Prehospital management of major bleeding

Jez Pinnell
Consultant Anaesthetist
Medical Advisor Yorkshire Air Ambulance
Overview

- Presentation focussed on bleeding due to trauma
- Scale of the problem
- Recent changes in regards to trauma systems
- Prehospital management with recent advances
- Local prehospital system
- Major/mass casualty incidents
20,000 cases major trauma in UK with 5400 deaths

Level 1 trauma centre in Australia
- 400 patients ISS>15 in 1 yr
- 175 deaths (including pre hospital)
- Average age 43, 63% male (me!)
- 66% died before arriving at hospital
- Exsanguination 33%/CNS and exsanguination 17%

What’s the bleeding problem?
What’s the bleeding problem?

- WHO suggest that worldwide, 40% trauma deaths are due to bleeding or its consequences.
- A proportion of these deaths are preventable.
- It is a big problem.
Who cares?

- Published 2007
- Data collected prospectively for 3/12 in 2006
- Reviewed by a multidisciplinary group of experts
- 3.3% deemed to have had inadequate haemorrhage control
- 12.8% inadequate fluid therapy
Yet another report

- Published 2010
- Despite many reports over previous 20 years still many deficiencies in provision of care after major trauma
- Possibly 20% higher in hospital mortality compared to the US.
Following on from these reports the DOH asked the various health regions to set up major trauma networks.

Started to come on line in 2012.

National clinical advisory group recommendations
What are YAS doing

- Paramedic in EOC to identify and coordinate response
- Clinical advances
- Triage tool to guide decision making
- Prehospital care being linked in to regional audit systems
- Enhanced care teams
MTCC

- Paramedic based in EOC at Wakefield
- Identifies major trauma and ensure appropriate response
  - RRV/DCA/CS
  - HART team
  - YAA
  - BASICS
- Lease with MTC/TU and assist YAS clinicians with on scene decisions
Management prehospital

- Safety
- C-ABC
- Control exsanguinating bleeding (recent advances)
- Cautious fluid replacement
- Hospital selection
Plugging the hole

- Stepwise approach
- Conventional wound management
- CAT
- Celox
- Femoral traction
- Pelvic binders
Haemorrhage

Apply a field dressing

Apply direct pressure

Where possible elevate the bleeding point above heart height

**NB Pressure must be firm and applied directly over the wound**

**Bleeding controlled**

Transfer to further care

**Bleeding NOT controlled**

Apply further dressings and continue to apply direct pressure

**Bleeding controlled**

Transfer to further care

**Bleeding NOT controlled**

Refer to catastrophic haemorrhage management – **start at appropriate point**

A: Jump to **point A** on the head, neck, torso side of the catastrophic haemorrhage algorithm

B: Jump to **point B** on the limbs side of the catastrophic haemorrhage algorithm
CATs

- Combat application tourniquet, used extensively in war zones
- Initially trialled by YAA/HART, now rolling out across YAS
CATs

- Only applied when other measure fail
- Time of application recorded
- Studies from Iraq demonstrated no limb damage solely as a result of CAT application
- Beware the good Samaritan
Celox

- Haemostatic granules coated on a dense gauze
- Designed to be packed into wounds
- Doesn’t cause an exothermic reaction
- Easy to remove
Splints

Kendrick traction splint

Prometheus pelvic splint
Fluids

- BP 60 penetrating torso, otherwise accept 90
- 250 ml bolus 0.9% NaCl
- IV access may be established during transport
- Some HEMS units now carrying packed cells
TXA within 3 hours significantly reduces all cause mortality with no apparent increase in the risk of adverse thrombotic events.

32% reduction in death due to bleeding if given in <1 hour

JRCALC indications
- time critical injury where significant bleeding suspected
- Step 1 or step 2 patients from triage tool
# Major Trauma Decision Tree

<table>
<thead>
<tr>
<th>Step</th>
<th>Assessment</th>
<th>Status</th>
<th>Action</th>
<th>All</th>
</tr>
</thead>
</table>
| **Step one** | Assess vital signs and level of consciousness  [Three-tick test]          | Glasgow coma scale <14  
? Sustained systolic blood pressure <90  
? Respiratory rate <10 >29 | Convey to nearest major trauma centre.  
! Ensure you contact the clinical co-ordination desk in EOC. | Should the airway become compromised at any time consider conveying/diverting patient to nearest trauma centre. |
| **Step two** | Assess anatomy of Injury  [Eight-tick test]                             | Chest injury with altered physiology  
? Traumatic amputation proximal to wrist/ankle  
? Penetrating trauma to neck, chest, abdomen, back or groin  
? Suspected open and/or depressed skull fracture  
? Suspected pelvic fracture  
? Spinal trauma suggested by abnormal neurology  
? Trauma with facial and/or circumferential burns  
? Time-critical (>20% burns) | Convey to nearest major trauma centre.  
! Ensure you contact the clinical co-ordination desk in EOC. | Patients with isolated head trauma may be conveyed to a trauma centre with appropriate neurosurgical facilities. |
| **Step three** | Assess mechanism of Injury  [Four-tick test]                          | Traumatic death in same passenger compartment  
? Falls >20ft (two stories)  
? Person trapped under vehicle including ‘one under’  
? Bullseye windscreen and/or damage to ‘A’ post of vehicle | Patients may benefit from going to a major trauma centre.  
! Contact the clinical co-ordination desk in EOC for further advice. |                                                                          |
| **Step four** | Assess special patient or system consideration  [Four-tick test]       | Patients who have sustained trauma but do not fit any of the criteria above but are:  
? Older patients (>65 years)  
? Pregnant (>20 weeks)  
? Known to have bleeding disorder  
? Morbidly obese | Patients may benefit from going to a major trauma centre.  
! Contact the clinical co-ordination desk in EOC for further advice. |                                                                          |

No

Take to nearest trauma centre
The future?

- Prehospital blood/products
- PCC
- Fibrinogen concentrate
Significant changes in terms of trauma systems over recent years

Ambulance service using new clinical treatments to reduce bleeding and hence mortality