

Pattern and Nature of Fatal Blunt Force Homicidal Injuries and Its Correlation with the Weapon

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Abstract

Blunt force trauma or blunt injury is a Physical / Mechanical injury which is non- penetrating or penetrating in nature characteristic of a weapon / instrument / object which is not sharp. The word denotes the nature of object producing the injury rather than the type of injury. Injuries produced by blunt trauma include abrasions, contusions, lacerations or bone fractures. The pattern and nature of the injury is influenced by the force transmitted, weight of object / weapon and nature of the surface of blunt object. The study evaluates the fatal blunt injuries over a period of six years (2006-2011) and correlates the pattern, nature and configuration of injury with the alleged weapon / object used to inflicting it.

Key words –Blunt force injuries -Homicide

Introduction

The hemodynamics of force transmitted during forceful blunt contact is the transfer of kinetic energy or potential energy of moving object or body resulting in mechanical injury¹. The kinetic energy ($1/2 mv^2$) is directly proportional to the mass of the object and velocity of contact. The nature of the tissue, its composition or plasticity has also an influence on the nature of injury. The nature of the surface of the object also has an influence on the external injury. The nature of blunt injury inflicted by a plastic instrument or an instrument which breaks on impact may also be different from that produced by a rigid instrument. When a moving object comes to rest by contact with human body, the entire kinetic energy of the moving object is transmitted on to the body resulting in injury, however in a glancing blow or impact only the kinetic energy corresponding to the decrease in velocity is discharged to the tissues². Factors which prolong the time of transmission of the energy will also reduce the destructive effect of the impact / blow. The skin being elastic and fat content of subcutaneous tissue being pliable, blunt injuries inflicted over these areas has a compressive effect resulting in rupture of smaller blood vessels. The crushing effect resulting in a contusion or undue stretching may result in a stretch rupture of deeper soft tissues like muscle. Even though

a definite quantification of blunt force applied cannot be measured evaluation of type and nature of injuries sustained to deeper soft tissues and bones help in an approximate evaluation of blunt force transmitted³.

Aims and Objectives

1. Evaluation of pattern and nature of blunt force injuries and correlation of injuries with weapon used for infliction.
2. Evaluation of probable nature of weapon by examination of blunt injury during medicolegal autopsy.

Materials and Method

Retrospective evaluation of death by blunt force injuries by perusal of notes prepared during medicolegal autopsy in the Department of Forensic medicine Govt. medical college Kozhikode.

The pattern and nature of fatal blunt force injuries is evaluated and correlated with the nature of weapon shown by the investigating officer during the course of investigation. The study is conducted over a period 2006-2011. Approval of research project obtained from Institutional Ethics committee of Govt. Medical college Kozhikode.

Inclusion criteria

All medicolegal autopsy cases of murder by blunt force in which the weapon of offence has been identified beyond reasonable doubt during the crime investigation and submitted before the doctor who had conducted the postmortem examination .

Exclusion criteria

Decomposed dead bodies has been exempted from the study

Observation

Evaluated 11 deaths conducted in the year 2011. Abrasions were seen in 4 cases and all of them were associated with underlying contusion. Out of the 11 cases, 9 deaths were due to blunt head injury. Contusions were seen in 6 of the deaths due to head injury with abraded contusions in 4 cases. 5 cases of head injury was having laceration of scalp and all of them were having underlying contusion. One case of injury inflicted by a laterite stone had abrasion, contusion and laceration of scalp. 8 cases of fatal head injury had fracture of skull out of which one was suture diastasis. Cerebral contusions were seen underneath the fracture in 8 cases with overlying subarachnoid haemorrhage subdural bleed in 5 of them . Death due to blunt trauma to chest in both cases was by stamping. Defence wound was seen in cases of homicide using wooden stick or iron rod / pipe except in one of the case.

Evaluation of 9 fatal injuries were conducted in the year 2010. 8 cases had died of blunt injuries sustained to the head. Abraded contusions were seen in four of the head injuries. In four cases, there were scalp contusion with overlying split laceration in three of them. Five cases having laceration of scalp was associated with underlying fracture. All the cases of fatal head injuries were associated with underlying fracture. Subdural and subarachnoid bleed was associated with brain contusion in six of the cases. Depressed fracture was seen in two cases where iron rod was used as weapon and in two cases and where stone was used as weapon. Defence wounds were seen only when the weapon was a linear blunt object (sticks/rods). One death was due to blunt injury to chest and abdomen resulting in fracture of rib and liver injury.

In the year 2009 ten deaths were evaluated out of which 8 were due to head injury. Abrasions were seen in four of the cases and was associated with contusion of scalp. Four cases were associated with contusion of scalp. Contusion was associated with laceration in one case with laceration of scalp in five of them. Comminuted fracture with depression was seen when stone was used as the weapon. Other cases had fissured fracture and sutural diastasis. Subarachnoid haemorrhage was seen in all cases with contusion of brain. Subdural haemorrhage was seen in four cases with contusion and subarachnoid haemorrhage. Extradural haemorrhage was associated with fracture of skull. Eventhough SAH and SDH was associated with contusion of the brain EDH was not associated with brain contusion. Comminuted fracture of skull was seen when the object used for inflicting blunt force was stone. Blunt force injury due to stamping had resulted in injuries to chest and abrasion. Defence wounds were only seen when the weapon was linear blunt weapon(sticks / rods).

In the year 2008, 11 cases of homicide by blunt force were evaluated. 10 deaths were due to head injury. 8 cases had contusion of scalp and 6 out of it had overlying abrasions. 9 cases of head injury was associated with laceration of scalp. Fractures were seen in all head injuries . Comminuted fracture and multiple fissured fractures of skull were seen when the blunt weapon was broad, heavy and hard like stone, linear fissured fracture was seen when weapon was linear blunt weapon which had also resulted in depressed fracture in one cases. 7 cases were associated with cerebral contusions and subarachnoid haemorrhage and subdural haemorrhage. Cerebral laceration was seen underneath the depressed fracture .Death had resulted from bowel rupture and peritonitis following blunt injury sustained to the abdomen. Defence wounds were seen in 7 cases of blunt injury using linear blunt weapon (stick/rod).

In the year 2007, 10 cases of homicide due to blunt force was evaluated. 5 deaths were due to head injury. Four cases were having abraded contusion of scalp. 3 cases were associated with laceration of scalp. All the death due to traumatic brain injury was associated with fracture of skull, the fracture being comminuted when stone was the weapon used. 4 cases of death due to traumatic brain injury was having brain contusion and subarachnoid haemorrhage. Laceration was seen

underneath the comminuted skull fracture in one death. Defence wounds were seen in all deaths where the weapon was linear and blunt (stick/rod). Two deaths were due to the combined effects of multiple injuries sustained, inflicted by a group of people using sticks and rods. Blunt injury to neck using linear blunt weapon resulted in delayed death due to quadriplegia. One death was due to chest injury involving lung due to stomping .

In the year 2006, 11 deaths due to blunt force injuries were evaluated out of which 7 deaths were due to head injury. Four of the deaths were associated with contusion of scalp with abrasion in 3 of them. Laceration of scalp was seen in 5 of fatal traumatic brain injury.

All the seven deaths were associated with fracture of skull out of which two had depressed fractures. Both the depressed fractures were associated with cerebral lacerations. Cerebral contusions with subarachnoid haemorrhage was seen in 3 cases with fissured fracture. Scalp lacerations were seen in both the cases where the blunt injury was inflicted with stone. All the head injury using linear blunt weapon was associated with fissured skull fracture. Defence wounds were seen in all cases of assault with stick / rod. Two deaths due to stomping had resulted in blunt injury to abdominal viscera and kicking had resulted in blunt trauma to viscera of chest and pneumothorax.

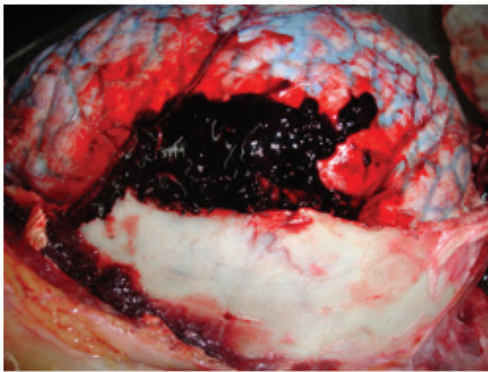


photo 1 Extra dural haemorrhage

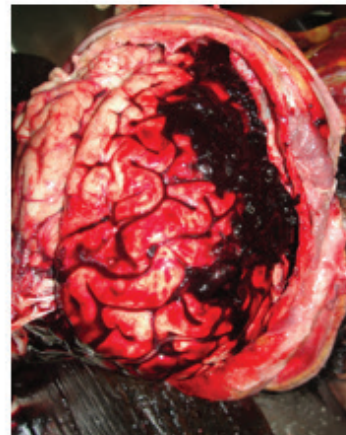


photo 2 Subdural haemorrhage

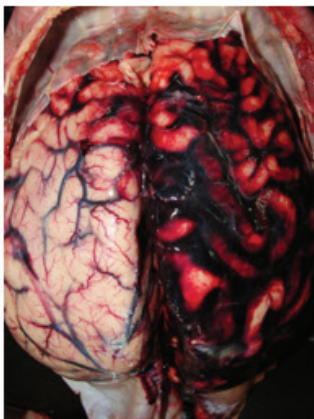


photo 3 Subarachnoid haemorrhage

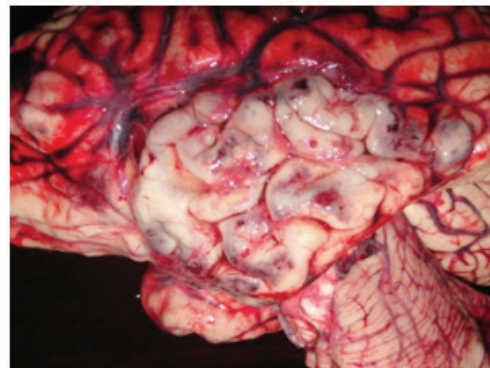


photo 4 cerebral contusion

Table : 1 – Homicide by blunt force injury

Year	No.of cases	Head injuries	Chest injuries	Abdominal injuries	Multiple injuries	Neck injury
2011	11	9	2	-	-	-
2010	9	8	1	1	-	-
2009	10	8	1	1	-	-
2008	11	10	-	1	-	-
2007	10	5	1	-	2	2
2006	11	7	1	2	1	-

Table : 2 – Evaluation of Head Injury

Year	No.of cases	Abraded contusion	Contusion	Laceration	Fractures	EDH, SAH, SDH	Brain laceration / contusion	Weapon used
2011	9	4	6	5	8	5	8	Wood stick 3 Iron rod – 2 Stone – 2 Hit wall 2
2010	8	4	4	5	8	6	8	Wood stick 1 Iron rod – 3 Stone – 2 Hit on wall - 2
2009	8	4	4	5	5	7	contusion5 Laceration-1	Wood stick – 4 Iron rod – 2 Stone – 2
2008	10	6	8	9	10	7	contusion7 Laceration- 1	Wood stick – 3 Iron rod – 3 Stone – 4
2007	5	4	1	3	5	4	Contusion-4 Laceration-1	Wood stick – 2 Iron rod – 2 Stone – 1
2006	7	3	4	5	7	6	Contusion-3 Laceration-2	Wood stick – 3 Iron rod – 2 Stone – 2

Table : 3 Other blunt injuries

Year	Chest Injury	Abdominal injury	Multiple injuries	Neck injury	Manner
2011	2	-	-	-	Stamping
2010	-	1	-	-	Stamping
2009	1	1	-	-	Stamping
2008	-	1	-	-	Stamping
2007	1	-	2	1	Stamping 3 iron rods /stick
2006	1	1+1=2	1	-	Stamping 3 iron rods /stick

Discussion

Most of the deaths in homicides due to blunt violence was due to traumatic brain injury (47 cases of TBI out of 62 homicides)⁴, the head being the most vulnerable part in blunt force trauma. Traumatic blunt injuries was inflicted using wooden stick in majority of deaths (20/62 cases), followed by iron rods / pipes (18/62 cases) and stone (13/62 cases) and blunt impact on wall in 3/62 cases. In two cases, the assailants were multiple using wooden sticks and iron pipes / rods. Majority of the deaths due to traumatic brain injury by blunt force had scalp lacerations with underlying contusions (32/62) contusions associated with abrasions were seen in 25 out of 62 cases and contusions without abrasions or lacerations were seen in 27 out of 62 cases. Blunt traumatic injuries to head with underlying fractures was seen in 46 cases out of the 47 deaths due to traumatic brain injury. Even though the blunt force delivered during assault cannot be precisely quantified, the force exerted in all cases of homicide was sufficient to fracture the skull⁵. Coup contusions were seen in majority of cases (33/47) underneath the skull fracture and the contusion was associated with Extra dural / subdural bleed / Subarachnoid haemorrhage in 35 cases. Out of the 62 homicides by blunt force one deaths was due to injuries to the neck. Stamping of neck resulted in rupture of trachea and soft tissue contusion of neck. Blunt injury inflicted to the neck with linear blunt weapon resulted

in cervical spinal cord injury. A small proportion of homicides by blunt force were injuries involving chest and abdomen (5/62 each) involving the lungs, liver and bowel and all of them were blunt force inflicted by stamping and not by weapons. They appear to have been inflicted in the lying down position of the victim. Three deaths were due to combined effects of multiple injuries inflicted including soft tissue injuries and bony fractures. They were inflicted by many assailants with blunt weapons like sticks and rods. There was no evidence of a single fatal injury but death had occurred due to the effects of multiple injuries. Following blunt trauma to the head, majority of (27/47) subjects developed coup contusion underneath the site of blunt impact associated with surrounding haemorrhage (haemorrhagic contusion extending into subarachnoid space or subdural space), possibly a compression contusion and haemorrhage from damaged blood vessels of brain parenchyma. Contra coup contusions was seen in two persons possibly a acceleration contusion due to movement of head at the time or immediately after sustaining the blunt force⁶. Contusion without haemorrhage was seen underneath the fracture in 7/47 cases, possibly due to inbending of the skull at the site of blunt injury due to the elastic nature⁷. Depressed fracture was associated with underlying dural tear and cerebral laceration. Intra cranial haemorrhage without contusion of brain parenchyma was seen in

7/47 cases which appears to be due to the sudden jerky movement of the unsupported head within the cranial cavity resulting in vascular stretch, shearing or rupture of the bridging veins.

Conclusion

Most of death due to blunt trauma / blunt force injuries in homicide is due to head injury. The excess force applied that is always more than required to cause death has almost always resulted in skull fracture and brain contusions⁸. The patients had not survived in the hospital following sustaining the injury which on evaluation retrospectively conveys the intention to kill, however the knowledge that he will die would not have been amenable for evaluation by the assailant forcing him to use excess force. Most deaths due to blunt injuries were unlikely to happen as a result of grave provocation as the weapon commonly used, a linear blunt weapon like wooden stick or iron rod suggest premeditation. A prospective study is also being attempted to observe the changes in the pattern and nature of injuries and the manner of homicide by blunt force which is a curse to the society in the name of politics, religion, and vengeance .

Ethical Clearance: Taken from institutional ethics committee Govt. medical college Calicut

Conflict of Interest : Nil

Source of Funding : Self

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