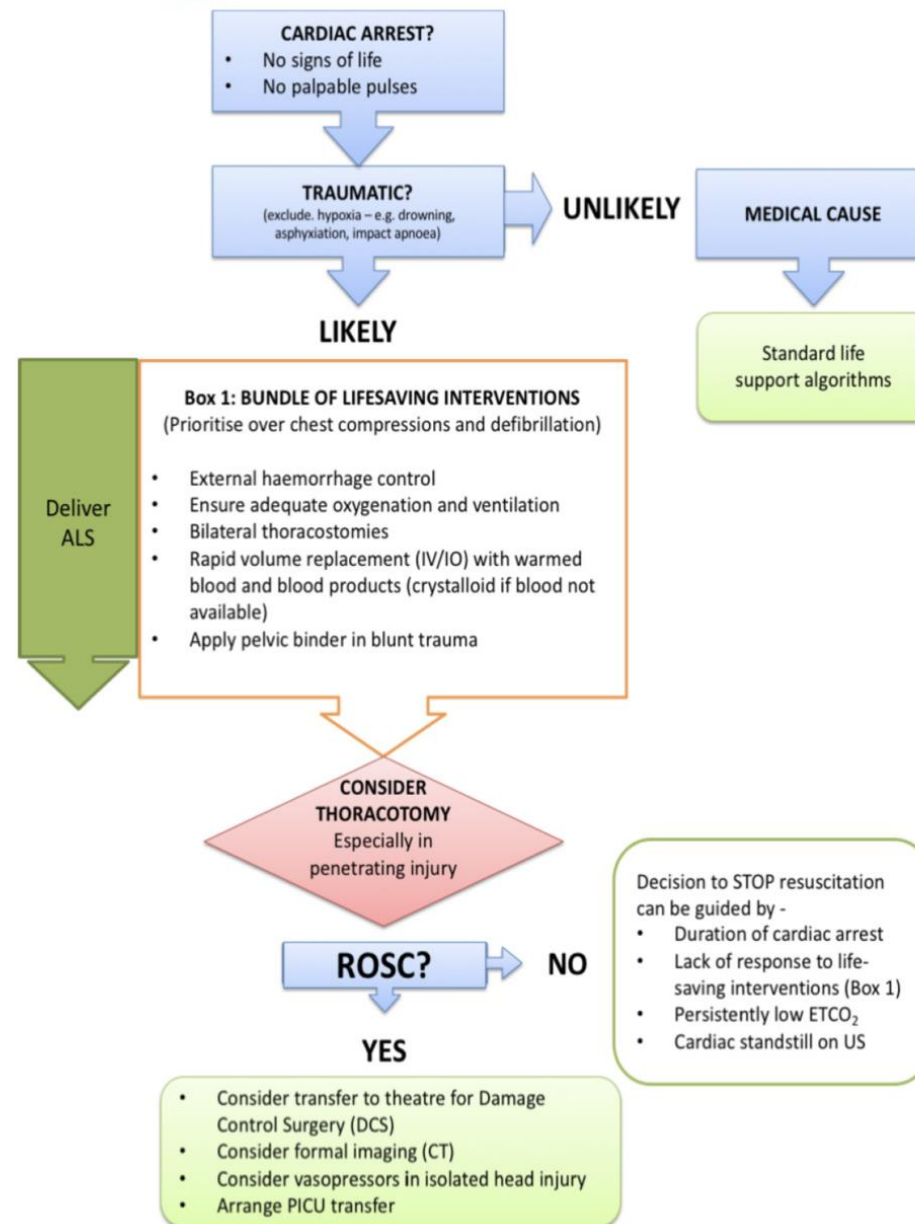
- basic / advanced airway management
- maximise oxygenation

Tension pneumothorax

- decompress chest



PAEDIATRIC TCA



CHEST COMPRESSIONS IN TCA

- Current pernicious trend away from compressions in TCA
- Physiological sense in **some** cases
- Review main paper and invite opinion



ERC GUIDELINES 2021

Hypovolaemia

Traumatic cardiac arrest (TCA)

- Resuscitation in TCA should focus on the immediate, simultaneous treatment of reversible causes.
- The response to TCA is time critical and success depends on a well-established chain of survival, including focused pre-hospital and specialised trauma centre care.
- TCA (hypovolemic shock, obstructive shock, neurogenic shock) is different from cardiac arrest due to medical causes; this is reflected in the treatment algorithm (Figure Trauma1).
- Use ultrasound to identify the underlying cause of cardiac arrest and target resuscitative interventions.
- Treating reversible causes simultaneously takes priority over chest compressions. Chest compression must not delay treatment of reversible causes in TCA.
- Control haemorrhage with external pressure, haemostatic gauze, tourniquets and pelvic binder.
- 'Don't pump an empty heart'.
- Resuscitative thoracotomy (RT) has a role in TCA and traumatic peri-arrest.

CHEST COMPRESSIONS IN TCA



ELSEVIER

Available online at www.sciencedirect.com

Resuscitation

journal homepage: www.elsevier.com/locate/resuscitation

Experimental paper

Closed chest compressions reduce survival in an animal model of haemorrhage-induced traumatic cardiac arrest

Sarah Watts^{a,}, Jason E. Smith^{b,c}, Robert Gwyther^a, Emrys Kirkman^a*

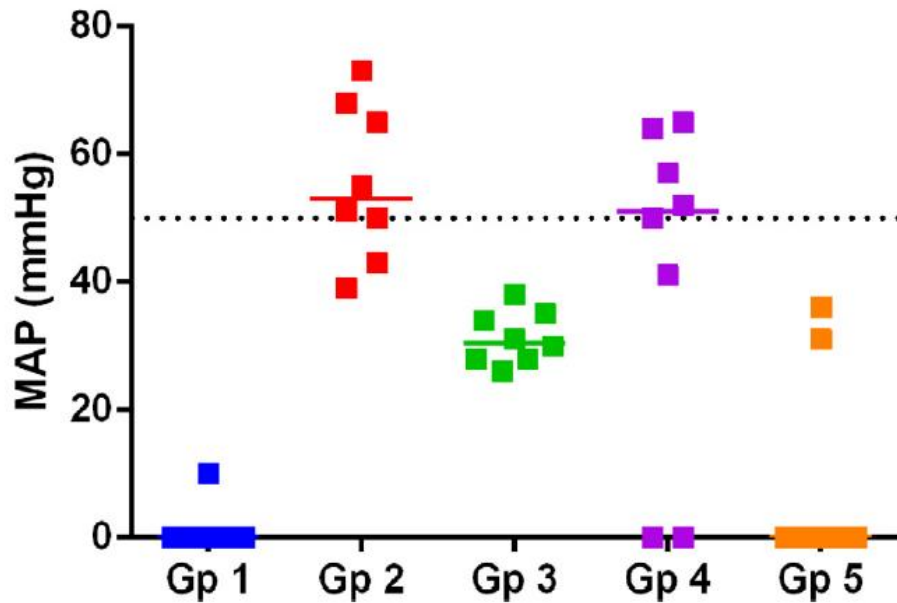
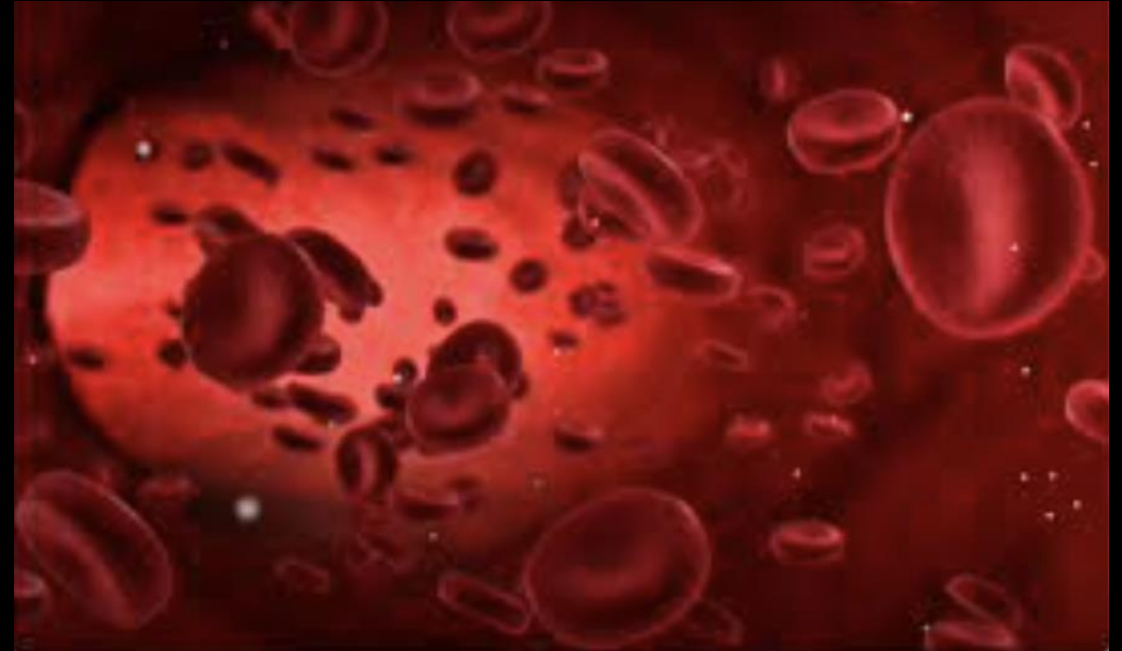
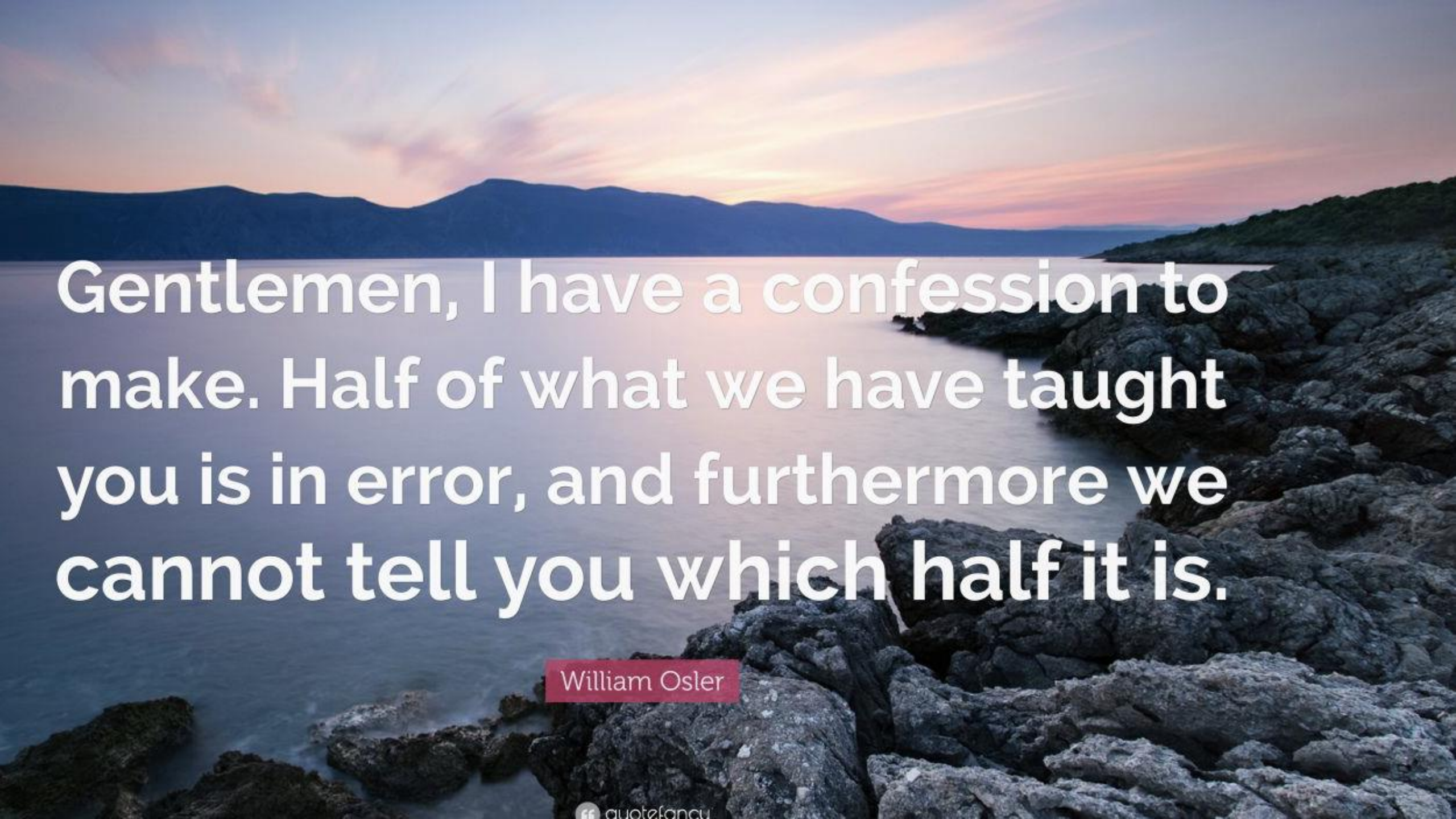


Fig. 1 - MAP at the Study End, the dashed line equates to ROSC.



CHEST COMPRESSIONS IN TCA

- Prioritise HOTT algorithm
- Chest compressions on case by case basis



Gentlemen, I have a confession to make. Half of what we have taught you is in error, and furthermore we cannot tell you which half it is.

William Osler



QUESTIONS



SUMMARY

- Systematic and co-ordinated team
- HOTT Algorithm in TCA
- Benefits of proactive rib fracture management