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RESEARCH ARTICLE

MUSCLE OR MUZZLE? A MUDDLED MURDER: BLUNT TRAUMA SIMULATING FIREARM

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Abstract

Weapon acquires a peculiar importance as it is not only a proof of offence occurred but also links the perpetrator to the crime. However, it often become difficult to identify the type of weapon causing the injury as various different type of injuries may simulate each other.Here we present one such unusual case of a blunt trauma penetrating wound simulating a firearm wound taking into consideration the physical process that takes place during the injury sustained.Here we will discuss the process of injury sustained due to blunt force is in accordance with the tissue-force interaction of firearm wound. The injury sustained over the tissue does not depend upon the type of weapon but on the tissue-force interaction that includes type of tissue, plasticity of tissue, dynamics of point of contact of weapon, force generated by the weapon and energy produced during the tissue-force interaction.

Introduction:-

Injury, defined as any harm, whatever illegally caused to any person in body, mind, reputation or property under Section 44, I.P.C. in our law has always raised perplexing questions for investigators and forensic experts with regards to their type, nature, manner and weapon used etc. Weapon acquires a peculiar importance as it is not only a proof of offence occurred but also links the perpetrator to the crime. However, it often become difficult to identify the type of weapon causing the injury as various different type of injuries may simulate each other.Simulated injuries are also known to result from post-mortem artefact like activity of infesting insects as well as from decomposition and other environmental factors. Surgical intervention and medical therapy are other recognized source of injury modulation.Moreover,sometimes shape, density of material of weapon and amount of force applied may produce such wounds even with blunt object so that, injuries may mimic as caused by the sharp force. Hence, identification of weapon of offence is of utmost importance.

The application of force to the head may result in injury either to the contents of the skull i.e., the brain alone or accompanied by the injury to the calvaria as fracture of the skull. The extent of injuryin terms of area affected in an injury to the skull and its contents is not necessarily proportional to the amount of force applied because multiple factors like shape and weight of the offending weapon, surface area of part of the body that comes into contact with the weapon and underlying structures of the area affected. Therefore, all type of craniocerebral injury can be caused by any kind of force. Here we present one such unusual case of a blunt trauma penetrating wound simulating a firearm wound taking into consideration the physical process that takes place during the injury sustained.

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Case Report

A dead body of a 45-year-old male was received in mortuary of an apex tertiary care centre in Haryana for post mortem examination with history of multiple blunt injuries over the head and a stitched wound over the left frontal region of scalp(Fig. 1). As per history, the deceased was in the market and some people attacked him. The legally authorised representative alleged that the accused used firearm weapon.The cause of death provided by the per the police was "ladayijhagde me chotlagnesey".Now all the reliability was on the autopsy surgeon to relate the type of injury with the weapon used in assault. Radiographic examination of the body was done and no metallic object was detected in the body. On external examination of body, multiple bluish contusions were present over the scalp and a stitched wound of length 1 cm was present over the left frontal region of scalp. On opening of stitches, it was a through and through bone deep defect in the scalp of size 0.5 x 0.5 cm with blackish discolouration was present at its margins. The surrounding area of the overlying scalp was ecchymosed(Fig. 2). On reflection of scalp layers, a circular bone defect of diameter 0.8 cm was present over the left side of frontal bone of skull with very fine margins and no radiation fractures were emerging from it. Brain matter was visible through the bony defect. (Fig. 3). On opening of skull vault, the inner table of the skull bone was bevelled around the bony defect which was defining the magnitude of momentum and kinetic energy dissipated to the area affected(Fig. 4). The defect was also found in the corresponding dura and brain matter was protruding out from it. On further exploration of brain, no track was found into the brain matter and a chip of bone was found impinged into the brain matter(Fig. 5). However, the negative findings in the case were so perspicuous that we couldn't refrain ourselves to designate the weapon of offence as blunt(Fig. 6). The weapon of offence was a metallic jack rod made up of highly dense alloy.

Discussion:-

The size, shape and configuration of the wounds are influenced by a number of endogenous and exogenous factors as: a) The site of injury and the plane in which the weapon struck the target. b) Whether the weapon is single-edged or double-edged, c) the type of weapon used etc. There is no denying the fact that the site of the wound in relation to tissue planes may have a modifying effect on its pattern.[3]. Blunt object is an object that has a wide, dull or convex surface with rounded edges or corners; does not possess any pointed or sharp edges and injuries sustained by themare called as blunt force injuries due to different possible mechanism: moving blunt object impacting against a resting body and moving body impacting against a resting blunt object or moving body and a moving blunt object collide (4).

There is significant correlation between the type of weapon used in an offence and the injury sustained. However, weapon-tissue interaction is a dynamic process and the type of injury sustained depends on the resiliency of tissue during and after the impact. Sometimes injuries sustained may simulates different types of weapons. Let's take an example of bevelling, it is usually seen in the cases of penetration injuries of skull sustained after impact of a bullet. As the bullet enters, it creates a round to oval sharp-edged hole in the outer table of the skull, with a large, bevelled-out hole on the inner table (5). Bevelling, however does not pertain to the firearm wound only it can also result after a blunt force impact. The momentum of offending object at the time of impact, density of bone tissue and perpendicularity of the force are the precipitating factors that causes bevelling.A pattern of injury is a combination or distribution of external or internal injuries that suggest a causative mechanism or sequence of events, indicating infliction of wounds over a period of time versus those occurring simultaneously.Although injuries by different types of weapons may mimic each other but a meticulous examination and skeptical eye of forensic expert can resolve most of the doubt. In our case, penetrating injury was found caused by the blunt force. Now discussing about the bullet-skull interaction. The degree of tissue disruption caused by a projectile is related to the cavitation the projectile creates as it passes through tissue. A bullet with sufficient energy will have a cavitation effect in addition to the penetrating track injury. As the bullet passes through the tissue, initially crushing then lacerating, the space left forms a cavity; this is called the permanent cavity. Higher-velocity bullets create a pressure wave that forces the tissues away, creating not only a permanent cavity the size of the caliber of the bullet but a temporary cavity or secondary cavity, which is often many times larger than the bullet itself. The temporary cavity is the radial stretching of tissue around the bullet's wound track, which momentarily leaves an empty space caused by high pressures surrounding the projectile that accelerate material away from its path.

When skull receives a focal impact, there is momentary distortion of the shape of the cranium. The area under the point of impact bends inwards and as the contents of the skull are virtually incompressible, there must consequently be a compensatory bulging of other areas, the well-known 'struck hoop' concept. When the focal impact is severe, the depressed fracture may follow the actual shape of the offending object, such as a hammer head. The shape may follow only that part of the object that drives into the skull; for example, the circular head of the hammer may strike

at an acute angle, so only a part of the circumference of the weapon may operate and produce a corresponding punch in the bone.

In a study conducted by J. A. Prahlow that Lesions that simulate gunshot wounds, they have presented various defects which might be misinterpreted as gunshot wounds. In two of the presented cases, there was no question as to the origin of the defects, however, given the proper circumstances, each of these types of injuries might be confused with gunshot wounds. In the remaining cases presented, the defects were initially thought to represent gunshot wounds. Only after investigation, clinical correlation, and close examination of the wounds did the true nature of each defect come to light.(6)

In the case reported by the authors, the process of injury sustained due to blunt force is in accordance with the tissue-force interaction of firearm wound.

Conclusion:-

The injury sustained over the tissue does not depend upon the type of weapon but on the tissue-force interaction that includes type of tissue, plasticity of tissue, dynamics of point of contact of weapon, force generated by the weapon and energy produced during the tissue-force interaction. Any type of injury may be sustained from any type of force and vice versa therefore, the injuries can simulate one another.

Figures:

Figure 1:-

Figure 2:-

Figure 3:-

Figure 4:-

Figure 5:-

Figure 6:-

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