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1. Learning Outcomes

After studying this module, you shall be able to know about-

- Stab Wounds, Types of stab wounds
- Characteristic features of stab wounds
- How to correlate between weapon and stab wound
- Medicolegal Importance of stab wounds
- Differentiate between suicidal, homicidal and accidental stab wounds

2. Introduction

*“Come, thick night.....that my keen knife sees not the wound it makes”... Macbeth,
Shakespeare.*

A stab wound is a type of mechanical injury where depth is of the greatest dimension than length and breadth, produced, when force is delivered along the long axis of a sharp pointed object such as knife, dagger, sword, chisel, screw driver etc.

Thus a stab wound is caused by sharp pointed object either when the instrument is driven in the body or the body is pressed against or falls against the instrument.

3. Types of Stab Wounds

A) Punctured wound:

A punctured wound typically “punctures” or terminates in flesh only. It may be due to insertion of ice pick, needles, therapeutic injections etc. Needle puncture wounds due to drug addiction will present as old scars from previous repeated punctures. In cases of death due to drug overdose or snake bite, the excised tissue, along with normal tissue around the puncture wound is to be sent for chemical analysis.

Concealed puncture wounds may be missed in homicidal cases, especially when inflicted upon base of skull near nape of neck, thereby causing injury to medulla, axilla or natural orifices like canthus of eye, ear, nostrils, vagina, rectum etc. These locations are chosen intentionally by assailant to “conceal” or “hide” the wound and hence the terminology “Concealed puncture wound”.

B) Penetrating wound:

A penetrating stab wound typically “penetrates” or enters the body cavity like chest, abdomen, skull, orbit etc without exiting from the opposite end. Hence, a penetrating wound has got an entry wound but no exit wound. The wound should be described in a sequential order as entrance wound, depth and direction of track and location of termination of the wound.

C) Perforating wound:

A perforating wound, as the name itself explains, “perforates” the body and thus has both entry wound and exit wound. The weapon enters through one surface of the body (front of the trunk) and then exits out the opposite side (back of trunk). The wound should be described in a sequential manner. In perforating wounds, the entry wound is larger than the exit wound with inverted edges. The exit wound is smaller than the entry with everted edges. Sometimes, underlying fat or part of intestine etc may also protrude out from the wound.

4. Characteristics

- A)** The equivalence of dimension: when a knife is entering the body cavity, then the length of the wound corresponds to the width of the weapon, the depth of the wound corresponds to the length of the blade, and width of the wound corresponds to the thickness of the knife.
- B)** The length of the stab wound is normally less than the width of the weapon. It is because of the fact that the severed elastic fibres in the skin tend to recoil and the actual length of the wound diminishes. To predict the corrected width of the weapon, the edges of the wound should be brought together and measured.

- C) However, deliberate rocking of the blade during withdrawal from the body may tend to elongate the length of the stab wound than the breadth.
- D) Margins of the wound: The margins of the wound may be either clean cut, when the weapon has sharp edges as in knife or margins may be contused if weapons with rounded edges like cricket stump, ice pick, screw driver etc are used.
- E) The entry wound may also have the patterned abrasion of the hilt surrounding the injury. This is produced when the weapon having a hilt is thrust with force along the whole length of the weapon.
- F) The depth of the wound is the greatest dimension. Assessing the depth of the injury is important medico-legally. However, in a living patient, the wound should never be probed to assess the depth. It may produce false tracks or may dislodge any clot leading to fatal hemorrhage or may cause further injuries. Whenever depth is to be measured, it has to be done in operation theatre, when the wound is being repaired. The depth of the wound is usually equal to or less than the length of the blade. But on yielding surfaces, like the anterior abdominal wall, the depth of the wound may be greater because the force of the thrust may press the tissues underneath. In young persons, the chest is mobile and thus may be compressed during stabbing. However expansion and contraction of the chest while breathing has to be considered.
- G) The viscera of the dead body are not in the same position as the living. During the fright, fight or flight, the victim may be moving or changing position. When the abdomen is tensed, then the distance between the abdominal wall and the spine is reduced and when same body is on autopsy table, abdomen is relaxed and distance increases. Similar sequence of events happens with other visceral organs as well. Thus in a stab wound, the postmortem depth of wound is greater than the antemortem wound. If the stab injury is at the back of chest, then the depth of the wound will be less as the lungs will collapse posteriorly.

Thus, the depth of the stab wound depends on:

i) Condition of the knife: The sharpness of the tip of knife is of more extreme importance rather than the cutting edge condition of the knife. As a sharp pointed tip will perforate with more ease. A blunt pointed instrument will take more effort to penetrate.

ii) The resistance offered by the tissues or organs: The skin and muscle is not much resistant to knife penetration. Uncalcified cartilage usually gets penetrated easily by sharp knife and more force is required.

iii) Clothing: Multiple layers of clothing like thick leather jacket, coats etc will require greater force for stab injury.

iv) Greater the speed of the thrusting knife, deeper is the penetration power.

v) When the knife strikes at a right angle over a stretched skin, then the depth is greater.

Over the autopsy table, depth is measured by inserting a pliable tube gently into the track and if it goes easily, the true track will be revealed. Tissue dissection is carried out parallel to and away from the wound to reveal the track. Radio-opaque material or dyes can be injected into the stab wound to demonstrate the wound of the track by X-rays.

H) Shape of the wound: The shape and size of the stab wound depends upon the type of implement, cutting surface, sharpness, width and shape of the weapon. Also on the body region being stabbed, depth of insertion, angle of withdrawal, direction of thrust, movement of the blade, cleavage direction, movement of the person stabbed and the condition of tension and relaxation of the skin. **Cleavage lines of Langer** are the lines within the skin, along which the dense framework of intimately intermingled dermal collagen and elastic fibres are arranged.

They are arranged in parallel rows and are same in all persons. In the extremities they run longitudinally and in the neck circumferentially. The stab wounds which runs across the Lines, gapes more and a stab wound which lies parallel to it, produces an oval cut. The shape of weapon influences the shape of stab wound immensely and helps in identifying the weapon of offence. It is further elaborated here as:

- i. **A single edged weapon** produces a wedge shaped or triangular shaped wound. The angle caused by the sharp edge is acute and the one caused by the blunt edge is rounded or squared off, and forms the base of the wedge shape. Sometimes, the blunt edge produces a split such that the wound appears like the tail of a fish and is called as **fishtailing** of the wound.
- ii. **Double edged weapon** produces elliptical shaped or spindle shaped injury. Sometimes, a single edged weapon may produce spindle shaped injury. This happens if length of knife near the tip was double-edged and the skin was too elastic. The angle corresponding to the blunt edge reflects the shape of initial few centimeters. If the weapon is thrustured with considerable force, then the skin will “let in” without much change of shape. If the weapon penetrates at an oblique angle, the blunt edge doesn’t impart any shape at all as it doesn’t contact.
- iii. **A single or double edged weapon may produce a wound with both ends blunt-** if the weapon is thrustured upto the level of ricasso (the short and unsharpened section of the blade in between the cutting blade and the guard). In such confusing cases, the serosal planes and the underlying structures cut should be examined properly to opine regarding the weapon involved.
- iv. **A rounded object with a pointed tip** e.g., a spear or ice pick produces a circular wound.

- v. A **round object with blunt tip** as in cricket stump, ball point, pointed stick etc, produces a circular wound with contused, inverted and ragged margins. The more blunt the tip, the coarser or stellate shape the injury will be.
- vi. A **pointed square weapon** like screw driver produces a cross shaped injury, each of four edges producing its own cut.
- vii. In a **thick and relatively blunt weapon**, like bayonet, the penetrating wound may be associated with laceration.
- viii. A stabbing followed by rocking, twisting or movement of the victim may change the initial shape of the wound into a “L” or “V” shape where, one limb will correspond to the weapon and the other limb, an extension of it.
- ix. If a knife has **serrated edge**, they produce ragged margins.

I) Direction of the wound: If the weapon is penetrated at an angle, the margins are beveled on one side and undermined on other side. If the weapon is withdrawn and thrust again, two or more punctures may be seen in soft parts. In solid organs, the track made by weapon is seen in better manner. The principal direction of the wound should be noted at first. In a penetrating wound, the entrance wound should be described first, followed by the depth, direction of wound and specific termination. While describing a perforating wound, the description should be complete till the exit wound.

5. Complications

1. The patient may die of hemorrhagic shock as internal hemorrhage may be marked due to involvement of vital organs; though there may not be marked external hemorrhage.
2. Air embolism may occur due to involvement of neck vessels. Air may be sucked into the vessels due to negative pressure.
3. Infection may set in due to lodgment of foreign body.
4. Asphyxia due to inhalation of blood.
5. Pneumothorax.

6. Medico- Legal Importance

1. The shape of the wound indicates the class and type of the weapon involved. The doctor should also examine the weapon of offence, if recovered, and should record the length, width and thickness of weapon, whether single edged or double edged, the degree of taper from hilt to tip, the nature of the back edge of the single edged, whether serrated or clean or squared off, the shape of the hilt guard, whether any grooving or serration or forking of the blade. This information helps in corroborating the weapon with the injury found over the body.
2. The depth of the wound indicates the force of penetration.
3. The age of injury is determined.
4. Direction and dimensions of the wound indicates the relative position of the assailant.
5. Manner of the injury is determined from the position, direction and number of wounds.

6. **Harakiri [syn Sepukku, “cutting the belly”]** is an unusual form of suicidal stab wound by a short sword. In this, the victim inflicts a single large wound on the abdomen with a short sword while in a sitting position or falls forward upon a ceremonial sword and pulls out the intestines. The sudden evisceration of the internal organs causes a sudden decrease in the intra-abdominal pressure and cardiac return, producing sudden cardiac collapse and death.
7. **Overkill homicide:** Assailant continues stabbing beyond the victim’s death. Postmortem stab wounds will not show any bruising and are often yellow or tan due to absence of tissue perfusion and are sharply defined.
8. Accidental stab wounds are rare but may be seen on accidental fall from height on projecting objects or in animal attacks, by the horn of the bull etc.

Difference between Suicidal/Homicidal/Accidental Stab Wounds

FEATURE	SUICIDAL WOUND	HOMICIDAL WOUND	ACCIDENTAL WOUND
Cause	Self-inflicted	Inflicted by other	Falling on sharp objects
Position	Accessible areas	Generally on vital parts and can be anywhere	Can be anywhere.
Grouping	Uniform in parallel lines with hesitation cuts	No definite grouping	Most of the time single large wound.
Direction	Left to right in right handed person and vice versa.	Any direction.	Generally straight inside.
Severity	Mostly superficial	Usually very deep and severe.	Variable.
Defense wounds	Absent	Present	Absent.

Secondary injuries	Absent	Present	May be associated with fall.
Weapon	Found by the side of the body	May not be present by the side.	Present.
Clothes	Not damaged	Damaged	Damaged
Scene of crime	Usually in a closed isolated room with no disturbance of surrounding household goods	Disturbed and disorganised surrounding with signs of struggle.	Varies with nature of accident.
Motive	Present eg. domestic violence, disappointment, worries etc.	Robbery, revenge, sexual offences etc.	Absent.

7. Summary

- A stab wound is a type of mechanical injury produced by sharp pointed object where depth is of the greatest dimension than length and breadth, produced, when force is delivered along the long axis of a sharp pointed object such as knife, dagger, sword, chisel, screw driver etc.
- When a knife is entering the body cavity, then the length of the wound corresponds to the width of the weapon, the depth of the wound corresponds to the length of the blade, and width of the wound corresponds to the thickness of the knife.
- There are 3 types of stab wounds i.e. punctured, penetrating and perforating.
- Direction and dimensions of the wound indicates the relative position of the assailant.
- The depth of the wound is the greatest dimension and is usually equal to or less than the length of the blade.
- Harakiri is an unusual form of suicidal stab wound of abdomen by a short sword.
- Manner of death can be commented by thorough and meticulous examination of the wound.