ADULT BURNS PATIENT

MODULE: Intensive Care Medicine / Trauma

TARGET: ALL ANAESTHETISTS, INTENSIVISTS & ED PHYSICIANS

BACKGROUND:
Severe burns are a significant source of morbidity and mortality and present major challenges to the multi-disciplinary team. Early effective resuscitation, early surgical debridement and prevention of complications in addition to potential transfer to specialist burns centres are among the difficulties that must be overcome. Major risk factors for mortality are older age, high percentage of burned surface area, inhalational injury and presence of co-existing chronic disease.
### RELEVANT AREAS OF THE ANAESTHETIC CURRICULUM

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| IG_BS_08 | In respect of intravenous induction:  
- Makes necessary explanations to the patient  
- Demonstrates satisfactory practice in preparing drugs for the induction of anaesthesia  
- Demonstrates proper technique in injecting drugs at induction of anaesthesia  
Manages the cardiovascular and respiratory changes associated with induction of general anaesthesia |
| IG_BS_10 AM_BS_05 | In respect of airway management:  
- Demonstrates optimal patient position for airway management  
- Manages airway with mask and oral/nasopharyngeal airways  
- Demonstrates hand ventilation with bag and mask  
- Able to insert and confirm placement of a Laryngeal Mask Airway  
- Demonstrates correct head positioning, direct laryngoscopy and successful nasal/oral intubation techniques and  
- confirms correct tracheal tube placement  
- Demonstrates proper use of bougies  
- Demonstrates correct securing and protection of LMAs/tracheal tubes during movement, positioning and transfer |
| 1.1     | Adopts a structured and timely approach to the recognition, assessment and stabilisation of the acutely ill patient with disordered physiology |
| 4.4     | Uses fluids and vasoactive / Inotropic drugs to support the circulation |
| 5.2     | Performs emergency airway management |
| CI_BS_01 | Demonstrates good non-technical skills such as: effective communication, team-working, leadership, decision-making and maintenance of high situation awareness |
| MT_BS_01 | Demonstrates how to perform the Primary survey in a trauma patient [S] |
| MT_BS_02 | Demonstrates correct emergency airway management in the trauma patient including those with actual or potential cervical spine damage [S] |
| MT_BS_06 | Demonstrates the initial resuscitation of patients with trauma and preparation for further interventions including, emergency surgery |
| CI_IS_01 | Demonstrates leadership in resuscitation room/simulation when practicing response protocols with other healthcare professionals |
| CI_IS_02 | Demonstrates appropriate use of team resources when practicing response protocols with other healthcare professionals |
| RC_IS_05 | Demonstrates leadership during resuscitation, including supporting less experienced members of the team |
| 1.5     | Assesses and provides initial management of the trauma patient |
| 1.6     | Assesses and provides initial management of the patient with burns |
| MT_HS_01 | Demonstrates ability to lead a multi-disciplinary trauma team, co-ordinating and delivering the early hospital care of all types of complex multiply injured patients including the primary survey, resuscitation and secondary survey and appropriate HDU/ICU admission |
| MT_HS_02 | Demonstrates the ability to lead and/or deliver the safe perioperative anaesthetic care to all multiply injured patients including HDU/ICM admission if required for continued care |
| MT_HS_05 | Demonstrates good communication skills with all members of the trauma team when leading the clinical care of the multiply injured patient and seek prompt and active advice from specialties not involved in the initial resuscitation when needed |
| MT_HS_06 | Demonstrates the ability to:  
- Recognise when the patient’s needs exceed local resources and specialist expertise and that transfer for further definitive care is necessary |
| PL_HS_03 | Demonstrates correct management of a patient with a severe inhalational injury |
INFORMATION FOR FACULTY

LEARNING OBJECTIVES:

• Initial management of a serious burns patient, including recognition of risk of inhalational burn
• Calculation of the fluid resuscitation regime
• Early shock in the burns patient is not likely to be caused by the burn – look for other causes

SCENE INFORMATION:

• Location: Resuscitation Room

ED is extremely busy – they are short staffed and have asked the ICU/Aneasthetic team to manage this patient who has been brought in by paramedics after suffering significant burns in a bedroom fire from a poorly extinguished cigarette. Both the junior and senior anaesthetic trainees commence this scenario together.

EQUIPMENT & CONSUMABLES

• Mannequin: On ED trolley. Collar, blocks and tape on. Dressings covering face (partially), right shoulder, arm, hand, RHS torso and back extending down to groin and thigh. Pelvic stabilizer T-POD (optional)
• Stocked airway trolley
• Portable monitor
• Portable ventilator
• Syringes, IV fluid and giving sets
• Warming blanket
• O negative blood

PERSONS REQUIRED

• Anaesthetic Junior Trainee
• Anaesthetic Senior Trainee
• Anaesthetic assistant
• ED Resus nurse
• Paramedic for initial handover (Optional)
• Foundation/ED Trainee (Optional)
• Outreach nurse (Optional)

PARTICIPANT BRIEFING: (TO BE READ ALOUD TO PARTICIPANT)

Handover from Paramedic or ED Nurse (ATMIST style):

This is a lady in her 80’s who was found at her home around an hour ago. We were called to a house fire where the fire crew had rescued her. She was found on her left hand side at the bottom of the stairs, with most of the hallway on fire around her, probably started by a cigarette upstairs. Her clothes and hair was on fire. She was conscious at the scene and calling out for help. It appears she usually uses a frame to walk. She was trapped for at least 40 minutes, but probably longer. Her airway was intact, but there are facial burns and soot around the nose. She is coughing frequently and sounds productive, but her sats are 96% off O2. Her heart rate was 110bpm, and we’ve established IV access in the left arm. She was confused and crying out with pain, but her pupils were equal and reactive. She has evidence of burns to her face and right arm, chest, abdomen and right thigh which we have dressed. We haven’t seen any other injuries. We don’t have any other information about her at this time as she lives alone and wasn’t able to answer our questions.
**‘VOICE OF MANIKIN’ BRIEFING:**

Moaning in pain. No clear words given. No history available...

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**ADDITIONAL INFORMATION**

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### RADIOMETER ABL 9000 SERIES

**ABL900 ED**

**PATIENT REPORT**
- **Syringe:** S195uL
- **Sample #:** 90.....

**Patient ID**
- Patient First Name: Unknown
- Patient Last Name: Female
- Date of Birth: 80’s
- Sample type: Arterial
- **FiO₂:** 1.0
- Department: ED
- Operator:

**Blood Gas Values**
- **pH:** 7.15 [7.340 - 7.450]
- **pCO₂:** 4.3 kPa [4.70 - 6.00]
- **pO₂:** 5.3 kPa [10.0 - 13.3]
- **pO2(A-a)e:** kPa

**Oximetry Values**
- **cHb:** 9.3 g/dL [12.0 - 16.0]
- **sO₂:** 70 % [95.0 - 98.0]
- **pH, Hb:** 45 % [94.0 - 99.0]
- **PCO₂Hb:** %
- **AHb:** % [0.02 - 0.05]
- **Hct:** 30.3 %

**Electrolyte Values**
- **K⁺:** 5.9 mmol/L [3.0 - 5.0]
- **Na⁺:** 128 mmol/L [130 - 146]
- **Ca²⁺:** 1.07 mmol/L [1.15 - 1.29]
- **Cl⁻:** 97 mmol/L [98 - 106]

**Metabolite Values**
- **Glu:** 7 mmol/L [3.5 - 10.0]
- **Lac:** 6.1 mmol/L [0.5 - 1.6]

**Acid Base Status**
- **cBase(Ecf)c:** -8.3 mmol/L
- **cHCO³⁺(P,ST)c:** 20 mmol/L

**Notes**
- ↑ Value(s) above reference range
- ↓ Value(s) below reference range
- c Calculated Value(s)
- e Estimated Value(s)

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**ABL900 ED**

**PATIENT REPORT**
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- Patient First Name: Unknown
- Patient Last Name: Female
- Date of Birth: 80’s
- Sample type: Arterial
- **FiO₂:** 1.0
- Department: ED
- Operator:

**Blood Gas Values**
- **pH:** 7.16 [7.340 - 7.450]
- **pCO₂:** 4.9 kPa [4.70 - 6.00]
- **pO₂:** 7.2 kPa [10.0 - 13.3]
- **pO2(A-a)e:** kPa

**Oximetry Values**
- **cHb:** 8 g/dL [12.0 - 16.0]
- **sO₂:** 76 % [95.0 - 98.0]
- **pH, Hb:** 36 % [94.0 - 99.0]
- **PCO₂Hb:** %
- **AHb:** % [0.02 - 0.06]
- **Hct:** 20.7 %

**Electrolyte Values**
- **K⁺:** 5.3 mmol/L [3.0 - 5.0]
- **Na⁺:** 128 mmol/L [130 - 146]
- **Ca²⁺:** 1.06 mmol/L [1.15 - 1.29]
- **Cl⁻:** 102 mmol/L [98 - 106]

**Metabolite Values**
- **Glu:** 6.5 mmol/L [3.5 - 10.0]
- **Lac:** 6.5 mmol/L [0.5 - 1.6]

**Acid Base Status**
- **cBase(Ecf)c:** -8.6 mmol/L
- **cHCO³⁺(P,ST)c:** 19 mmol/L

**Notes**
- ↑ Value(s) above reference range
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- e Estimated Value(s)
CONDUCT OF SCENARIO

INITIAL SETTINGS

A: Own. Collar, blocks and tape applied.
B: SpO2 99% on O2. RR 32/min.
C: HR 125 (Sinus), BP 90/60.
D: Eyes half open. Pupils equal. AVPU. Moaning in pain.
E: Face bandaged allowing eyes, nose and mouth openings only. Dressings on Rt shoulder, arm and hand, torso, abdo, and thigh.

EXPECTED ACTIONS

- Nominate team leader
- Assign team roles and tasks
- <C>ABCDE structured primary survey according to ATLS guidelines
- AMPLE history attempted – no good responses obtained
- Consider intubation at this stage or later
- Establish IV access and send bloods including blood gas
- Commence fluid resuscitation initially
- Calculate burnt surface area and use Parkland formula to calculate rate of fluid resuscitation – remove dressings and log roll
- Give appropriate analgesia if not intubated and sedated.
- Check for neurovascular compromise of Rt arm
- Look for other injuries (expose)
- Prevent hypothermia

AFTER PRIMARY SURVEY

A: Own. Collar, blocks and tape applied.
B: SpO2 99% on O2. RR 32/min.
C: HR 130 (Sinus), BP 90/60. Absent pulse in RHS arm.
D: Eyes half open. Pupils equal. AVPU. Moaning settles with analgesia.
E: Estimate 30% burned surface area.

EXPECTED ACTIONS

- Reassess patient based on blood gas results
  - Take note of lactataemia and high COHb
- Intubation/ventilation with 100% O2 if not done already
- Consider relevant causes of high lactate and any specific therapy e.g. cyanide poisoning and hydroxocobalamine
- Consider repeat blood gas after intubation and further fluid resuscitation
- Contact burns specialist care unit or National Burns Bed Bureau
- Contact plastics surgeons for consideration of escharotomy of right arm and right thigh
- High index of suspicion of other injuries
- Arrange for transfer to CT

LOW DIFFICULTY

Straightforward intubation. Haemodynamic state improves with correct fluid resuscitation.

NORMAL DIFFICULTY

Fixed cervical spine makes intubation challenging. Haemodynamics fail to improve with resuscitation. Consider ongoing bleeding/other causes of shock.

HIGH DIFFICULTY

Fixed cervical spine makes intubation challenging.
Haemodynamics worsening (BP 70/55, HR 130) and falling Hb (7.4, if third ABG sent). Ongoing bleeding requiring blood resuscitation and investigation for source: pelvic fracture in this instance (have PXR prop ready).

RESOLUTION

At faculty discretion.

Original Author: Dr P Shanmuha
Editor: Dr Andrew Darby Smith
DEBRIEFING

POINTS FOR FURTHER DISCUSSION:

Technical:
- Initial assessment of the trauma patient.
- Management of the patient with severe burns
- Fluid resuscitation in the burns patient
- Estimation of affected body surface area
- Carbon monoxide poisoning
- Management of major haemorrhage secondary to trauma

Non-technical:
- Based on established non-technical skills frameworks e.g. ANTS, NOTECHS etc

DEBRIEFING RESOURCES

   http://ceaccp.oxfordjournals.org/content/12/3/118
   338: 1037
   http://www.bmj.com/content/338/bmj.b1037
KEY POINTS:

- Initial management of a serious burns patient, including recognition of risk of inhalational burn
- Calculation of the fluid resuscitation regime
- Early shock in the burns patient is not likely to be caused by the burn – look for other causes

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PARTICIPANT REFLECTION:

What have you learnt from this experience? (Please try to list 3 things)

How will your practice now change?

What other actions will you now take to meet any identified learning needs?
PARTICIPANT FEEDBACK

Date of training session:..................................................................................................................

Profession and grade:........................................................................................................................

What role(s) did you play in the scenario? (Please tick)

- Primary/Initial Participant
- Secondary Participant (e.g. ‘Call for Help’ responder)
- Other health care professional (e.g. nurse/ODP)
- Other role (please specify):
- Observer

<table>
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<th>Strongly Agree</th>
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<th>Neither agree nor disagree</th>
<th>Disagree</th>
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<td>I found this scenario useful</td>
<td></td>
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<td>I understand more about the scenario subject</td>
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<td>The material covered was relevant to me</td>
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Please write down one thing you have learned today, and that you will use in your clinical practice.

How could this scenario be improved for future participants?

(This is especially important if you have ticked anything in the disagree/strongly disagree box)
FACULTY DEBRIEF – TO BE COMPLETED BY FACULTY TEAM

What went particularly well during this scenario?

What did not go well, or as well as planned?

Why didn’t it go well?

How could the scenario be improved for future participants?