

Basic traumatology



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Outcomes

At the end of this module you would be able to:

- Define violence, trauma and injuries
- Define the different types of injuries
- Understand the complications associated with injuries
- Explain how injuries ought to be documented for medico-legal purposes.

9.1

Violence, trauma and injury

Definitions

VIOLENCE

Violence is the threatened or actual use of physical force against another person, oneself, a group or a community.

TRAUMA

Trauma may be defined as an injury to the body caused by physical, mechanical or chemical factors, which may result in wounds and possible complications.

INJURY/WOUND

An injury or a wound is the damage to the body caused through the application of force (violence) to the body.

9.1.1

Definitions

Violence is defined as "the threatened or actual use of physical force against another person, oneself, a group or a community, which results in or has a high likelihood of resulting in injury, death or deprivation"¹.

Trauma may be defined as an injury to the body caused by physical, mechanical or chemical factors, which may result in wounds and possible complications. For medical purposes, violence refers to either behaviour that results in injury or to the injury itself. This violence may result in both psychological and physical trauma. [See pg 139]

Examples of traumatic physical factors include heat, cold, radiation, electricity or lightning. Mechanical factors include the use of weapons or instruments such as knives or guns and injuries resulting from falls, traffic accidents or domestic violence. Chemical factors include damage to tissue by acids, alkalis or poisons. An injury or a wound is the damage to the body caused through the application of force (violence) to the body. A wound or injury to the body occurs when the force applied to the body is greater than the body's ability to absorb such a force safely. In this chapter we will focus on mechanical injuries to the skin.

9.2

Types of mechanical injuries

INJURIES

- blunt force
- sharp force
- single
- multiple
- localised
- widespread
- internal
- external

The injuries inflicted by mechanical force are generally divided into those caused by blunt force and those due to sharp force. Injuries may be single or multiple. There may be more than one type of skin injury to the body and they may be localised or widespread. The effects of the injury on the body may be local (e.g. a bruise on the breast), systemic (e.g. shock following a stabbed blood vessel in the leg) or as a result of complications (e.g. kidney failure due to shock and infection).

It should be noted however, that the absence of external injury to the skin or genitalia does not exclude the possibility of serious injury to the internal organs.

Blunt force injury

This refers to the application of force to the body by a blunt instrument or where the body strikes a surface such as a wall or the ground. Blunt force injuries to the skin are divided into three categories: abrasions, bruises and lacerations.

Abrasions

An abrasion is a superficial injury to the skin in which the outer layer of the skin is scraped off. Examples include a scratch from a fingernail, imprint caused by a belt buckle, grazing of the skin caused by dragging the body over a rough surface and the impression around the neck caused by a cord or rope used in strangulation.

Abrasions allow inferences to be drawn about the nature and shape of the object (e.g. a belt buckle); the time of the injury (e.g. recent or healed); the type of the assault (e.g. abrasions on the neck and genitalia in rape strangulation); and the cause and mechanism of death (e.g. strangulation).

Bruises

A bruise or contusion is a blunt force injury that occurs when blood vessels in the skin or internal organ are ruptured. The resulting bleeding may be small (petechiae) or large (haematoma). Bruises, like abrasions, allow inferences to be drawn about the nature and shape of the object (e.g. sjambok); the time of the injury (e.g. colour changes reflect the age of the bruise); the type of the assault (e.g. bruises in the neck and genitalia in rape strangulation); and the cause and mechanism of death (e.g. severe beating by a stick). The extent to which a person bruises depends on the age (e.g. older people bruise easier than young people) and the gender of the person (e.g. women bruise easier than men) and the presence of an underlying disease (e.g. haemophilia, liver diseases, and alcoholism).

Lacerations

A laceration is a wound with irregular edges which results from the application of blunt force which causes tearing or splitting of the skin. [See pg 222, Table 9.1] Lacerations also allow inferences to be drawn about the nature and shape of the object (e.g. knobkierrie); the time of the injury (e.g. recent, healing or healed); and the cause and mechanism of death (e.g. head injury caused by beating with a stick).

Sharp force injury

Sharp force injuries are caused by cutting or stabbing the skin with sharp instruments such as knives, daggers, tins, glass, razor blades, and tools. The characteristics of sharp force injuries are described in

9.2.1

9.2.1.1



Abrasion.

9.2.1.2



Bruise.

9.2.1.3



Laceration.

9.2.2



Incised wounds.

Table 9.1 and contrasted with lacerations. Inferences from the wound examination may be drawn concerning the nature and size of the instrument causing the injury or death (e.g. knife or panga); the force used to inflict the injury (slight or considerable); the time of injury (fresh, healing or healed wound); and whether the victim attempted to defend him/herself (e.g. the presence of wounds on forearm or hands to deflect or block stabbing).

There are three types of sharp force wounds: incised wounds (cuts), penetrating incised wounds (stab wounds) and chop wounds.

9.2.2.1 Incised wounds (cuts)

An incised wound is a superficial wound in which the size of the wound on the surface is larger than the depth of the wound (e.g. wound caused by a razor blade).

9.2.2.2 Penetrating incised wounds

In a penetrating incised wound the depth of the wound is greater than the surface length of the wound (e.g. stab wound caused by a dagger).

9.2.2.3 Chop wounds



Chop wounds.

A chop wound is a wound caused by a heavy weapon or instrument which has at least one sharp cutting edge (e.g. a panga, axe, bush knife or machete). Frequently the wound has abraded margins (the wound margins may be scraped off) and this may be mistaken for a laceration. If the wound is over bone there may be a groove or cut in the underlying bone (e.g. skull).

TABLE 9.1

Sharp force wounds vs lacerated wounds	
Characteristics of sharp force wounds	Characteristics of lacerated wounds
<ul style="list-style-type: none"> Sharply outlined edges; may be straight, curved or angled depending on how the blade was used on/in body 	<ul style="list-style-type: none"> Straight, round, oval, star-shaped, etc.
<ul style="list-style-type: none"> Absence of bruise/abrasion on edge of the wound 	<ul style="list-style-type: none"> Edges may be irregular, ragged, and may have associated abrasions and bruises
<ul style="list-style-type: none"> No loss of hair around wound 	<ul style="list-style-type: none"> Hair around the wound may be absent
<ul style="list-style-type: none"> No bridging strands of tissues across the wound 	<ul style="list-style-type: none"> Tissue bridges (usually more elastic structures resistant to tearing stretching) e.g. nerves may be present
<ul style="list-style-type: none"> Usually no foreign material around/in wound 	<ul style="list-style-type: none"> Foreign material [debris] often present if injury caused by dirty instrument or surface
<ul style="list-style-type: none"> Bleeds profusely 	<ul style="list-style-type: none"> Bleeding less than in incised wounds (except for the scalp)

9.3

Complications associated with injury

Local complications

There are two main types of local complications: haemorrhage (bleeding) and infection. Haemorrhage is due to disruption of blood vessels usually associated with trauma. The bleeding may be external or internal and may occur immediately or be delayed. Bleeding from arteries is more severe than bleeding from veins. If the blood loss is significant it may lead to shock and death. [See para 9.3.2]

The injury may lead to a breakdown of the normal defence mechanism of the body and cause infection. The organisms (germs) that cause infection may be implanted into the wound at the time of injury (primary infection – e.g. a dirty knife blade) or may occur later due to organisms invading the wound after the injury (secondary infection – e.g. a contaminated wound dressing).

Systemic complications

The main systemic complications are shock, bleeding disorders and various types of embolism (e.g. blockage of a blood vessel by a blood clot, globules of fat or air bubbles). Shock and its consequences are the most important causes of death following an injury. It affects all organs but its effects are seen mainly in the brain, kidneys, liver, heart, lungs and adrenal glands. Shock refers to a state in which the blood circulation is inadequate to meet the necessary demands for nutrients (e.g. sugar) and oxygen to the tissues in the body with resultant damage of the tissues. This may lead to failure of the above-mentioned organs and death of the patient.

Bleeding disorders may result in organ disturbance as a result of bleeding into organs or the formation of clots in blood vessels with resultant blockage of blood flow. Embolism has similar effects on organ function because of blockage of blood flow.

Shock is a condition where there is a collapse in blood circulation in which the blood pressure in the arteries is so low that it fails to circulate the blood fully to the tissues.

9.3.1

COMPLICATIONS

- haemorrhage
- infection

9.3.2

SYSTEMATIC COMPLICATIONS

- shock
- bleeding disorder
- embolisms

Definition

SHOCK

A collapse in blood circulation where the blood pressure in the arteries fails to circulate the blood fully to the arteries.

Checklist for documenting and interpreting injuries²

The following checklist should be used when documenting and interpreting injuries:

Checklist

1. Treat all patients with empathy and without bias in a non-judgemental fashion.
2. Obtain informed consent (for all procedures, where necessary in writing). [See pg 86]
3. Obtain a good history of the incident and past medical history of the patient.
4. Begin with a general examination and then proceed to examine the injured area/s including injury to adjacent or underlying tissue.
5. Ensure right environment with good lighting for examination.
6. Examine clothing to correlate defects e.g. tears with underlying wounds.
7. Consider each wound individually (note the shape, the nature of the edges and the presence of foreign material).
8. Use a ruler to measure dimensions of the wound (the size, length and the width).
9. Contemporaneously record the findings in duplicate using the J88 form as a guide to which suitable annexures may be added (e.g. diagrams). [See Appendix D]
10. Separate findings of fact from opinions and conclusions in the notes.
11. Consider the mode of injury and the cause of death (if applicable).
12. Use body charts or diagrams to locate the injury.
13. Use fixed anatomical landmarks (e.g. heel of foot and not the nipple) to fix location of the injury.
14. Take photographs that include a scale and identity label in order to preserve the chain of custody and assist the court.
15. Examine the 'hidden' areas such as: the palms and soles; the armpits and inner aspects of the upper arms; the inner thighs and genital areas; the insides of mouth, lips and throat; and the eyelids, scalp and the back.
16. If no injuries apparent on initial examination, re-examine the patient in 24 hours.
17. Look for complications of injury (e.g. infection).
18. Look for signs of ageing of the wound (e.g. colour changes in bruises).
19. Exclude injuries caused by medical treatment (iatrogenic injury) (e.g. bruising of the front of the chest due to resuscitation).
20. Take appropriate specimens for special investigations (e.g. blood for alcohol determination, urine for drugs and dagga and vaginal swabs for semen evaluation).
21. Ensure proper chain of custody by providing a written record indicating that there was continuous possession of the specimen by one or more persons during the processing, and maintenance of the specimen.