Pitfalls in Trauma Management

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Trauma as a health problem

• The incidence of trauma is on the rise globally due
  – to industrialisation & urbanisation
  – increase in mechanised transport
  – urban violence
  – social conflicts
  – man-made & natural disasters

• Trauma is a **number one killer below 40 years**

• Leading to high morbidity, mortality, disability & economic loss

• Costs 3 times more to Rx trauma patient
State Trauma System

• The trauma system
  – fully integrated into the emergency medical service system
  – strives to meet the needs of all injured patients requiring an acute care facility, regardless of
    • severity of injury
    • geographic location
    • population density
Victoria is a leader in injury prevention
And it works
Steep Learning Curve
Identified 3 Key Pitfalls

1. Delays in management
2. Elderly comorbid patient
3. Severe head injury
Pitfall 1. Delays in management

• Preparation
• Reception
• Transfer or not
• What can you do while you wait?
Pitfall 1. Delays in management

• Preparation
  – Set up
  – Trauma team
  – Primary / Secondary Survey
    • ABC’s
Trauma Triage Criteria

- Allow identification of potentially major trauma patients
- Transfer to highest designated
- Prevent secondary transfers
Pitfall 1. Delays in management

- **Reception**
  - Guidelines available to assist in early management of trauma
  - Identify and treat actual or potential life threats
  - Early transfer activation
Pitfall 1. Delays in management

• Interhospital transfers
  – Historically time is the enemy!
    • Golden hour: increase time = increase mortality
      – Increase 10% with 1 hour
      – Increase 75% with 10 hours delay
  – Today
    • Golden hour means window of opportunity to save patients life
      – Minutes to hours
Pitfall 1. Delays in management

- What can you do while you wait?
  - Prepare for retrieval
  - Monitor and identify signs of deterioration
  - Exhaustive clinical workup and interventions is not always necessary or appropriate
  - Key
    - Stabilise patient
    - Address life threatening problems
    - Take steps to prevent deterioration enroute
Pitfall 1. Delays in management

- **Preparation for Retrieval**
  - Early identification of major trauma criteria requiring inter-hospital transfer should be achieved using the defined triage guidelines.
  - Early activation of the retrieval and transfer system should take place.
  - All inter-hospital transfer of adult major trauma patients should be referred via ARV (1300 368661).
  - All inter-hospital transfer of paediatric major trauma patients should be referred via PIPER (1300 137650).
Pitfall 2. Elderly Comorbid Patient

- Increasing age puts a trauma patient into a higher-risk
- Elderly patients sustaining major trauma
  - higher complication
  - Higher mortality rates
    - preexisting medical condition
    - diminished physiologic
    - inability to compensate for severe injuries
Changes in getting old!

↓ Brain mass  Stroke
  Eye disease  Diminished hearing
↓ Depth of perception
↓ Discrimination of colours
↓ Pupillary response
↓ Respiratory vital capacity
↓ Renal function
  5 – 7.5 cm loss in height  Heart disease and high blood pressure
  Impaired blood flow to lower leg(s)
↓ Degeneration of the joints
↓ Total body water
  Nerve damage (peripheral neuropathy)
↓ Sense of smell and taste
↓ Saliva production
↓ Oesophageal activity
↓ Cardiac stroke volume and rate
  Kidney disease
↓ Gastric secretions
↓ Number of body cells
↓ Elasticity of skin, thinning of epidermis
  15 – 30% body fat (increase)
So how old is old???

- WHO 2012
  - The ageing process is of course a biological reality which has its own dynamic which is largely beyond human control
So how old is old???

• WHO
  – developed world, chronological time is important
  – age of 60 or 65, roughly equivalent to retirement ages in most developed countries
    • is said to be the beginning of old age
How big is the problem

- In 1991 older people constituted 4.0% of Australia's population.
- In 2011 people older than 65 = 14% of population. > 81 has tripled 1.8%
How big is the problem

• Majority of trauma deaths occur in elderly
  – 66% > 75 years
• Median death age
  – Male 78.4 years
  – Females 84.6 years
Major trauma incidence by age
>85 increase by 11% per year
64-75 and 75-84 have increased but no significant
15-64 no increase
Victoria Elderly Deaths

- 2010-11
  - 1/3 of adult major trauma patients were > 65
  - 4 fold increase in the 75-84 years
  - 6 fold increase in > 85 years
Pitfall 2. Elderly Comorbid Patient

• Mechanism of Injury
  – Major trauma
    • 9% Falls
  – Low falls
    • 62% of 75-84 years
    • 84% of > 85

• Falls are consequence of aging
  – Loss of vision, touch and hearing
  – Multiple causality
    • Mechanical, physiological

• Significant cause of hospitalisation
  – Accounts for 55% of injuries in the elderly
Pitfall 2. Elderly Comorbid Patient

- Motor Vehicles and Mechanism
  - 62.6% of Victoria's MVA > 65 years
    - 22% being 75-84 years
  - Crashed during the day, close to home, involving intersections, poor right of way judgment
  - Drivers 75+ have highest rate of fatal crashes
Pitfall 2. Elderly Comorbid Patient

- Pedestrians and MOI
  - 65+ highest population based fatality rate for pedestrians
  - Standard time for most cross walks in US requires a walking speed of four ft./sec.
  - 46% of all MPC fatalities in those 65+ occurred in a crosswalk
Comorbidities

• Diabetes most common comorbidity in all trauma patients 6.5%
  – Increases with age
    • 14% 65-74 years
    • 14% 75-84 years
    • 8.6% > 85 years
Trauma Team Activation

- Elderly experience significant injury from a trivial mechanism
- Risk of under triage
  - alterations in baseline vitals
    - Hypertension
      - means norm BP mask blood loss
    - Beta blockers
      - Prevent tachycardia
  - Altered mental status
    - Late recognition of shock or TBI
  - Lower threshold for elderly
Pre-hospital Major Trauma Triage

**High Risk Criteria for Major Trauma**

- Ejection from vehicle
- Motor/cyclist impact > 30 kph
- Fall from height > 3 m
- Struck on head by object falling > 3 m
- Explosion
- High speed MCA > 60 kph
- Pedestrian impact
- Prolonged extrication

**AND:**
- Age > 55 / Age < 16
- OR pregnant
- OR Significant comorbidity

**RMH > 65**

- Review by trauma geriatric unit
Rib fractures in the Elderly

- 10% of trauma patient have rib #
- 12% overall mortality rate
  - 35% incidence respiratory complications
- Incidence in elderly
  - 60% > 65 years of age
  - Mortality twice the rate
    - For every rib # mortality increased by 19%
    - Risk of pneumonia by 27%
Neurologic Elderly Differences

• GCS Changes
  – Pre-existing dementia/ memory loss
  – Medication use/ misuse
  – Drugs and ETOH
  – Due to cerebral atrophy the dural bridging veins become stretched and more susceptible to rupture
    • Acute and chronic subdural hematomas
  – Further altered sensorium secondary
    • cerebral atrophy, hypoperfusion, and medications

• Pupillary changes
  – Pupils sluggish and/or eye disease or surgery

• Spinal osteoarthritis & discs
  – Increased spinal column and cord injuries
Pitfall 3. Head Injury

- Traumatic Brain Injury (TBI)
  - Significant cause of mortality in Australia
  - Key: minimise secondary brain injury
    - Avoid hypoxia / hypotension / ensure perfusion
  - Early activation of ARV essential if TBI suspected
Pitfall 3. Head Injury

- 40.1% of hospital admissions
  - Serious head injury
- Mechanisms changing
  - Ped & pedal cyclists 18.8%
  - Elderly low falls 16.9%
  - MVA 11.2%
- TBI incidents occurs in rural areas
  - Delays to definitive care
Pitfall 3. Head Injury

• Patient with multisystem injuries
  – Head is most frequently injured
  – Many incidents occur in rural areas
    • Delays to definitive care
  – Patients can be challenging
    • Confused, combative
Pitfall 3. Head Injury

• Severity of injury
  – GCS 13-15 mild
  – GCS 9-12 mod
  – <9 severe

• Hypoxia &/or hypotension can have harmful impact on outcome
  – A single BP< 90 is associated with 150% increase in mortality
  – Action to prevent secondary TBI begin at scene & all stages of care
RMH Trauma Deaths 2015

- 36 Traumatic Brain Injury Deaths
  - Average Age 62
  - Ave ISS 31
  - Ave MV hrs 48
  - Ave LOS 2.3 days
  - 83 % LOT for futility
Discharge

• Traumatic injury is a sentinel event in the life of an elderly patient
  – Changes to trajectory of functional decline
  – Up to 88% of seriously injured fail to return to previous levels of function and independence

• Discharge is complicated by
  – medical comorbidities
  – psychosocial issues
  • Caregiver availability • home safety
Who you going to call?

• ARV
  – Adult Retrieval Victoria
  – Advice and coordination of retrievals
  – Management of critical care beds throughout Victoria
    • 1300 36 86 61
    • www.ambulance.vic.gov.au/Main-home/Arv.html
Trauma Resources!

• Trauma Guidelines
  – Documents
  – Flow charts
• Online learning
• Moderated tutorials
• Conferences and course
• Library

• Trauma.reach.vic.gov.au
Thankyou