Chapter 2 – Triage
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Introduction

Existing trauma courses focus on a vertical or horizontal approach to the ABCDE assessment of an injured patient:

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<td>Airway</td>
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<td>B</td>
<td>Breathing</td>
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<td>C</td>
<td>Circulation</td>
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<td>Disability</td>
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<td>E</td>
<td>Exposure</td>
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This remains the standard of care, with adjustments made to give greater priority to the assessment of circulation and the cervical-spine on the assessment ladder.

The horizontal approach favours the concurrent assessment of ABCDE normally performed by a team of practitioners. The vertical approach ensures that an assessment of each area occurs in sequence and is usually performed by a sole clinician.

In the Emergency Department, elderly patients may present in one of two ways – they might be alerted in whereby the paramedic team forewarn the ED about their imminent arrival, allowing the department to mobilise a trauma team if required.

Alternatively, elderly patients may be under-triaged, arriving to wait in the same queue as other patients. In this situation, they might be assessed by a single clinician. This circumstance may also arise if a hospital inpatient falls on the ward and sustains an injury – it is more likely that one practitioner will assess the patient and a vertical ABCDE approach is used.

Irrespective of how patients present, the quality of in-hospital triage is crucial in initiating the appropriate hospital response.

Patients with significant mechanisms of injury or severe anatomical and/or physiological derangement are more likely to need a trauma team approach than the patient who presents in a stable condition following a simple fall.

The Trauma Team

Most trauma networks will have a pre-hospital triage tool that Emergency Response Teams use to determine whether patients should be taken to a Major Trauma Centre or Trauma Unit.

An example of such a tool is illustrated below and trauma teams will be activated (or not) on the basis of abnormal physiological signs, abnormal anatomy or mechanism of injury.

Such tools allow a measured response from hospital teams in the form of mobilising a trauma team. The teams will often consist of: a trauma team leader (usually ED staff); anaesthetists to manage the airway, disability assessment and c-spine; speciality or ED staff to perform BCE assessments; and members of the Nursing team or advanced practitioners for additional support.

This triage system is useful for patients in extremis or with high mechanisms of injury. In-hospital teams should not question the decision or judgement of pre-hospital teams until they have assessed the patients themselves. In short, it is far safer to mobilise the trauma team once requested, assess the patient, and review performance and decisions once patient care has been delivered.
## Major Trauma Triage Tool

### 1. Measure Vital Signs
- **S** Glyceryl trinitrate
- **H** Meperidine
- **N** Calcium gluconate

### 2. Assess Acuity
- **S** Glasgow Coma Scale
- **H** Capillary refill time
- **N** Cyanosis

### 3. Assess Manifestations
- **S** Crossed syndromes
- **H** Drop in blood pressure
- **N** Shock

### 4. Special Conditions
- **S** Malignant hirsuties
- **H** Perforated viscus
- **N** Hypocalcemia

### 5. Assess Injury
- **S** Mangled extremity
- **H** Distal numbness
- **N** Fractures

### 6. Emergency Mechanism
- **S** Significant impact
- **H** Clotting abnormality
- **N** Shock

### 7. Transport to Major Trauma Centre
- **S** Awake and orientated
- **H** Major Trauma Centre
- **N** Hypothermia

### 8. Ticket Test
- **S** Yes
- **H** No

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**Note:** Any criteria to this stage is a judgement that the patient may have severe significant trauma.
There is a risk of under-triage with tools that are insensitive to age-based differences in physiology and anatomy. Elderly patients may be in hypovolaemic shock with a systolic blood pressure of 110mmHg and yet would not trigger direct transit to a Level I centre.

**Understanding Under-Triage**

It is important for the triage team to have an understanding about why elderly patients might be under-triaged. This normally occurs as a result of different physiological responses to any given injury hence patients may not activate the pre-hospital triage tools, but can also be due to age-related bias and perceptions in the pre-hospital setting that a patient may not be suitable for MTC/Level I Trauma Care.

A US Study reviewed all patients admitted to a trauma service over a ten-year period and defined under-triage as having an ISS > 15 but not having formal trauma team activation by pre-hospital or in-hospital teams. Of 4534 elderly patients, 15.1% were under-triaged and the study identified that these patients were more likely to die when corrected for GCS, Revised Trauma Score (RTS), the occurrence of >1=complication and whether they were taking warfarin. Such studies demonstrate the risks of under-triage and highlight the need to understand why it occurs in order to develop mechanisms to manage this risk.

**Falls & Under-Triage**

Same-level falls are often perceived to be a low mechanism of injury and unlikely to cause significant trauma. One study looked at trauma data and compared patients aged 65 years or less to patients aged over 65 years and found that falls were the injury mechanism in 48% of the older group and only 7% of the younger group (p<0.05). This same study identified that 32% of all falls resulted in serious injury (ISS > 15) for older patients compared to 15% in the younger group (p<0.05). Similarly same-level falls led to serious injury 30% of the time in the older group compared to 4% in the younger group (p<0.05). The following injury types were also recognised between groups:

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<thead>
<tr>
<th>Injury Type</th>
<th>&gt;65 years</th>
<th>65 or less</th>
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<tr>
<td>Head/Neck</td>
<td>47%</td>
<td>22%</td>
<td>P&lt;0.05</td>
</tr>
<tr>
<td>Chest</td>
<td>23%</td>
<td>9%</td>
<td>P&lt;0.05</td>
</tr>
<tr>
<td>Pelvic/Extremity</td>
<td>27%</td>
<td>15%</td>
<td>P&lt;0.05</td>
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In light of such evidence, it is important that triage teams are aware that same-level falls in elderly patients are COMMON and CAN RESULT IN SERIOUS INJURY.

**Physiology & Under-Triage**

If pre-existing triage tools list hypotension (systolic blood pressure < 90mmHg) and low GCS (<14) as markers of compromise, this may lead to under-triage of elderly patients.

If an individual suffers from hypertension, they may have a significant drop from their baseline measurement due to haemorrhagic shock, but present with a systolic blood pressure above 90mmHg. It is important in patients with hypertension to evaluate the initial blood pressure measurements in accordance with previous blood pressure (if available from hospital records).

A US Level 1 trauma centre retrospective review identified that mortality increased in elderly trauma patients with a systolic blood pressure of <110mmHg. This same
association was not seen in younger patients until the blood pressure dropped below 95mmHg\textsuperscript{3}.

A separate study demonstrated that elderly patients appeared less likely to tolerate relative hypotension with higher mortality at initial systolic blood pressures of 90 - 130mmHg\textsuperscript{4}. However, this study suggested that if such criteria were to be used as predictors of injury severity, they would need to be adjusted for different age groups.

Both studies highlight the fact that pre-existing triage tools with a systolic blood pressure cut-off of <90mmHg will fail to identify elderly patients with significant injuries who have a higher SBP. It is important for in-hospital teams to be aware of this fact and incorporate a higher index of suspicion for injury at higher SBP levels.

A 2014 UK-based study\textsuperscript{5} found that presenting GCS was higher in elderly patients than younger patients for each level of AIS-related head injury. This difference was noted to be more apparent in the presence of the most severe injury types (AIS 5). From this study, it is possible to extrapolate that older patients may have a significant head injury and not trigger the triage tool because they will have a higher initial GCS than younger patients.

**Anatomy of Injury & Under-Triage**

Patients with suspected pelvic fractures are deemed as needing MTC-Level care according to most triage tools. A small US study reviewed 87 patients with severe pelvic injuries and identified that 39% were initially taken to a non-tertiary centre\textsuperscript{7}. Of these patients, the two-week incidence of complications was 54% higher in the group of patients who were transferred later to the level I trauma center.

Elderly patients with injuries to the pelvic or groin region are most likely to suffer from pubic rami or neck of femur fractures. Such injuries are extremely common and may lead pre-hospital teams to consider such diagnoses before more significant pelvic injuries. The triage team should manage this risk by evaluating the exact mechanism of injury, with higher mechanisms (e.g. fall downstairs, road or pedestrian traffic collisions), being more likely to cause significant injury.
The Triage Team

The maximum time any patient should wait to be triaged is **15 minutes** and there is an expectation on Emergency Departments to tailor their assessment systems accordingly.

Some departments will have an assessment team comprising of: a senior clinician; Nursing staff; and phlebotomists, whereas others will have a Triage desk. Whatever system is in place, there is a need to have a “secondary” filter to manage the risk of under-triaged patients.

**HECTOR believes that mechanism of injury plays a pivotal role in determining the correct in-hospital response.** Assessment teams can use this in combination with adjusted parameters of physiology and anatomical injury to determine the best course of action.

After the initial assessment, patients will either be assessed by the Trauma Team or by an individual clinician. Irrespective of the individual pathway, all patients should have ABCDE assessed and documented appropriately.

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### MECHANISM OF INJURY

1. Fall downstairs
2. Fall from any height other than standing
3. Pedestrian / Cyclist struck by vehicle
4. Road Traffic Collision (anything other than simple rear-end shunt or speed >30mph)
5. Penetrating or crush injury to torso

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### PHYSIOLOGY

- Systolic BP < 110mmHg
- Heart Rate > 90 bpm
- GCS < 15

### ANATOMY OF INJURY

- Injury to \(\geq 2\) Body regions
- Suspected head / spinal injury

### OTHER

- Patient on anticoagulant medication or has a bleeding disorder

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**MOBILISE TRAUMA TEAM**

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**IMMEDIATE SENIOR NURSE / CLINICIAN REVIEW**

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*If any concerns*
Using Pre-Hospital Information

Most trauma teams will receive direct handover by Paramedic crews. This isn’t possible if elderly patients are under-triaged and the crews have already stood down. Attempts should be made to obtain information about the pre-hospital assessment using tools such as the “ATMIST” mnemonic.

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This information can be obtained from ambulance records if ambulance crews have already stood down. It is vital to have a grasp on what occurred to the patient between the point of injury and arrival in hospital.

Even before the primary survey, assessment should be focussed on looking at the “complete picture”. For elderly patients, the commonest mechanism is a simple fall – it is important to know why such falls may have occurred and bring this into the primary survey.

Summary

- Individual assessment of patients will either merit a formal trauma-team or individual clinician-led response. As elderly patients are likely to present following low mechanisms of injury, trauma team activations are less likely to occur.

- Underlying knowledge of the reasons for under-triage is an essential component in managing this risk. The team that is aware of the causes of under-triage is more likely to be able to identify the severely injured patient at the point of their arrival.

- Robust triage mechanisms are essential in Emergency Departments to counteract the effects of under-triage from pre-hospital teams – assessment of vital signs, suspected anatomy of injury and consideration of mechanism of injury are key factors in this process.

References


