Simulation: Trauma, Burns

Title: Gimli, Son of Gloin

*Please note, this scenario is deliberately unrealistic, although the points it raises are important.

Learning Objectives: (enter - identify/demonstrate etc) - technical/non-technical

1. Demonstrate appropriate management of unstable penetrating chest wound and burns using ATLS/EMST or equivalent approach
2. Demonstrate ability to identify and treat the causes of a patient with severe burns (fluid loss, pain, CO poisoning, CN poisoning
3. Demonstrate ability to concurrently manage multiple complex issues in a resuscitation

Take Home Points: (over-arching messages/key learning points - e.g. Calcium stabilizes cardiac membrane in hyperkalaemia/importance of closed loop communication)

1. Search Satisficing/Confirmation Bias – do not call off the search for more information once you have found and treated initial problems. Always remain suspicious of further problems and complications.

Sim Brief - Introduction, Familiarisation, Ground Rules, Basic Assumption

Case Stem (for participants) – Read out to participant at the start.

Brief case history. Typically ambulance handover style (MIST - Mechanism/Medical Complaint, Injuries/Illness, Signs & Symptoms, Treatment so far)

Background Info (For instructors eyes only)

- Provides patient background in more detail, relevant PMHx/SHx/Meds etc.
- Summary on the ideal/expected progression of the sim.
- E.g. Chest pain -> STEMI -> activate STEMI code -> appropriate treatment -> disposition
- Notes on potential alternatives (if candidates perform exceptionally, then what?/if candidates perform poorly, then what?)

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Settings for SIM Man/Woman

HR, BP, Sats, Temp, CO2, ECG etc.
Relevant SIM set-up - moulage, clothing, rashes, position

Equipment required

- Cardiac monitor/Defib
- VBG/ABG printouts
- Imaging printouts – CXR –
- O2 +/- masks/NP
- IVC equipment
- Relevant specific medications – fluids, intubation drugs, analgesics
- Relevant products - colloids/crystalloids

Participants required

- ED Registrars – Team Lead, Airway, Circ/Defib
- Nursing Staff – at least airway + drugs, ideally defib. and scribe

Scenario Outline

Brief outline in table form of step-by-step progression of SIM
Include possible alternatives and end-points

Scenario Outline (Outline of what should occur at each stage)	Participant Response (Expected or ideal response)	Outcome (what do participants do, what happens to SIM mannequin)
Stem given to team, Patient wheeled in immediately	Role allocation. Plan of approach.	Team to successfully obtain thorough history
Patient arrives with Ambulance	Patient transferred over. Handover given to team. Begin to obtain a history	Patient is groaning in pain Follows commands

Assessment of patient	A: Groans in pain B: reduced movement. Bilateral creps. Reduced sounds right. RR 35, sats 90% C: HR 122, BP 80/55 - IV access ensured large bore - Bloods sent(which), ABG/VBG D: GCS 12/15. Right arm weak. Left leg no pain/temp. E: T 36	Verbalise potential differential - Burns thickness + TBSA - CO/CN risk - Investigate - VBG - ECG - CXR - USS
Initial Treatment Patient Deterioration	Pt continues to deteriorate Sats 90% GCS 12-13/15 - Should progress to intubation - Sats remain 90% despite adequate intubation - Sats only improve after escharotomy	- Results return – VBG - Pre-escharotomy VBG - ECG – sinus tachy.
Patient intubation	- Look for a safe intubation - Right sided chest drain due to pneumothorax	- Despite escharotomy and intubation, pt. doesn't improve unless CO/CN toxicity is picked up - Tx. Hydroxycobalamin 5g

Patient stabilizes	- Sats 100% - GCS 3 intubated	- Disposition – theatres - Prepare for theatres - End Sim

Debriefing Objectives:

- Focus should be on relevant Technical Skills which appear deficient
    - Burns – classification, treatment
        - Airway management
        - Escharotomy
        - TBSA
        - Parkland formula
        - Carbon Monoxide
        - Cyanide toxicity
    - Penetrating trauma
        - Neurological injury
- Relevant Non-Technical Skills

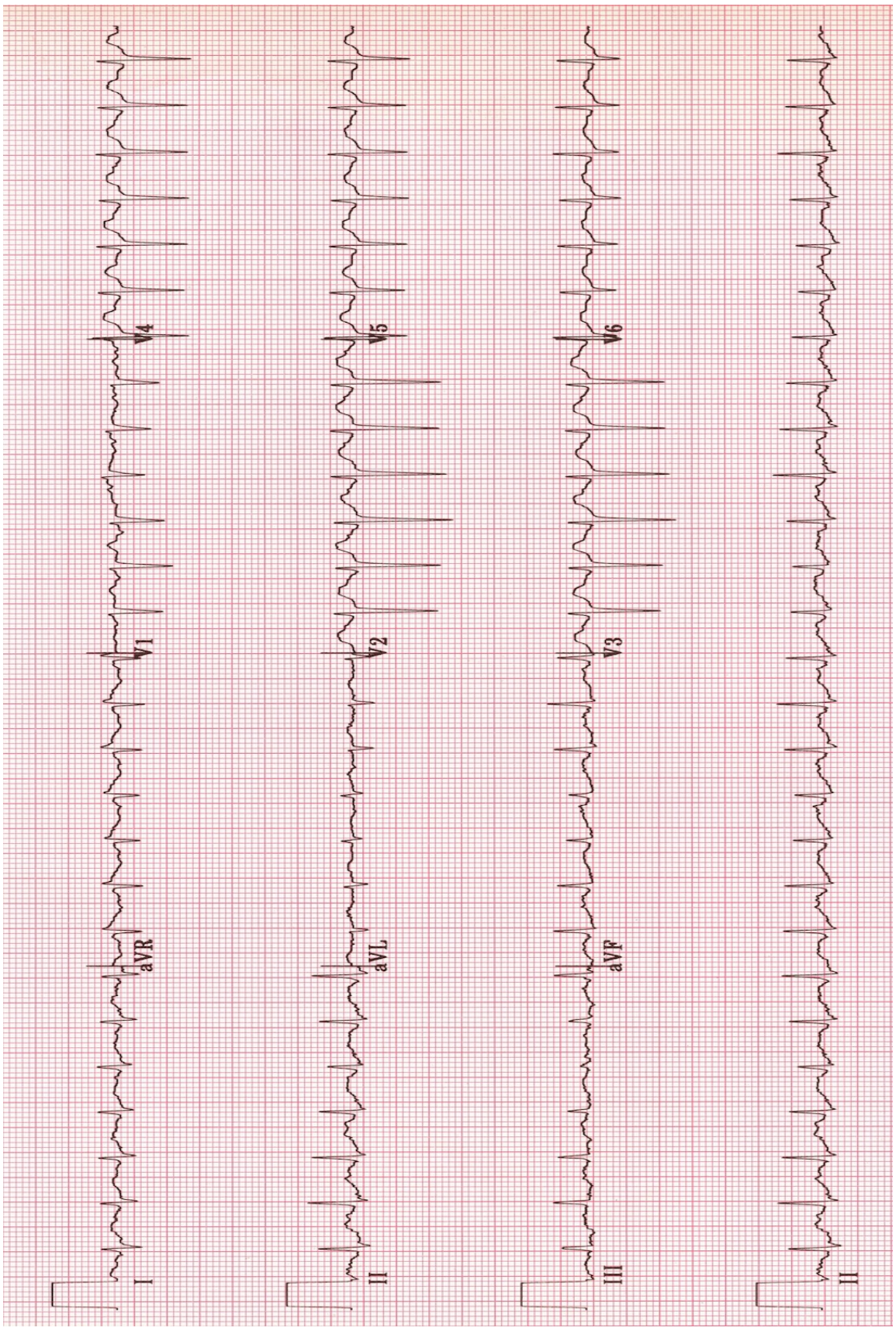
Blood Gas 1

Sample (ABG)	Value	Reference Range
pH	6.93	7.35 - 7.45
paCO2	55	35 - 45 mmHg
paO2	100	75 - 100 mmHg (arterial)
HCO3-	15	22 - 26 mmol/L
Base Excess	-6	-2 to +2 mmol/L
Hb	140	135 - 180 g/L
Na+	140	135 - 145 mEq/L
K+	5.0	3.5 - 5.0 mEq/L
iCa2+	0.90	0.90 - 1.15 mmol/L
Cl-	***	96 - 106 mmol/L
Anion Gap	32	22 - 26
Lactate	12	0.5 - 1.0 mmol/L
COHb	7.1	<6.0%
Creatinine	120	50 - 120 mmol/L

Blood Gas 2 arterial

Sample (ABG)	Value	Reference Range
pH	7.01	7.35 - 7.45
paCO2	20	35 - 45 mmHg
paO2	100	75 - 100 mmHg (arterial)
HCO3-	13	22 - 26 mmol/L
Base Excess	-5	-2 to +2 mmol/L
Hb	132	135 - 180 g/L
Na+	140	135 - 145 mEq/L
K+	5.1	3.5 - 5.0 mEq/L
iCa2+	0.90	0.90 - 1.15 mmol/L
Cl-	100	96 - 106 mmol/L
Anion Gap	36	22 - 26
Lactate	13.1	0.5 - 1.0 mmol/L
COHb	6.5	<6.0%
Creatinine	123	50 - 120 mmol/L

SCGH ED Simulation Template



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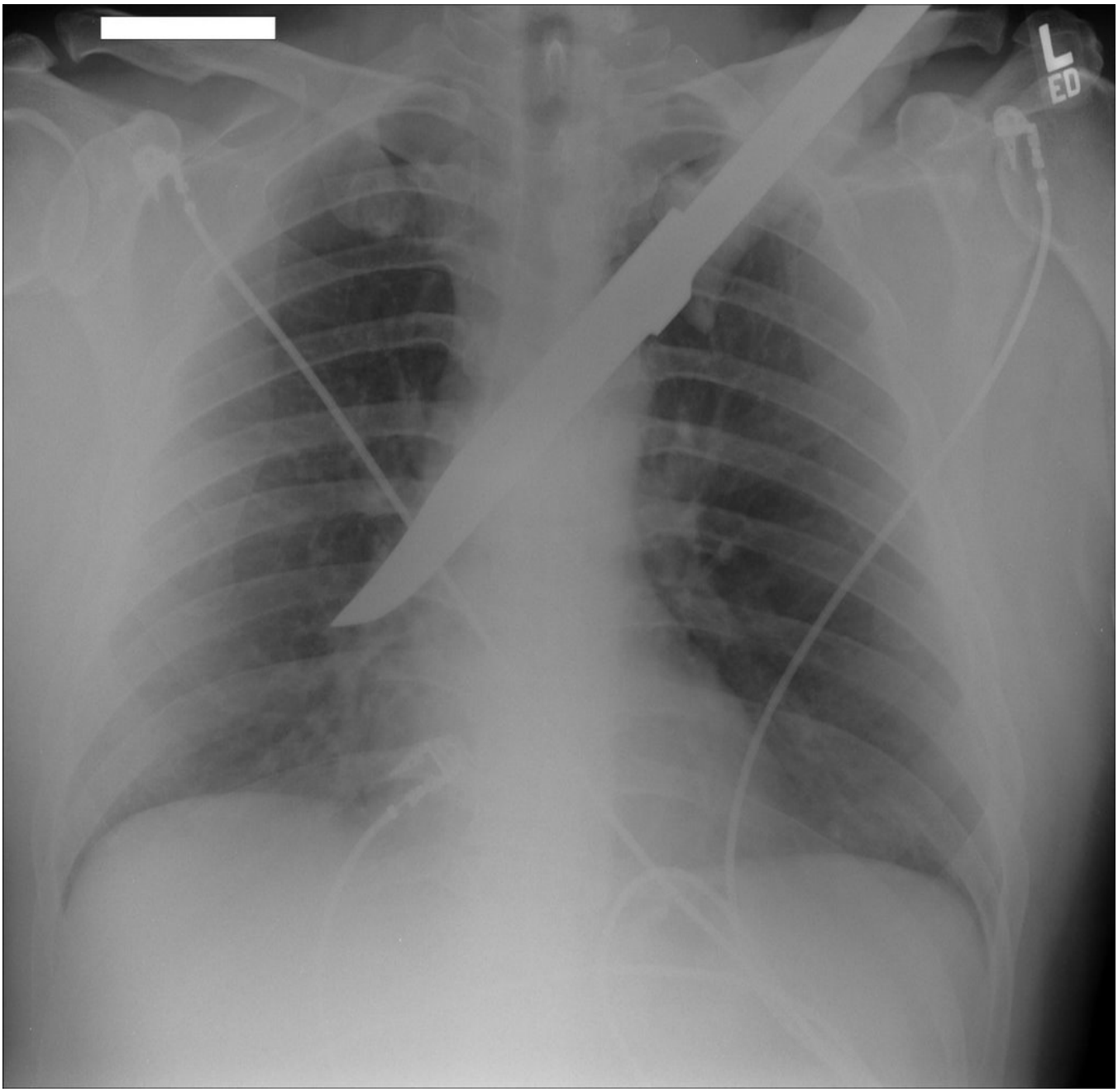
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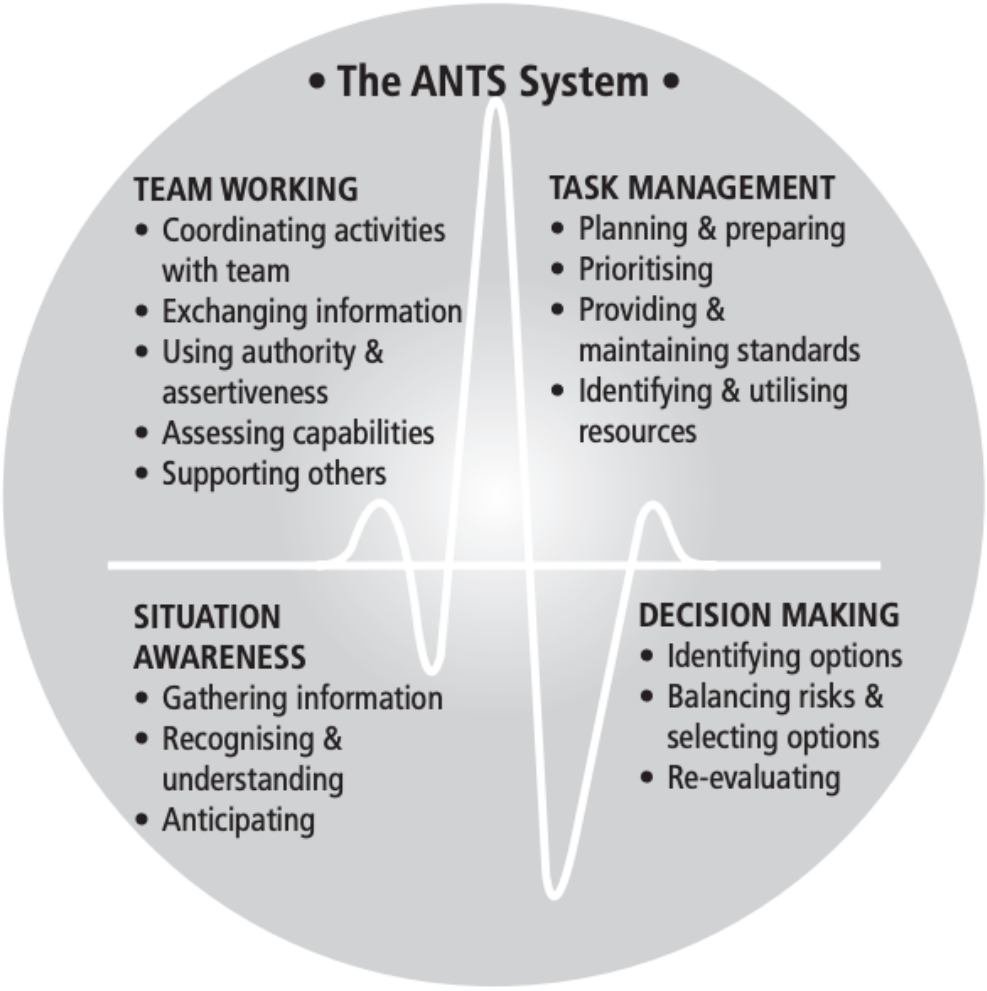
Non-Technical Skills

It is suggested to implement a consistent, frequent and repeated teaching of non-technical skills during SIM in order to entrain these skills.
The anaesthesia is a suggested framework that can be applied for the observation of SIM.
See below for a brief screenshot of the framework, and a link to the ANTS handbook for further information.
Feel free to choose your own approach here.



ANTS Framework
https://www.abdn.ac.uk/iprc/documents/ANTS%20Handbook%202012.pdf