

General Comments:

- Write CLEARLY.
- Use Buzz Words for brevity.
- Do not use acronyms that the examiner may not know (i.e. CSL, I&V, etc.).
- Give “consultant level” answers to all questions. Use accurate wording, give targets and limits, etc.
- Get the most value from your answers. Dividing a single fact or answer into multiple subsections, scores you only 1 point. For example:
 - Describing the burns as involving hands, feet, perineum and face, scores you a single point for burns to “special areas”, and not a point for each body part).
- I have been very lenient. Please revise the entire topic.
 - Examiners in the real exam will not search through your answers for correct bits and give you points for them.
 - They will ignore anything listed below the required number of responses.
- See handout with (hopefully correct) answers attached to your question.

- **Question I (Description):**
 - Most burns are full thickness burns. There are no blisters in the photo. Lower limbs are covered in glad wrap.

- **Question II (Complications):**
 - The mechanism for limb ischaemia from circumferential burns is the eschar constricting circulation and arterial supply to the limb. It is not from a compartment syndrome (which is more typical in electrical injuries). Circumferential burns require an escharotomy (superficial, involving skin). Compartment Syndrome requires a fasciotomy (deeper, involving muscle compartments).
 - “Severe Dehydration” is not the main cause for this patient having hypovolaemic shock. Loss of skin integrity is only one component of the causes of hypovolaemic shock. Others include fluid shifts secondary to capillary leak, SIRS, etc.

- **Question III & iv (Fluid calculation):**
 - READ THE QUESTION and associated information. In the fluid resuscitation calculation, the patient already received 2L NS over the first two hours. This must be taken into account in calculating the fluid needs for the first 8/24 (of which only 6/24 are left), and not subtracted from the total 24 hour fluid requirement.
 - The time for fluid calculation starts from the time of injury, not from the time seen. Therefore, if patient seen 4 hours since injury, and has not received any fluids, you now have only 4 hours left to give 1/2 of the 24/24 calculated fluid requirement.
 - Do not add potassium to fluids if patient has rhabdomyolysis (see IDC with myoglobinuria in picture). This would be considered dangerous practice and will be a good enough reason for you to fail the entire question!
 - You do not need to add maintenance fluids to Parkland’s formula in adults. You do need to add it to the 24/24 calculation in kids under age of 10 or under 30kg.

- **Question v (Fluid Resus):**
 - Give “consultant level” answer. Giving a list stating “urine output, BP, HR, CVP, lactate” without giving limits and targets, is unacceptable as a fellowship exam answer (a 5th medical student can give the same answer).
 - Capillary refill will be unreliable in this patient with circumferential burns to all limbs. This would not reflect the systemic circulation. See handout.
 - The IVC does not collapse in an intubated patient on IPPV. You need to check the Distensibility Index.

- **Question vi (indications for transfer to Burns Unit):**
 - PLEASE REVISE THE LIST. Most candidates got this wrong. Multiple texts, LITFL, and the Victorian State Burns Service Referral Criteria (vicburns.org.au) have good lists.
 - Airway burns / inhalation injury - in isolation are not an indication for transfer to burns unit.

- **Question vii (Info to mother):**
 - This should include the top 3 critical facts. Think what these are. “Involuntary admission” is not one of these...
 - See handout for examples.

QUESTION 1

An 18 year old man is transferred by ambulance to your rural emergency department after a self inflicted burn injury. Two hours ago the patient set himself alight with petrol after a fight with his girlfriend. He was intubated at the scene by the intensive care paramedic.

A clinical photograph is shown in the prop booklet, page 3.

- I. Describe the burn giving four (4) relevant findings. (4 marks)
 1. Excessive burns involving all visible parts of body. Likely full thickness, but possibly partial thickness in some areas. Involving critical areas (face, hands, feet, perineum). (mandatory)
 2. Severe systemic injury - survival questionable.
 3. Pt intubated - suspected airway burns - upper and lower. (mandatory)
 4. Evidence of rhabdomyolysis in IDC.
 5. Circumferential burns - likely compromise of thorax expansion and limbs (feet) - likely to need escharotomies.
 6. Patient uncovered - hypothermia very likely.

- ii. List five (5) important complications of this injury. (5 marks)
 1. Airway burns - upper & lower
 2. Inhalation injury - smoke, CO, ?cyanide (if in enclosed space), ARDS, VAP.
 3. Limb vascular compromise - requiring escharotomies (possible compartment syndromes).
 4. Ventilation compromise - requiring escharotomies.
 1. Haemodynamic instability - massive fluid losses / shifts. HYPOVOLAEMIC SHOCK.
 5. Rhabdomyolysis - ARF, hyperkalaemia, electrolyte abnormalities.
 6. Infection / sepsis - tissue & skin loss, loss skin integrity, edema, skin and capillary leakage.
 7. Hypothermia / Acidosis
 8. Multi-organ failure.
 9. Pain
 10. Other injuries / trauma.
 11. Need for transfer and associated risks.
 12. Surgery - multiple, skin grafts, repeated GAs with associated risks.
 13. Repeated transfusions and associated risks.
 14. Long-term disfigurement.
 15. Psychological - PTSD, sensory deprivation, etc.
 16. Death

After a thorough examination, you calculate his percentage of body surface area involved to be 80%. During the two hours since the injury the patient has received 2 litres of normal saline. His current blood pressure is 100/60 mmHg and pulse rate is 80 bpm.

- III. Assuming the patient weights 70kg, calculate the patient's fluid requirements for the first 24 hours. Show your calculation. (2 marks).
 1. Fluid replacement for first 24/24 according to Modified Parkland's formula - Hartmans at 4mls/kg/%BSA - $4 \times 70 \times 80 = 22.4L$. FLUID CALCULATION IS FROM TIME OF INJURY (not time seen). Half (11.2L) of this fluid is given in the first 8/24, and half (another 11.2L) in the next 16/24.
 2. We are 2 hours post injury (therefore 6/24 remaining for first half of fluid). 2L NS were already given. 11L (needed to be given in first 8 hours) - 2L (already given) = 9L to be given in remaining 6/24 = 1500 ml/hr, for 6/24.
 3. Next half (11L) to be given over the next 16 hours = ~700 ml/hr over 16/24.
 4. Would use Hartman's solution, as large volumes of chloride rich fluids associated with higher rates of ARF and mortality. Once in ICU - would convert to 4% Albumin. Will accept NS as an okay answer for short-term use.
 5. No additive to fluids at this stage, as patient has myoglobinuria and likely rhabdomyolysis. Adding potassium to his IV fluids, would be considered a fatal mistake and would lead to failing the entire question.

Question 1 continued

IV. Prescribe your fluid treatment for your patient. (2 marks)

INTRAVENOUS FLUID PRESCRIPTION Chart

| Fluid | Additives | Rate ml/hr |
|--------------|-----------|------------------|
| Hartmans 9L | | 1500 (over 6/24) |
| Hartmans 11L | | 700 (over 16/24) |

V. List four (4) measures for monitoring adequate of fluid resuscitation. (4 marks)

1. Urine output of at least 0.5ml/kg/hr via IDC (mandatory).
2. HR < 100 - may be influenced by pain, sedation, etc.
3. MAP > 65, SBP > 90 - may be influenced by pain, sedation, etc.
4. CR may be not represent systemic circulation because of circumferential burns to all limbs and vascular compromise.
5. US - IVC distensibility (intubated).
6. CVP 8-12 - at later stage.
7. Improving pH and lactate clearance - at later stage. May worsen initially.
8. Skin turgor - unreliable in view of capillary leakage.

VI. List five (5) indications for transfer of any patient to a burns unit. (5 marks)

1. Burns > 10 % TBSA in an Adult
2. Burns > 5 % TBSA in a Child
3. Full thickness burns > 5% TBSA
4. Burns of face, hands, feet, perineum, genitalia, and major joints
5. Circumferential burns
6. Chemical or electrical burns
7. Burns in the presence of major trauma or significant co-morbidity
8. Burns in the very young patient (<12/12), or the elderly patient
9. Burns in a pregnant patient
10. Suspicion of Non-Accidental Injury
11. Burn injury in patients with preexisting medical disorders that could complicate management, prolong recovery, or affect mortality.

VII. The patient's mother has arrived. List three (3) facts you need to convey to the family. (3 marks)

1. Very severe injury - chances of survival poor.
2. Currently sedated, ventilated, receiving analgesia. Requiring "life support".
3. Need to transfer to burns unit.
4. Consequences of survival - multiple operations, permanent disfigurement, scarring, psychological, etc.
5. Possibility of palliation.
6. Social work / counselling and support.
7. ?Organ donation.

TOTAL 25 MARKS

Other possible question that may be asked:

VIII. List five (5) immediate treatment priorities (5 marks)

1. Airway - ensure adequate placement of ETT
2. Exclude chest trauma / pneumothorax. Ensure adequate ventilation. consider inhalation injury and CO & Cyanide poisoning (especially if occurred in enclosed environment). Send VBG till A/L available.
3. Assess perfusion and vascular compromise. Establish 2 large-bore IV and start immediate fluid administration pending calculations of requirements.
4. Assess conscious state. Ensure adequate analgesia and sedation. Titrate to BP and GCS.
5. Prevent hypothermia. Cover pt with clean sterile sheets. Fluid warmer.
6. Exclude other injuries / life threats.
7. Urgent referral to burns unit and retrieval service.
8. Prevent secondary insults - hypoxia, hypothermia. etc.
9. Treat rhabdomyolysis - forced diuresis, etc.