PROTOCOL: T1

PREHOSPITAL MANAGEMENT OF MAJOR TRAUMA

Trauma Triage Tool – Major Trauma Criteria (MIST)

MECHANISM OF INJURY (MOI) – Triage by MOI alone has limited accuracy, however the “force of mechanism” still needs to be factored into clinical decision making for appreciation of potential underlying injuries.

MOI + *high risk groups = much stronger indicator for major trauma

*High risk groups include:

- Patients < 16 or ≥ 65 years
- Obstetric patients > 20 weeks gestation
- Patents on anticoagulants, antiplatelet medications or with clotting disorders
- Significant co-morbidities
- NESB / Difficult to assess

In the pre-hospital environment a major trauma patient is defined as a patient that meets ANY of the criteria of the Trauma Triage Tool.

M— MECHANISM

<table>
<thead>
<tr>
<th>Blunt</th>
<th>Other Incidents</th>
</tr>
</thead>
<tbody>
<tr>
<td>-Death in same vehicle</td>
<td>-Agricultural machinery or equipment / Quadbike</td>
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<tr>
<td>-Intrusion into occupant compartment &gt; 30cm</td>
<td>-Livestock (e.g. horse/cattle)</td>
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<td>-Steering wheel deformity</td>
<td>-Crush Injury (excluding fingers/toes)</td>
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<tr>
<td>-Patient side impact</td>
<td>-Falls &gt; 3m or paediatrics twice the child’s height</td>
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<td>-Cyclist/Motorcyclist (Fall or Collision)</td>
<td>-Falls off ladder &gt; 1m</td>
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<tr>
<td>-Vehicle vs pedestrian</td>
<td>-High voltage injury</td>
</tr>
<tr>
<td>-Ejection from vehicle (partial or complete)</td>
<td>-Any rapid deceleration incident</td>
</tr>
<tr>
<td>-Entrapment with compression</td>
<td>-Focal blunt trauma to head or torso</td>
</tr>
<tr>
<td>(eg. implement / assault bike handlebars)</td>
<td>(eg. implement / assault bike handlebars)</td>
</tr>
<tr>
<td></td>
<td>-Hanging</td>
</tr>
</tbody>
</table>

I— INJURIES

Penetrating - All penetrating injury (excluding isolated injury to hands or feet) - e.g. Blast/Shooting/Stabbing/Impalement

Head: Head Injury with LOC or amnesic to events with ANY of the following:

- 2 or more vomits
- Seizure
- Pt on anticoagulants, antiplatelet medication or Hx clotting disorder
- Open, depressed skull # or signs of base of skull # (periorbital ecchymosis, CSF leak)

The primary cause of a patient’s ↓ LOC is due to the traumatic injury until proven otherwise.

Alcohol consumption / drug use as the primary cause should only be considered once ALL OTHER CAUSES of ↓ LOC have been ruled out.

Face: Injury with potential airway risk, severe haemorrhage

Neck: Swelling, severe bruising, hoarseness or stridor

Chest: Suspicion of multiple rib #’s, severe pain, restraint abrasion/contusion, evidence of blunt impact

Abdomen: Severe pain, rigidity, distension, swelling, restraint abrasion/contusion, evidence of blunt impact.

Pelvis: Pain, including severe lower back pain, (Does MOI suggest a potential #), deformity, significant abrasion/contusion.

Limbs: 2 or more proximal long bone #’s, degloving injury, ischaemia, amputation proximal to digits

Spinal/Back: Visible deformity, priapism, severe pain

Burns: Dermal or full thickness burns Adults > 20%, Children > 10%, or burns involving face, hands, feet, genitalia, perineum, anus and major joints or inhalation injury with cutaneous burns. All circumferential burns or burns in a patient with significant comorbidities or pregnant women in the 2nd/3rd trimester.

Note: For burns patients in the Sydney Metro area without multi-system trauma (i.e. no additional T1 criteria other than burns) refer to Protocol T12 Burns Patient Transportation Cascade.
Trauma Triage Tool – Major Trauma Criteria (MIST) continued

### S— SIGNS AND SYMPTOMS

**Airway:** Potential injury / at risk, hoarseness, stridor

**Breathing:** RR < 10 or > 29, SpO$_2$ < 90% on air, cyanosis or respiratory difficulty, chest wall crepitus, subcutaneous emphysema

**Circulation:** HR > 120

SBP < 100 at anytime or severe haemorrhage or suspected severe haemorrhage

**Disability:** GCS ≤ 13 or combined motor sensory deficit or any worsening trend in ABCD

**Paediatrics:**

Physiological changes are late indicators of serious injury in a child whom may lose 30% blood volume prior to ANY changes in vital signs. The following is a guide:

<table>
<thead>
<tr>
<th></th>
<th>1st year</th>
<th>1-5 yrs</th>
<th>6-12 yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>HR</td>
<td>&gt; 160</td>
<td>&gt; 140</td>
<td>&gt; 120</td>
</tr>
<tr>
<td>SBP</td>
<td>&lt; 60</td>
<td>&lt; 70</td>
<td>&lt; 80</td>
</tr>
<tr>
<td>RR</td>
<td>&gt; 60</td>
<td>&gt; 35</td>
<td>&gt; 30</td>
</tr>
</tbody>
</table>

**T— TRANSPORT**

If a patient meets Major Trauma Criteria paramedics are **authorised** to transport up to 60 minutes Metropolitan / 90 minutes Regional from scene in order to reach the appropriate destination (see transport destination algorithm for suitable destinations- this includes cross border)

**MANDATORY NOTIFICATION** by Paramedics via the Control Centre to the Aeromedical Control Centre (ACC) is required for direction on a suitable destination for patients unable to be transported directly to the appropriate destination indicated in the transport destination algorithm. Once a destination hospital has been determined in conjunction with the ACC Retrieval Consultant, Paramedics are to comply with the agreed destination. **Do not delay transport to hospital waiting for higher clinical skill level / Aeromedical team – rendezvous en-route.**

**Considerations for patients ≥ 65 years:**

- May have different physiological responses to trauma resulting in:
  - Vital signs that do not fit within the parameters listed above
  - Vital signs that don’t reflect the severity of the injuries due to medications, hypertension Hx and co-morbidities
- Low impact mechanisms (e.g. ground level falls, low speed MVA’s etc) may result in severe injury

### Transport destinations

#### Major Trauma Service (Adult)

| John Hunter | Liverpool | Royal North Shore |
| Royal Prince Alfred | St George | St Vincent’s |
| Westmead | Canberra (ACT) | #Gold Coast University (QLD) |

#### Major Trauma Service (Paediatric)

| Sydney Children’s (POW) | Children’s Hospital Westmead | John Hunter Children’s |

*Where established local cross-border agreements exist.

#### Regional Trauma Services

| *Albury | Gosford | Nepean |
| Wollongong | Coffs Harbour | Lismore |
| Orange | Port Macquarie | Tamworth |
| Tweed Heads | Wagga Wagga |

*Where established local cross-border agreements exist.

#### Trauma Staging Hospitals

| Armidale | Broken Hill | Dubbo | Griffith |
| Manning Base | Shoalhaven | South East Regional (Bega) |
T1 Assessment:
Assess the scene and provide reports and requests to the Control Centre:
• Initial situation report using ETHANE
  – Exact location
  – Type of incident
  – Hazards
  – Access to location
  – Number of casualties
  – Emergency services, required or present
• Provide Control Centre with SMART Tag™ patient triage colour when completion of a full MIST might be delayed
  - RED (Priority 1)
  - YELLOW (Priority 2)
  - GREEN (Priority 3)
  - BLACK (Deceased)
• Provide a FULL MIST report
  – Mechanism of injury
  – Injuries
  – Signs and symptoms
  – Treatment/transport
• Request for additional resources as required (higher clinical skill level/Aeromedical team etc)

Minimise time on scene where possible.
Remember: Patients with penetrating trauma and/or blunt trauma who are exsanguinating require early pre hospital notification from scene to the receiving hospital, extremely short scene times and treatment en-route because surgical intervention and major blood transfusion is often needed to control the bleeding and stabilize the patient

Treat per specific protocol/s

Trauma Code 3 notification to the receiving hospital

Urgent Transport – Refer to specific transport destination algorithm

Regularly repeat and document ABCD physical examinations and physiological observations in order to identify trends, clinical deterioration and/or response to treatment

Documentation Requirements - The correct documentation of Protocol ‘T1’ on a patient’s clinical record, is essential to enable pre-hospital and in-hospital data linkage to track patient outcomes.
• Patients who are positive to T1 Trauma criteria – Record T1P as the chief protocol
• Patients assessed and are negative to T1 Trauma criteria – Record T1 on the clinical record

Refer to Reference R39—Pre-Hospital Management of Major Trauma Principles for further information
**Major Trauma: Adult — Metropolitan Transport Algorithm**

**Assess Pt using Major T1 Trauma Criteria Tool**

**IMMEDIATE LIFE THREAT**
Will patient die without immediate intervention?
- i.e. Peri-arrest (Trauma)

**Yes**

**Closest Trauma Service (Major/Regional)**
- Provide early notification from scene to hospital for immediate life threat (Trauma Code 3).
- Mandatory: Notify Aeromedical Control Centre (ACC) of patient with immediate life threat if transporting to a Regional Trauma Service.

**No**

**Is the patient positive to any injury criteria (including penetrating injury) and/or signs and symptoms criteria?**

**Yes**

**Transport to highest level Trauma Service within 60 minutes from scene.**
- Provide early notification to hospital (Trauma Code 3).

**High risk group patients:**
- Positive to blunt mechanism criteria only; and
- Is vital sign abnormality an isolated reduction in GCS ≤ 13 in a patient ≥ 65 years following a fall from any height (standing height and above) **AND** patient is on anticoagulants, antiplatelet medications or has history of a clotting disorder?

**Yes**

**Non-High Risk Groups who are:**
- Positive to blunt mechanism criteria only; and
- Ambulant at scene with normal physiology; and
- Minor or no apparent injury?

**Yes**

**Determine Pt Disposition (A10)**

**No**

**Closest Trauma Service (Major/Regional)**

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If no Trauma Service within 60 minutes from scene **MANDATORY:** Request Control Centre notify ACC of major trauma patient requiring retrieval and seek direction on appropriate destination. Do not delay transport waiting arrival of Aeromedical Team – update MIST reports with Control Centre & responding Aeromedical Team regarding any call-off, rendezvous point en-route.
**Major Trauma: Adult - Regional Transport Algorithm**

**Assess Pt using Major T1 Trauma Criteria Tool**

**IMMEDIATE LIFE THREAT**
Will patient die without immediate intervention? i.e. Peri-arrest (Trauma) and/or an exsanguinating patient requiring blood products

- **No**
- **Yes**

**Head Injury with a GCS ≤ 13?**
(Includes an isolated reduction in GCS in a patient ≥ 65 years of age following a fall from any height (standing height and above) AND the patient is on anticoagulants, antiplatelet medications or has a history of clotting disorder)

- **No**
- **Yes**

Is the patient positive to any injury criteria (including penetrating injury) and/or signs and symptoms criteria?

- **No**
- **Yes**

High risk group patient positive to blunt mechanism criteria only?

- **No**
- **Yes**

**Non-High Risk Groups who are:**
- Positive to blunt mechanism criteria only; and
- Ambulant at scene with normal physiolgy; and
- Minor or no apparent injury?

- **No**
- **Yes**

If no Trauma Service within 90 minutes from scene

**Mandatory:** Request Control Centre notify Aeromedical Control Centre (ACC) of major trauma patient requiring retrieval and seek direction on appropriate destination. Transport to closest Trauma Service or destination as confirmed by ACC.

Provide early notification from scene to receiving hospital (Trauma Code 3)

Transport to highest level Trauma Service within 90 minutes from scene.

Provide early notification to hospital (Trauma Code 3)

**Hospital Destination Cascade**
1. Trauma Service within 90 minutes from scene, if not then;
2. Trauma Staging Hospital within 90 minutes from scene, if not then;
3. Local Hospital

If unable to transport to a Trauma Service, request Control Centre notify ACC of major trauma patient and seek direction on appropriate destination.
Major Trauma: Paediatric — Transport Algorithm

Assess Pt using Major T1 Trauma Criteria Tool

**IMMEDIATE LIFE THREAT**
Will Pt die without immediate intervention? i.e Peri-arrest (Trauma)

Yes

No

Is a Paediatric Trauma Service located within 60 mins (Metropolitan) or 90 mins (Regional) from scene?

Yes

Paediatric Trauma Service
Pre-hospital notification (Trauma Code 3)

No

MANDATORY: Request Control Centre notify ACC of trauma patient requiring retrieval and seek direction on appropriate destination. Do not delay transport waiting for arrival of Aeromedical Team – update MIST reports (local channel) with Control Centre & responding Aeromedical Team regarding any possible call-off, rendezvous en-route

Paediatric Destination cascade if no Paediatric Trauma Service located within 60 mins (metro) or 90 mins (regional) from scene:
- Major Trauma Service, if not then
- Regional Trauma Service, if not then
- Trauma ‘Staging’ Hospital, if not then
- Local Hospital

ACC notification and direction on appropriate destination / rendezvous point remains mandatory and takes precedence.

Early pre-hospital notification from scene to receiving hospital (Trauma Code 3)

Closest Trauma Service:
(Paediatric/Regional/Major)

Mandatory: Notify ACC of T1 Paediatric Trauma Patient if transporting to a non-paediatric Trauma Service

Approved by: Executive Director - Clinical Systems Integration

Revised: July 2018

Maintained by: Clinical Systems Integration

Note: The most current version of this document is available on the NSW Ambulance Clinical Systems Integration Intranet. Document is uncontrolled when printed.