ORTHOPAEDICS

FOR PRIMARY HEALTH CARE

LION
LEARNING INNOVATION VIA ORTHOPAEDIC NETWORKS

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Approach to the multiply injured patient

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Learning objectives

1. A multidisciplinary approach to the multiply injured patient leads to a reduction in post-injury morbidity and mortality.
2. The assessment of any multiply injured patient starts with the primary survey assessment according to Advanced Trauma Life Support (ATLS) protocol.
3. Haemorrhagic shock is one of the central problems in patients with multiple trauma.
4. Up to 50% of musculoskeletal injuries are missed in the first assessment of a polytraumatised patient.

Introduction

Polytrauma, or the co-existence of multiple traumatic injuries in the same patient, is present in as many as 40% of trauma admissions. Polytrauma often involves young, productive individuals and represents a substantial burden to society, from both financial and human perspectives, and the residual disability in survivors can consume a significant proportion of healthcare resources.

With most hospitals in Africa receiving at least one polytrauma patient per week it is highly likely that you as a junior doctor will be involved in the care of these patients, either in the acute resuscitation phase or following surgery.

The initial presentation of a poly-traumatised patient can be quite overwhelming and familiarity with an algorithm for the assessment and initial treatment provides the treating physician with the confidence to competently manage polytrauma and ensures optimal outcomes for the patient.

Incidence and epidemiology

In Africa, injury-related mortality rates are six times (and road traffic injuries double) the global rate, and unique to our country is that pedestrians account for more than halfof all road traffic fatalities. A diagnosis of“multiple trauma” implies the presence of two or more separate injuries, at least one or a combination of which endangers the patient’s life.

Multidiscipinary approach

The optimal approach to the polytrauma patient requires the involvement of a multidisciplinary team. This team is often made up of, but not limited to, trauma surgeons, intensivists, orthopaedic surgeons, radiologists, urologists, neurosurgeons and anaesthetists.

Management – ATLS approach

The approach to the multiply injured patient who has sustained orthopaedic injuries begins similarly to any other trauma patient and starts with the primary survey assessment of the airway, breathing, circulatory and neurologic status (i.e. the Advanced Trauma Life Support)

A-B-C-D-E Scheme	
A	Airway: Secure/establish airway,immobilise cervical spine
B	Breathing: Secure adequate gas exchange
C	Circulation: Secure adequate tissue perfusion
D	Disability: Identify neurological deficits.
E	Exposure: Examine whole body of a fully exposed patient, keep patient warm and manage injuries that are not life treatening.

The ATLS course contains elements of theoretical tuition, but focuses mainly on practical exercises and simulations of emergency room procedures. In the primary survey, each patient is examined systematically according to the A-B-C-D-E scheme.

Hemorrhagic shock

Haemorrhagic shock is one of the central problems in these patients and a common cause of death. Excessive bleeding carries with it not only the threat of immediate death, but also increased mortality due to multi-organ failure and sepsis. Massive blood loss often starts a cascade of shock, inflammation and coagulopathy that can worsen blood loss and halt attempts at resuscitation. The goal of management is to "find the bleeding and stop the bleeding" with simultaneous rapid and effective restoration of blood volume. Additional attention should be given to maintain functional blood composition to preserve blood function, i.e. haemostasis, oxygen carrying capacity, oncotic pressure and biochemistry. It is critical to consider injuries to 6 regions which may account for major blood loss (see table below). If the patient does not respond to nonsurgical measures then surgical haemostasis is recommended.

After the primary resuscitation is complete, the secondary management of gross deformities includes realignment and splinting of the injured limb. A Thomas splint should be applied for all femur fractures in order to realign the fracture, provide immobilisation, control muscle spasm, reduce pain, reduce the incidence of fat embolism, decrease blood loss, and prevent further damage to blood vessels, neurovascular structures and soft tissue.

Six major potential areas of blood loss	
1	Chest
2	Abdomen
3	Long bones (especially femur fractures)
4	Pelvis
5	Retroperitoneum
6	'Blood on the floor': Scalp and external sources

The presence of limb-threatening phenomena, such as compartment syndrome and a pulseless limb, should be identified early. Open injuries should be washed with saline and covered with a Betadine-soaked gauze and splinted while waiting for radiographs and a formal orthopaedic consultation. Anti-tetanus toxoid and appropriate antibiotics should be administered for all open fractures.

Commonly missed musculoskeletal injuries

More minor injuries to the musculoskeletal system are frequently missed in the context of polytrauma. After initial treatment has been carried out, it is very important to carry out a head-to-toe secondary survey to identify more minor injuries.

Studies have indicated that up to 50% of musculoskeletal injuries are missed in the first assessment. These are often picked up weeks after the initial injury and can result in considerable morbidity, particularly undiagnosed foot trauma.

An awareness of the mechanism of injury helps to focus history taking and will guide examination to the relevant parts of the body. For example, if a patient presents with a posterior hip dislocation from a dashboard injury, this may be associated with ipsilateral patellar fracture, PCL disruption, femoral fracture, acetabular fracture or a combination of these injuries.

Patient with bilateral femur and tibia fractures, a potential cause of majorblood loss

Summary

Interdisciplinary healthcare approach to the multiply injured patient can help optimise care, minimise morbidity and mortality, and ultimately provide a framework for accelerated post-injury rehabilitation course.

Initial assessment and treatment should follow a structured approach (ATLS) which prioritises life-threatening injuries. Due to the high frequency of musculoskeletal injuries, the orthopaedic surgeon forms a vital member of the team. The most important step in the management of open fractures is adequate surgical debridement.

Patient with bilateral femur and tibia fractures, a potential cause of majorblood loss

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ABOUT THE BOOK

Informed by experts: Most patients with orthopaedic pathology in low to middle-income countries are treated by non-specialists. This book was based on a modified Delphi consensus study* with experts from Africa, Europe, and North America to provide guidance to these health care workers. Knowledge topics, skills, and cases concerning orthopaedic trauma and infection were prioritised. Acute primary care for fractures and dislocations ranked high.

Furthermore, the diagnosis and the treatment of conditions not requiring specialist referral were prioritised.

* Held et al. Topics, Skills, and Cases for an Undergraduate Musculoskeletal Curriculum in Southern Africa: A Consensus from Local and International Experts. JBJS. 2020 Feb 5;102(3):e10.

THE LION

The Learning Innovation via Orthopaedic Network (LION) aims to improve learning and teaching in orthopaedics in Southern Africa and around the world. These authors have contributed the individual chapters and are mostly orthopaedic surgeons and trainees in Southern Africa who have experience with local orthopaedic pathology and treatment modalities but also in medical education of undergraduate students and primary care physicians. To centre this book around our students, iterative rounds of revising and updating the individual chapters are ongoing, to eliminate expert blind spots and create transformation of knowledge.

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