Severe and multiple injuries

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Trauma can be defined as physical injury from mechanical energy. It is usually categorised as blunt or penetrating.

- **Two Types:**
  - **Blunt:** External force (e.g., fall). Danger is **hidden internal injury**.
  - **Penetrating:** Object pierces skin (e.g., bullet). Danger is **trajectory and energy**.
- **Rule:** Use a systematic approach and re-check to find all injuries.

Assessment and priorities

❑TRIAGE

Triage is the first step: sorting patients to find those with immediate, life-threatening injuries. We must act fast, often assessing and treating at the same time because there's no time for long exams. If a patient's injuries are too complex for our hospital, we must quickly transfer them to a specialized trauma unit.

❑Recognition of severity

Most patients with severe injury can be distinguished early by the following:

- **Signs of Shock:** The patient may look pale, cold, and sweaty. Their heart might be racing. This is usually caused by **severe blood loss** (internal or external).
- **Depressed Consciousness:** The patient is **not fully awake or alert**. They might be confused, drowsy, or unconscious. This could be from a head injury, blood loss, lack of oxygen, or other reasons. **The key is to treat their low level of consciousness right away, even before we know the exact cause.**
- **Breathing Difficulty:** The patient is struggling to breathe. This is common with injuries to the head, neck, or chest. We must quickly check for a blocked airway or injuries like a **collapsed lung (pneumothorax)**.

❑Priorities

A trauma patient often has multiple problems requiring attention. Determining priorities is not always easy. In general, the priorities are to:

1. **Life First:** Keep the patient alive (ABCs: Airway, Breathing, Circulation).
2. **Stop Bleeding:** Find and control major bleeding.
3. **Protect Neuro:** Prevent brain and spinal cord damage.
4. **Treat the Rest:** Address all other injuries last.

• *diagnose and treat* all other injuries and complications.

Basic treatment principles

A systematic approach to managing severe and multiple trauma is important. Effective programmes developed by the American College of Surgeons are now well established. A number of basic treatment principles apply to all severe trauma patients.

❑**Emergency assessment (primary survey)**

While airway, breathing, circulation (ABC) management is traditionally followed, battlefield trauma is managed using a <C>ABC approach, where <C> refers to the management of catastrophic external bleeding. The treatment priorities are as follows:

- **<C> - Catastrophic Bleeding:** Your first priority. Immediately identify and control any life-threatening external hemorrhage using tourniquets or pressure dressings.
- **A - Airway (with Spine Protection):** Assess if the airway is open and clear. In unconscious patients, always assume a neck injury and protect the cervical spine.

- **B - Breathing:** Evaluate if the patient is breathing effectively. Look for signs of respiratory distress, such as a rapid breathing rate or cyanosis.
- **C - Circulation:** Check for signs of shock from blood loss. Feel for a weak, rapid pulse and check for cold, clammy skin.
- **D - Disability:** Perform a rapid neurological assessment. Check the patient's level of consciousness using the Glasgow Coma Scale (GCS) and examine their pupils.
- **E - Exposure / Environment:** Fully expose the patient to perform a thorough head-to-toe examination, but then cover them to prevent hypothermia and maintain dignity.

❑Oxygen and ventilatory therapy

High-flow oxygen by mask is given to all trauma patients. Patients with severe trauma frequently require ventilatory support. A restless uncooperative patient should be anaesthetised and intubated under a rapid sequence induction to facilitate resuscitation.

❑Blood cross-match and tests

Blood is concurrently sent for baseline haematological and biochemical tests, including blood ethanol level. Six units of red cells should be cross-matched urgently, but it is impossible to predict the amount of blood that will be required.

❑Fluid resuscitation

If necessary, two or three large 14- or 16-gauge intravenous (IV) cannulae are inserted in upper limb, external jugular or femoral veins. Intraosseous cannulation can be useful initially if intravenous access is not obtainable.

❑Analgesia

Analgesia is easily overlooked. Opioid agents should be titrated IV, and not given intramuscularly or subcutaneously as the latter routes give unpredictable absorption in shock states. Large doses may be needed.

❑**Urine output**

A urinary catheter is inserted unless a ruptured urethra is suspected (because of blood at the urinary meatus, severe fractured pelvis or abnormal prostate position on rectal examination), in which case a urethrogram is indicated before catheterisation. Urine output monitoring is an important guide to resuscitation.

Clinical evaluation of injuries (secondary survey)

Injuries are easily missed in an emergency, especially when one injury is obvious. A secondary, and even a tertiary, survey should be performed. The back and the front of the patient should be examined. All body regions are examined systematically.

❑Head

Neurological observations are made. The ears and nose are inspected for cerebrospinal fluid and blood, and the scalp is examined thoroughly.

❑Face

Bleeding into the airway should be excluded, and the face and jaws tested for abnormal mobility.

❑Spine

A cervical spine fracture or dislocation is assumed in all patients with depressed consciousness until proved otherwise. Signs of spinal cord injury should be sought (e.g. warm dilated peripheries from loss of vasomotor tone, diaphragmatic breathing, paralysis). The thoracic and lumbar spine should be inspected and palpated.

❑Thorax

Fractured ribs in themselves are not usually life threatening, but haemothorax, pneumothorax, lung contusion and chest wall instability (flail chest) will require attention if present. Tension pneumothorax is a life-threatening emergency that needs to be detected and treated early. Less common but very serious injuries can occur to the heart and great vessels.

❑Abdomen

The spleen, liver and mesenteries are often damaged. Retroperitoneal haemorrhage is common. Injuries to the pancreas, duodenum and other hollow viscera are less frequent, and may be missed until signs of peritonitis occur. Renal injury with retroperitoneal haemorrhage is suggested by haematuria and loin pain

❑Pelvis

Pelvic fractures may be difficult to detect clinically, especially in the unconscious patient. Blood loss may be massive, particularly with posterior fractures involving sacroiliac dislocation. Consideration of a pelvic binder may be useful in the initial stages of resuscitation. Ruptured bladder and ruptured urethra may occur with anterior fractures.

❑Extremities

A litre or more of blood may be lost into a fractured femur. Long-bone fractures are more serious when they are open, comminuted or displaced, or if associated with nerve or arterial damage.

❑External

Contusions may be extensive and serious, especially in falls from heights, and may be overlooked if the victim’s back is not examined. Road crash victims may sustain serious burns or abrasions.

Shock in the trauma patient

The earliest, most constant and reliable signs of shock are seen in the peripheral circulation. A patient with cold, pale peripheries has shock until proved otherwise. Tachycardia is not always present and hypotension is a late sign of shock. The commonest form of shock in trauma is hypovolaemic shock.

❑Hypovolaemic shock

If the neck veins are empty, hypovolaemic shock should be inferred. Possible sites of blood loss causing shock are:

- External loss, which is obvious clinically from blood-soaked clothing and pooled blood
- Major fractures, which are obvious clinically by deformity, swelling, crepitus, pain and tenderness (e.g. femurs) or seen on a plain X-ray (e.g. pelvis)
- Pleural cavity, detected on urgent chest X-ray. Intrapleural drains will reveal the amount and rate of blood loss

- Peritoneal cavity, detected by laparotomy, computed tomography (CT) scan or ultrasound. Clinical examination of the abdomen can be misleading when the patient is intoxicated, has depressed consciousness or has multiple injuries. A single clinical examination is of limited value; changes over time are more important

❑**Cardiogenic shock**

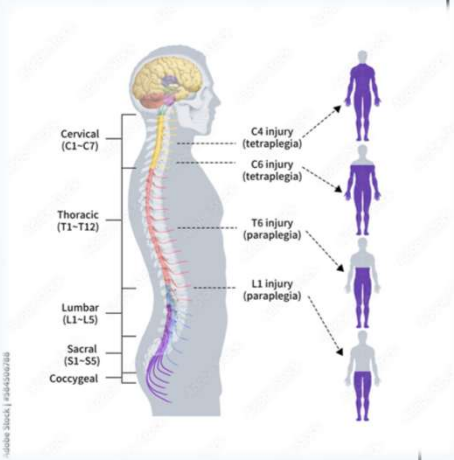
If the trauma patient with shock has distended neck veins, possible causes are tension pneumothorax, concurrent myocardial infarction, cardiac tamponade or myocardial contusion.

❑**Neurological shock**

Patients with paraplegia or tetraplegia from spinal cord injury may have low blood pressure with warm dilated peripheries.

❑**Septic Shock**

Occasionally, patients with pulmonary aspiration may develop septic shock. This is unlikely to confuse the initial trauma assessment soon after injury, but may require consideration some hours or a day or two later.



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