MEDAVIE HealthEd ÉduSanté

Trauma and Trauma Systems

Primary Care Paramedicine

Module: 08

Section: 01a

Case

Lecture Outline

- Introduction
- Trauma
- Trauma care system
- Trauma center designation
- Role of the Paramedic

Trauma

- A physical injury or wound caused by external force or violence

Introduction

- Fourth leading killer in Canada
  - Number one cause of death for persons under age 45
- Most expensive problem in terms of:
  - Productivity losses
  - High cost of initial care, rehabilitation and lifelong patient maintenance

Trauma

- Penetrating
  - Injury caused by an object breaking the skin and entering the body.
- Blunt
  - Injury caused by the collision of an object with the body in which the object does not enter the body.

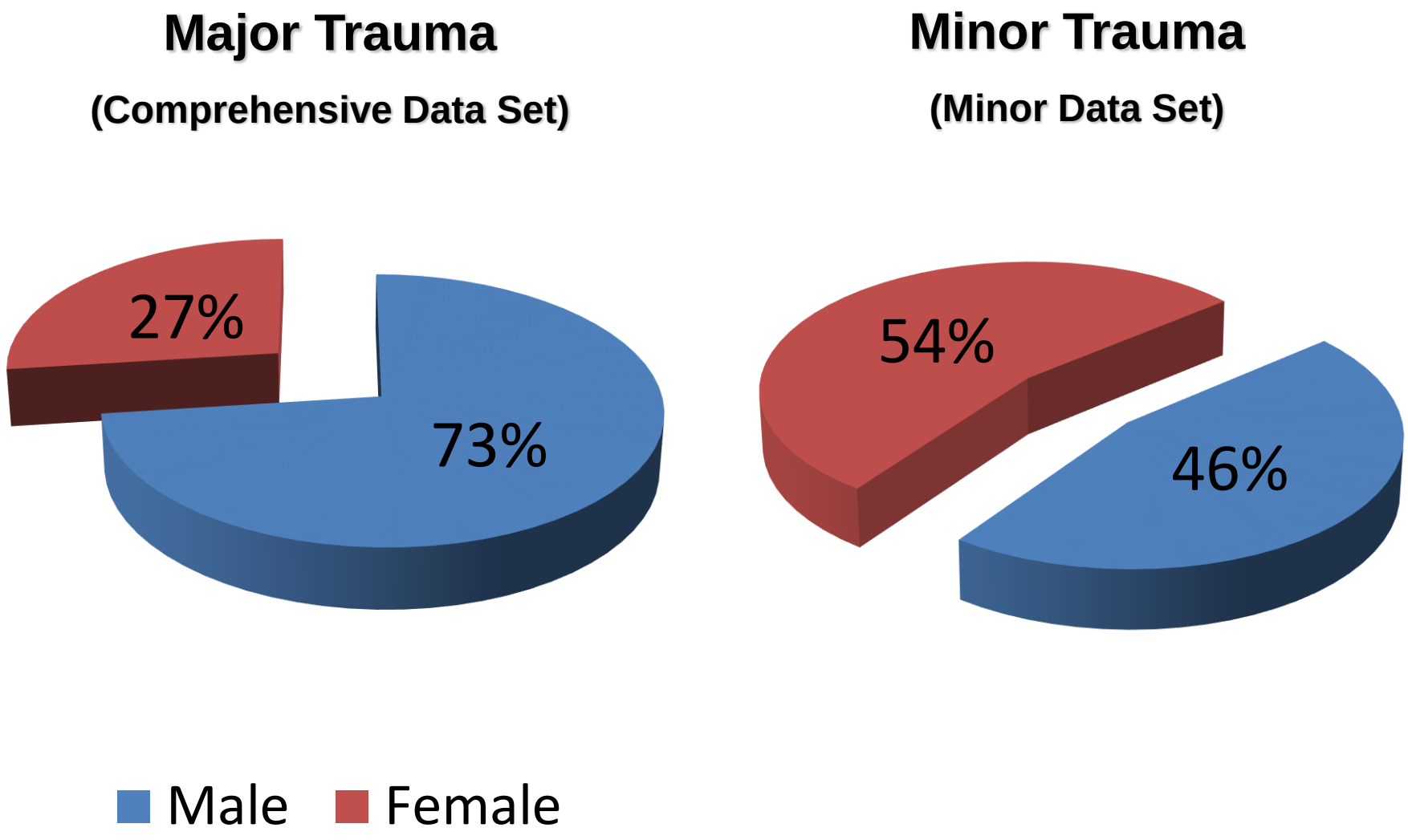
Trauma

- Presentation often masks patient's true condition
  - Extremity trauma is often obvious and grotesque
  - May be a distraction from internal bleeding and shock which may have a more subtle presentation
- Serious life-threatening injuries occur in less than 10% of injuries
  - Recognition and priority management (triage) become critical to effective management

Trauma

- Trauma is a major cause of morbidity and mortality.
- The paramedic must have an appreciation of the trauma system and be able to recognize mechanisms of injury to enhance patient assessment.
- Whether we are dealing with a minor or a major trauma, our plan should be consistent and follow an organized routine

Gender Breakdown



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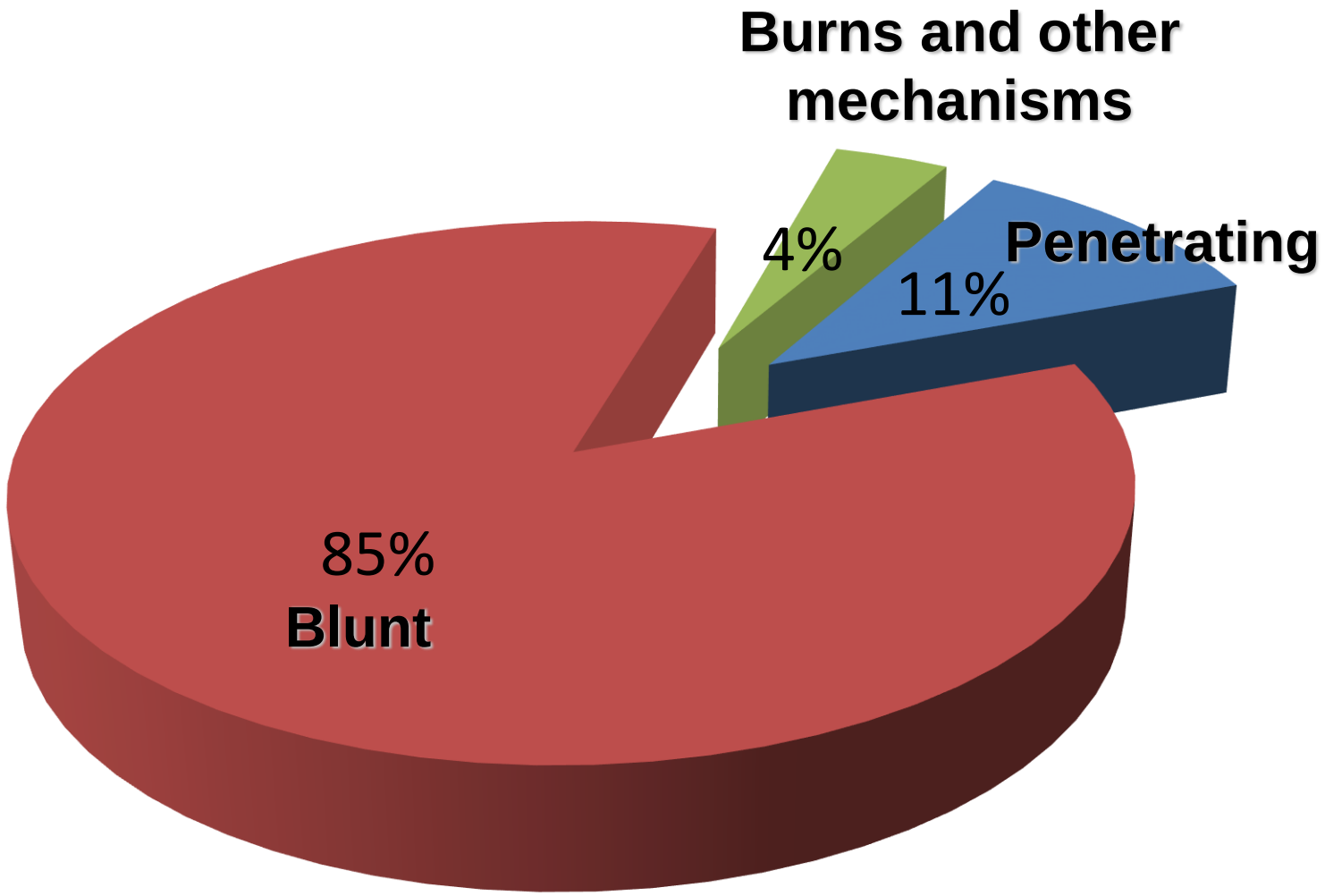
Injury Type



Other Findings…

- Injury Location (body):
  - Head and Neck > 60%
- Age:
  - Minor > 65 y/o
  - Major 20 – 49 y/o
- Location:
  - Minor Home (falls)
  - Major Street and highway (MVCs)
- Time:
  - Major traumas tend to occur more on the weekends
  - Major trauma tends to occur during the summer months

Injury

- It is essential that gruesome, non-life-threatening injuries do distract you from more subtle, life threatening problems.

Trauma Care System

- Serious trauma is a surgical disease
  - Proper care is often immediate surgical intervention
- Care for seriously injured trauma patients is expensive and complicated
  - Well-designed EMS systems allocate limited resources to provide the most efficient and effect care

Trauma Care System

- Integration of:
  - EMS
  - Hospital Care
- Reduces:
  - Cost
  - Time to surgery
  - Mortality
- Proper Care:
  - Immediate surgical intervention to repair hemorrhage sites

Trauma Centres

- Current Canadian model for trauma care involves the designation of trauma centres:
  - Tertiary Trauma Centres (TTC)
  - District Trauma Centres (DTC)
  - Primary Trauma Centres (PTC)
  - Or graded Level 1-5, Level 1 = Tertiary Centre
- Trauma systems should be flexible enough to meet local needs
  - Urban versus rural

Trauma Centre Designations

Table 16–2 Trauma Triage Criteria Indicating Need for Immediate Transport

Mechanism of Injury

- Falls greater than six metres (three times the victim's height)
- Pedestrian/bicyclist versus auto collisions
  - — Struck by a vehicle travelling more than 10 km/h
  - — Thrown or run over by vehicle
- Motorcycle impact at greater than 30 km/h
- Ejection from a vehicle
- Severe vehicle impact
  - — Speed at impact greater than 60 km/h
  - — Intrusion of more than 30 cm into occupant compartment
  - — Vehicle deformity greater than 50 cm
- Rollover with signs of serious impact
- Death of another occupant in the vehicle
- Extrication time greater than 20 minutes

Significant mechanism of injury considerations with infants and children include the following:

- A fall of greater than three metres (three times the victim's height)
- A bicycle/vehicle collision
- A vehicle collision at medium speed
- Any vehicle collision in which the infant or child was unrestrained

Physical Findings

- Revised Trauma Score less than 11
- Glasgow Coma Scale less than 14
- Systolic blood pressure less than 90
- Respiratory rate less than 10 or greater than 29
- Pulse less than 50 or greater than 120
- Two or more proximal long-bone fractures
- Flail chest
- Pelvic fracture
- Limb paralysis
- Burns to more than 15 percent of body surface area
- Burns to airway or face
- Complete amputation of limb, thumb, or penis; eye avulsion; partial limb amputation (partial amputation of the thumb and penis, depending on severity of the injury)
- Tender, distended abdomen secondary to blunt/penetrating trauma
- Head injury with unilaterally dilated pupil, and/or patient unconscious or level of consciousness decreased or decreasing during assessment

Specialty Centers

- Neurocentres
- Pediatric trauma centres
- Microsurgery
- Hyperbaric centres
- Burn units

Role of the Paramedic

- Triage
  - Trauma triage guidelines
- Rapid assessment
- Trauma care
- Transport to the appropriate facility

Trauma

- Trauma care is divided into 3 separate sections:
  - Pre-incident
  - Incident
  - Post-Incident

Pre-incident
Injury Prevention

- One of the best and most cost effective way to reduce mortality and morbidity is to prevent the trauma in the first place
- Designed to help promote safe practices to the public to help prevent injuries
  - "Injury is No Accident" Campaign
  - P.A.R.T.Y. Program (Prevention of Alcohol & Risk Related Trauma in Youth)
  - Bicycle safety programs
  - Firearm safety
  - Boat safety
  - Child Safety Seat classes and checking

Incident

- Prehospital care
  - Management
  - Transportation
  - Triage guidelines

Incident

- Acute care
  - Emergency department
  - Interfacility transport
  - Definitive care
  - Trauma critical care
- Rehabilitation
  - Improving ‘return to home’
  - Assisting the patient to regain or retrain

Post Incident

- Data and Trauma Registry
  - Data retrieval system for trauma patient information
  - Used to evaluate and improve the trauma system
  - Requires accurate documentation
  - Supports research

Post Incident

- Quality Improvement
  - Quality improvement (QI) and quality management (QM)
    - Another way of examining system performance with an aim of providing better patient care
  - Recommendations may include:
    - Continuing education
    - Protocol modifications
  - Peer review is often a critical component of this process

Decision to Transport

- Often a difficult decision with significant consequences
- Based on trauma triage criteria
  - Designed for “over-triage””
  - Ensures that patients with subtle signs and symptoms do not get missed
- Best to err on the side of caution

Trauma Triage Criteria
MOI-Adults

- >6 m fall (3 x height of patient)
- Pedestrian/bicyclist versus auto
  - Thrown or run over by vehicle
  - Struck by vehicle traveling >10 kph
- Motorcycle impact >30 kph
- Ejected from a vehicle

Trauma Triage Criteria
MOI-Adults

- Severe vehicle impact
  - > 60 km/hr
  - > 30 cm intrusion
  - > 50 cm vehicle deformity
- Rollover with signs of serious impact
- Death of another occupant
- Extrication time > 20 minutes

Trauma Triage Criteria
Infants and Children

- >3 m fall (3 x height of patient)
- Bicycle/vehicle collision
- Vehicle collision at medium speed
- Any vehicle collision involving an unrestrained infant or child

Revised Trauma Score

Revised Trauma Score			
GCS	SBP	RR	Coded Value
13 – 15	>90	10 – 29	4
9 – 12	76 – 89	>30	3
6 – 8	50 – 75	6 – 9	2
4 – 5	1 – 49	1 – 5	1
3	0	0	0

- Example:
  - GCS 10 3
  - SBP 140 4
  - RR 32 3
  - Total: 10

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Trauma Triage Criteria
Physical Findings

Pediatric Trauma Score			
	+2	+1	-1
Weight	>20 kg	10 – 20 kg	<10 kg
Airway	Normal	Oral or nasal AW	Intubated or tracheostomy
SBP	>90 mmHg	50 - 90 mmHg	<50 mmHg
LOC	Awake	Obtunded or any loss of consciousness	Comatose
Open wounds	None	Minor	Major or penetrating
Fractures	None	Minor	Open or multiple
Total			

Trauma Triage Criteria
Physical Findings

- Revised Trauma Score <11
- Pediatric Trauma Score <9
- Glasgow Coma Scale <14
- Systolic blood pressure <90
- Respiratory rate <10 or >29

Trauma Triage Criteria
Physical Findings

- > 2 proximal long bone fractures
- Flail chest
- Pelvic fracture
- Limb paralysis
- Burn > 15% BSA
- Burn to face or airway
- Penetrating trunk, neck and head trauma

Summary

- Trauma
- Trauma Care System
- Trauma Centre Designation
- Role of the Paramedic