SAQ 27 - Trauma

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General Comments

- Give **Consultant Level answers**:
  - Qualify, quantify, give aims / end points.
    - Medical student level answers scored no points.
- Dividing a single point over multiple subsections, scored only 1 mark.
- **TIME MANAGEMENT – 1 in 4 candidates did not attempt question**

You are working in a level-1 trauma centre . You receive an ambulance pre-notification regarding a 23-year-old male involved in a single vehicle high speed accident, striking a pole. The patient has abdominal injuries.

He was intubated at the scene, has a single large-bore IV cannula and received 250ml of normal saline. He has been placed in a hard collar and pelvic binder.

His observations at the scene were:

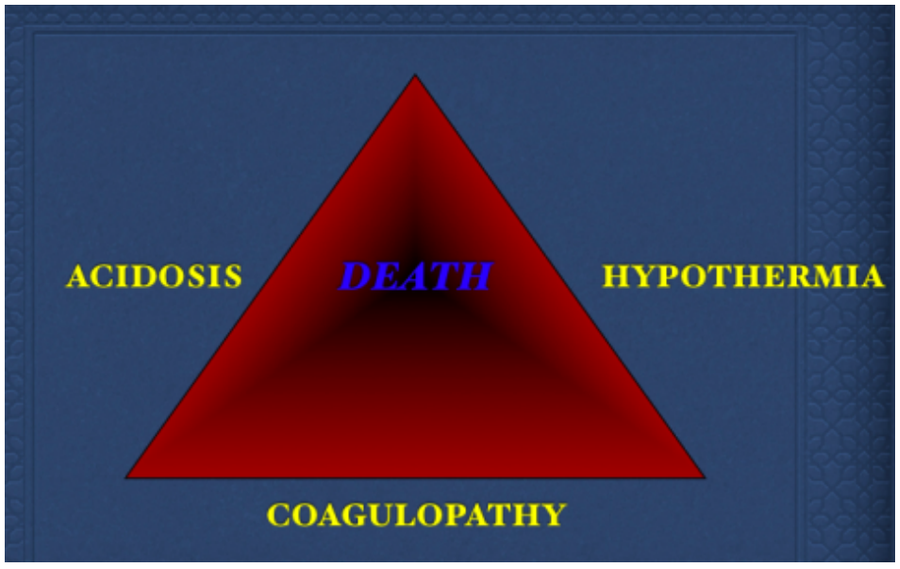
- Temp - 34^{o}C
- HR - 160 bpm
- BP - 75/50 mmHg
- O_2 Saturations - 99% (FIO2-0.6)
- GCS 3 (E1, M1, V1)

The patient arrives and you commence initial assessment and management.

A. List the three (3) components of the “Lethal Triad of Trauma”. For each component list two (2) actions **you** **would** **take** to prevent these from contributing to the patient’s morbidity and mortality.
(Marked out of 9.0).

The Lethal Triad of Trauma includes:

- Hypothermia
- Acidosis
- Coagulopathy



They beget each other and the eventual demise of the patient.

Section A – Lethal Triad of Trauma

- **Hypothermia:**
  - Prevention - Keep patient covered, remove wet clothing.
  - Active rewarming (Bair-Hugger).
  - Warm blood products through rapid infuser.
  - Close / invasive temperature monitoring (bladder/ oesophageal / rectal temp probes).

Section A - Lethal Triad of Trauma

- **Acidosis:**
    - May be hard to fix immediately - DCR and haemostatic resuscitation ongoing.
    - Frequent ABG monitoring
    - Control bleeding – external, DCS, IR.
    - Ensure normocardia - avoid respiratory acidosis.
    - $NaHCO_3$ as temporising measure if severe.
    - NB - patient already intubated (SO_2 99%). Treat hypoxia not given marks.

Section A - Lethal Triad of Trauma

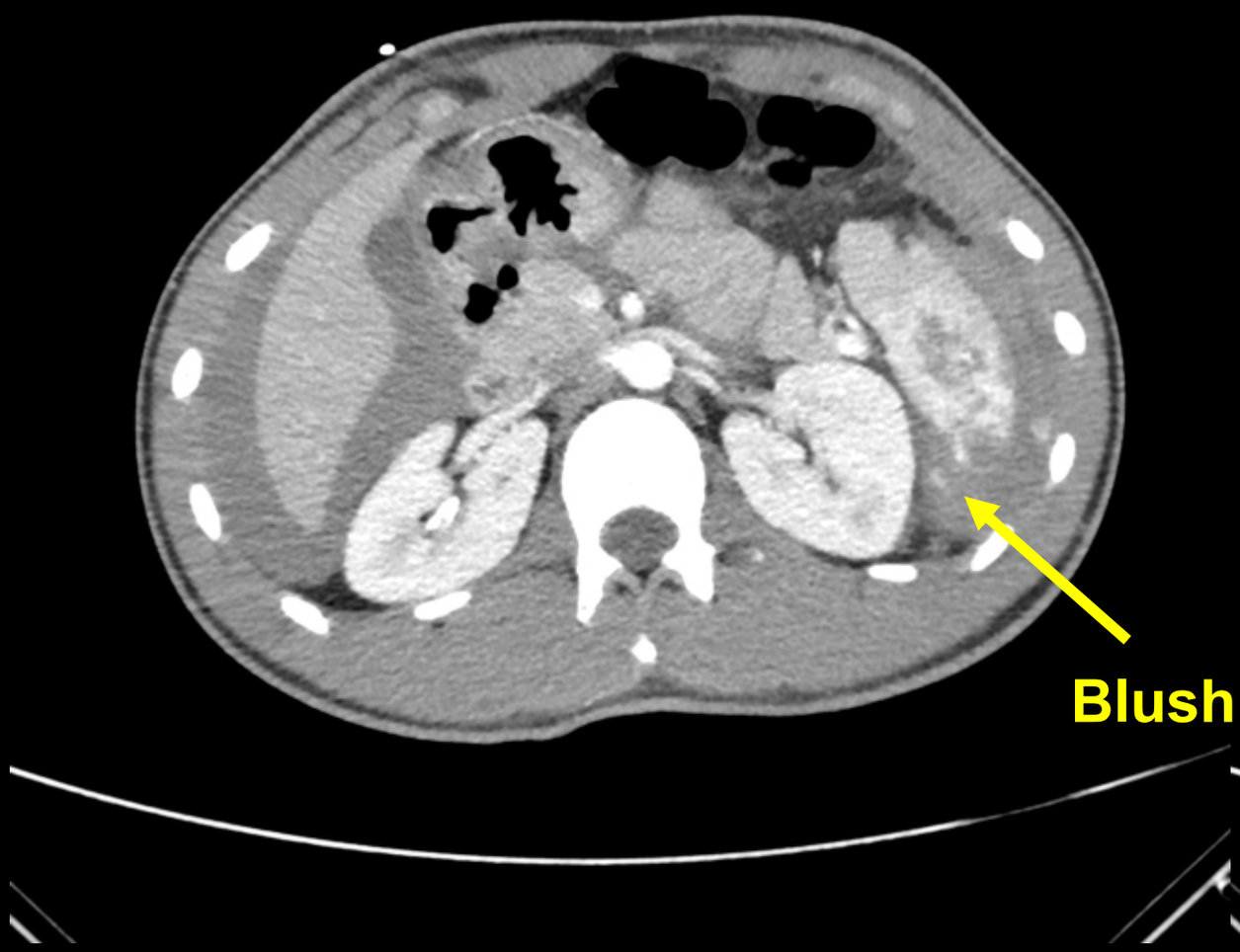
- **Coagulopathy:**
  - TXA on arrival
  - Treat hypocalcaemia.
  - Activate MTP / Haemostatic (blood product based) resuscitation - 1:1:1 ratio.
  - Minimise crystalloids, prevent dilution of clotting factors.
  - Cryoprecipitate
  - Consider TEG / ROTEM to guide further blood product administration.
  - Serial / frequent coagulation studies.
  - Actively treat hypothermia and acidosis.
  - Reversal of pre-existing anticoagulants (eg. warfarin)
  - Listing blood products without ratios not accepted.

After your initial expert management, the vital signs and haemodynamic status improve sufficiently to allow for safe transfer to the CT scanner.

Two consecutive slices of his abdominal CT scan are shown below.

B. State three (3) most important findings. (Marked out of 3.0)

* Images curtesy of Radiopaedia.org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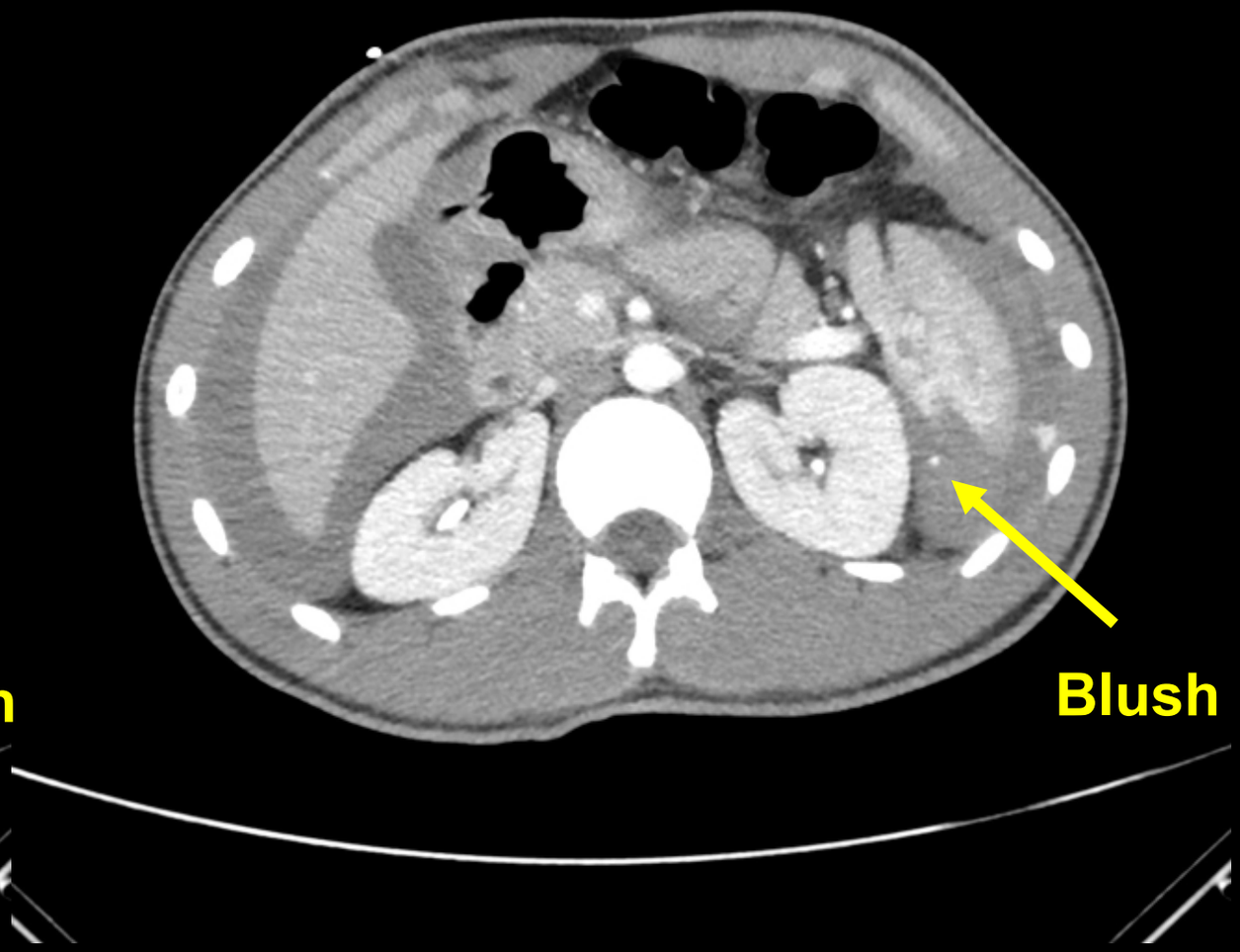
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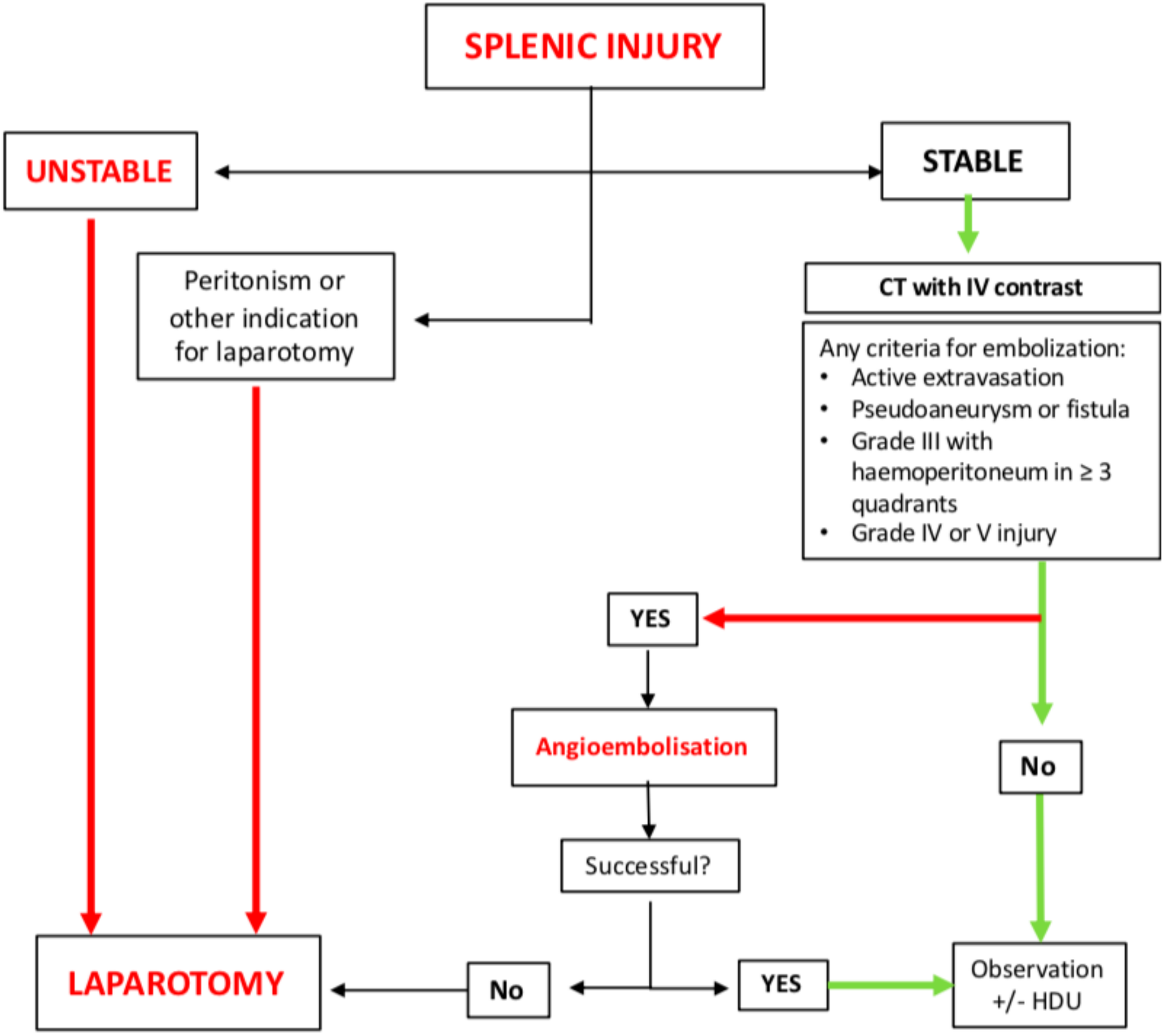
B. State three (3) most important findings (Marked out of 3.0).

- Grade IV splenic laceration - we accepted ”splenic laceration”.
- Patchy hypodense areas in the mid to inferior segment of the spleen extending to the hilum, surrounded by irregular contrast enhancement, which constitutes >25% devascularization.
- Peripheral contrast extravasation (“blush”) seen in the splenorenal space.
- Large amount of free intraperitoneal fluid seen at the perihepatic, perisplenic, hepatorenal, and splenorenal regions.
- No free gas within peritoneum (no bowel perforation).
- No liver or laceration or hematoma.
- No retroperitoneal hematoma.

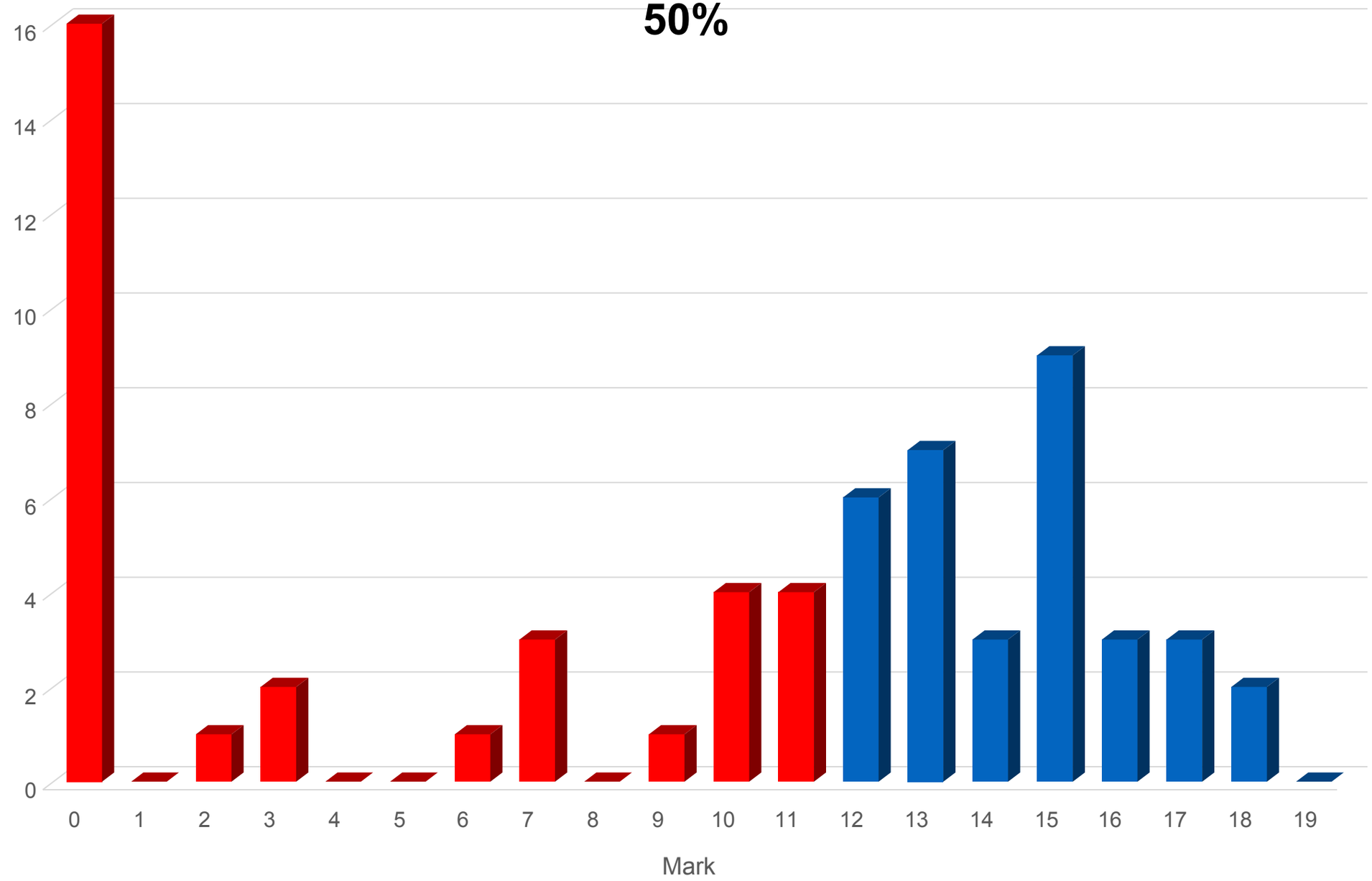
C. In general, state three (3) indications for Angioembolisation of any patient with the above type of injury?
(Marked out of 3.0)

- No indications for laparotomy - peritonism, suspected bowel injury.
- Haemodynamic stability (relative) - able to have CT and proceed to angio suite.
- Grade of injury:
  - AAST Grade IV & V (including lesser grades with vascular injury).
  - AAST Grade III with blood in at least 3 quadrants on CT or POCUS.
- No contraindication to procedure (IV contrast allergy, advanced care directive in elderly, etc.).
- Patient will not survive GA / laparotomy (comorbidities, frailty, etc.).
- Available expertise assumed - you are working in Level 1 Trauma Centre.


SPLENIC INJURY
UNSTABLE
STABLE
Peritonism or other indication for laparotomy
CT with IV contrast
Any criteria for embolization:
• Active extravasation
• Pseudoaneurysm or fistula
• Grade III with haemoperitoneum in ≥ 3 quadrants
• Grade IV or V injury
YES
Angioembolisation
Successful?
No
YES
No
LAPAROTOMY
Observation +/- HDU

D. List four (4) laboratory-based target parameters you would use to guide your resuscitation / massive transfusion protocol, in any patient with severe trauma. (Marked out of 4.0)

- pH>7.2
- Base excess < –6
- Lactate < 4 mmol/L
- iCa2+ > 1.1 mmol/L (ionised)
- Platelets ≥ 50 x 10^9 /L (>100 x 10^9 if head injury/ intracranial haemorrhage)
- INR ≤ 1.5
- PT/APTT < 1.5 x normal
- Fibrinogen > 1.0 g
- Hb > 80
- Temperature is not a laboratory-based parameter.


Pass Mark 12/19 (~6.3/10) – Pass Rate: 50%
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Good Luck!