

Case Report

Significance of Contre-Coup Injury in Trauma to Brain for Concluding Manner of Death: A Case Report

U.S. Sinha^{1*}, Alok Kumar Pathak², Sanju Singh³ and Archana Kaul⁴

¹Professor, ⁴Assistant Professor, Department of Forensic Medicine, M.L.N. Medical College, Allahabad, Uttar Pradesh, India

²Assistant Professor, Department of Forensic Medicine, Era's Medical College, Lucknow, Uttar Pradesh, India

³Chief Medical Superintendent, C.R.P.F. Head Quarters, New Delhi, India

*Corresponding author email id: udaishankarsinha@gmail.com

ABSTRACT

Traumatic brain injury is defined as an alteration in the brain function, or other evidence of brain pathology, caused by an external force. Injuries to brain can be classified as those occurring due to primary damage and secondary damage. Primary damage is that occurs at the time of actual impact. There are multiple types of primary damages that may occur. These include: skull fracture-breaking of skull bone, contusion/bruise, hematoma/blood clot, laceration, and nerve damage (diffuse axonal injury). While secondary damage is the damage that occurs over time after the actual brain injury; may include infection, hypoxia (oxygen deprivation), edema (brain swelling), elevated intracranial pressure, infraction (death of brain tissue which results in loss of blood supply to that region of the brain) and hematoma (focal area of bleeding in the skull due to tearing of blood vessels). When one considers the various types of intracranial lesion produced by trauma to the head, there is one type of injury which excites much speculation as to the application in solving medico legal cases, namely, contre-coup injury a type included in closed head injury. Coup contre-coup injury describes contusions that are both at the site of the impact and on the complete opposite side of the organ. This occurs when the force impacting is not only great enough to cause a contusion at the site of impact, but also is able to move the organ and cause it to slam into the opposite side of the hard protective wall of the organ, which causes the additional contusion. It can be seen in brain, heart^[1], spleen and lungs^[2,3]. Commonly, it is seen in brain. In most head injuries - notably traffic accidents and falls-there is marked deceleration of the moving head on contact with a fixed surface, though there might still be a 'coup' lesion at the site of impact, there is often cortical damage on the opposite side of the brain-the 'contre-coup' lesion^[4]. Practical points to be considered are - there may be no coup damage at all, only contre-coup. There need be no fracture of skull, even in the presence of severe coup and contrecoup lesions. The most common site for contre-coup injury is in the frontal and temporal lobes. It is often at the tips and on the undersurface of these lobes, and may be symmetrical, if a fall on the occiput has occurred. In temporal or parietal impacts, the contre-coup lesions are on contralateral regions but exact geometrical correspondence is not necessary^[5]. Few authors opine that in absence of other injuries to head and brain contre-coup injury is most dangerous. The authors describe here a case where the understanding of coup and contre-coup injury helped in solving the case and administration of justice.

Keywords: Traumatic brain injury, Contre-coup injury, Primary and secondary brain damage, Hematoma, Fracture of skull, Abraded contusion, Traffic accident

CASE DESCRIPTION

The victim went along with his friends to some party in the night as narrated by deceased mother. The body of the deceased was found on the road with his motorcycle. The investigating officer investigated the case and the friends along with whom the deceased went; narrated

the story that the deceased met an accident and died. The investigating officer after investigation found it to be a case of road side accident, but on the request of deceased's mother a fresh investigation was started to know the manner of death as she had raised suspicion of foul play in her son's death.

The post-mortem report showed following features:

Rigor mortis present in whole body, body cooling normally, bleeding from nostrils.

Ante mortem injuries:

6×4 cm. Hematoma over frontal part of forehead and frontal bone fractured.

1×0.5 cm. Lacerated wound over left side of forehead.

4×5 cm. Abraded contusion with bruising over nose and bleeding from nose.

3×0.5 cm. Size lacerated wound over middle of chin

9×6 cm. Abraded contusion over neck anteriorly.

6×2 cm. Multiple abrasions over left knee.

4×3 cm. Size abraded contusion on left side of lower back.

3×4 cm. Size multiple abrasions over back of left knee.

Hematoma present on frontal region of brain, wt. of brain – 1950 g.

Heart empty, trachea, lungs, NAD, stomach full with undigested food, large intestine half-full, and urinary bladder empty.

Cause of death is coma as a result of extensive injury to head.

DISCUSSION

To ascertain the manner of death in the above case a team of experts under first author examined FIR report, photograph of victim (Figures 1 and 2), photograph of scene of event (Figure 3), photograph of motorcycle driven by deceased (Figures 4 and 5) and post-mortem examination report meticulously and found the manner of death to be homicidal in nature.

The various injuries to head are lacerations and bruising of scalp, fracture of skull bone, intra-cranial hematoma and bruising and lacerations of brain and meninges.

Bruising of brain and meninges is caused by a blunt injury, which can be due to either direct impact over the skull or if the head in motion is suddenly stopped, a mechanism which leads to coupe and contre-coup injury.

In this case injury no. 1, 2 and 3 reported in post-mortem



Figure 1: External injuries over face and neck



Figure 2 : Deceased photograph



Figure 3: Scene of crime



Figure 4: Vehicle of deceased



Figure 5: Vehicle of deceased

report are on front side of the face and skull with a hematoma in the frontal area and there is no mention about any bruising or hematoma in the occipital area, the area just opposite to frontal area of skull and brain. It means that the head of the deceased was not in motion as had it been in motion there should have been a contre-coup injury over temporal area^[6] or occipital area of skull and thereby bruising of occipital area of brain. Hence, it is concluded that the deceased died due to direct blows to the head and not due to accident as narrated by his friends.

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