Fatal Internal Injuries-A Case Report of Mismatch Vehicular Collision

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Abstract

Cases of mismatch motor vehicle collisions have often been noted wherein signs of external trauma are relatively little. However, internal injuries were massive. These internal injuries were much more extensive and fatal than what was being expected from the minimal external signs of trauma.

Case under mentioned is typical such example. Here external signs of trauma were minimal. Internally, however there were massive injuries which proved fatal. Whilst the significant internal injuries in this case were not surprising, given the force of the collision involved and which was followed by vehicle run over. It was indeed surprising that the external examination showed relatively little injury.

Speed of collision, mismatch proportions of vehicles involved, transmission of force through the victim's body are few key contributors. These factors play key role in generating massive internal catastrophe whilst external signs are minimal.

***Key words**:* Mismatch motor vehicle collision, Run over, Internal injuries

Introduction

In absence of significant external trauma, it is surprising to note massive internal injuries. Usually such cases involve collision of relatively large and high speed moving vehicles such as buses, trucks and small two or three wheeled vehicles (Mismatch motor vehicle collision)[1].

It is speculated that collisions between smaller vehicles and very large vehicles generate massive internal injuries. These injuries are mainly by transmission of force within body cavity. Transmission of such forces is associated with rupture of ribs and other bones. This causes extensive laceration of vital internal organs such as lungs, liver, spleen, kidneys and major blood vessels[2].

Case Report

A 24 year male was coming from petrol pump after refuelling his motor-cycle on the highway. A speeding truck hit his motor-cycle head on from which he was thrown off. The truck ran over his mid-chest and upper abdominal region. Individual suffered massive crush injury of vital internal organs and succumbed to death instantaneously. Later the body was subjected to medico-legal autopsy in the Dept. of Forensic Medicine, Institute of Medical Sciences, BHU, Varanasi.

On external examination, there were peri-orbital blackening and swelling of both eyes; right eye was more swollen compared to the left. Right eye brow on outer aspect and right ear were lacerated. Dried blood stains were present around nostrils and at the angle of mouth (Figure-1). There was extensive contusion at the back of neck and both shoulders. Confluent deep abrasions were noted on upper back and mid-waist in the back. Front side of mid chest and upper abdomen on the right side showed pressure abrasion typical of tread design of tyre imprint. Face and neck showed purple congestion (Figure-1).

Head, pelvic region and extremities were not injured severely except for minor abrasions. Left side of mid-upper chest around nipples showed three linear block-shaped pressure abrasions in succession (Figure-2). Body was not ruptured at any site quite significantly to allow avulsion of internal organs. All injuries were typically internal within closed cavity of the body.

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On internal examination, there was fracture of right clavicle at the junction of outer one-third and inner two-third, left clavicle was fractured in the middle. On both sides second to tenth ribs were fractured in front near the costal cartilages and on the back near the outer angles. Last two ribs were also fractured at the back. Right and left sided pleural cavities contained around 100ml and 70ml blood respectively. Both lungs had suffered extensive lacerations. Right lobe of liver had extensive laceration and crushing. (Figure-3). Spleen was lacerated along its long axis. (Figure-3).Both kidneys were lacerated transversely in its posterior surface (Figures- 4). Peritoneal cavity contained around 1500 ml blood. Head and extremities suffered no harm.

After considering the autopsy findings death was attributed to haemorrhagic shock due to extensive crush injury of vital internal organs.

Discussion

External findings were subtle in this case. More peri-orbital blackening and swelling of right eye compared to left was attributed obviously to small lacerated wound at outer margin of right eye-brow (Figure-1) This resulted in ecchymosis due to extravasations' of blood into subcutaneous tissue and skin of the eyelids and surrounding regions. Blood extravasations' is easy due to presence of loose subcutaneous tissue around eyelids.

Bleeding from nose in absence of skull base fracture here was mainly due to wheels of truck compressing intra-thoracic and intra-abdominal contents (Figure-1). In absence of body wall rupture the rise of pressure within body cavity and the crushing effect had ruptured vessels anastomosing in little□s area of nose. Little's area ismainly fed through the external carotid system. Similar was the cause of bleeding from the mouth. Minor right ear laceration had caused blood staining of right ear and nape of neck on the right side (Figure-1).

Purple congestion of face and neck were akin to features resembling crush asphyxia following thoraco-abdominal compression (Figure-2) Perthes who described these characteristic features is responsible for the German term for crush asphyxia-'Perthes' pressure congestion. The typical pathological features of crush asphyxia include intense purple congestion of head and neck with petechial haemorrhages of face, neck, upper chest and conjunctivae, features seen here.[3]

Upper limbs escaped crush injury probably because they were flung over head as the individual fell down his motor-cycle. Three linear block-shaped pressure abrasions in succession on left side of chest were due to bruising associated with an avulsion of subcutaneous layer from the underlying fascia and formation of a blood filled pockets ("decollement")[4].

In run over by motor vehicle, ribs are fractured symmetrically on both sides[5], seen typically in this case. Sharp edges of fractured ribs had caused extensive laceration of lungs, liver and spleen leading to accumulation of blood in pleural and peritoneal cavities.

Fracture of last two ribs at the back had lacerated the kidneys transversely in its posterior surface and also caused retro-peritoneal haemorrhage.[6]

Conclusion

In present case extensive thoraco-abdominal compression had caused significant internal injuries. However, external signs of trauma were minimal. Mismatch vehicular collision in this case was associated with serious internal injuries and death. This was mainly due to transmission of force within body cavity. This force was generated due to collision between smaller vehicle and very large vehicle. This force was transmitted with in body cavity in absence of rupture of body wall externally. Elasticity of body wall was significant contributing factor preventing its rupture. Compression grinding forces had ruptured ribs lacerating lungs, liver, spleen and kidneys. Crushing of these vital structures had resulted in spontaneous death.

This was in contrast with normal observations of extensive rupture and

crushing of body wall and internal organs in most of the road traffic accidents.

References

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Fig 1: Abrasion right eye brow, congestion of face & neck, tread design of tyre

Fig 2: Three blocks of decollement in succession

Fig 3: Rupture of Liver and Spleen

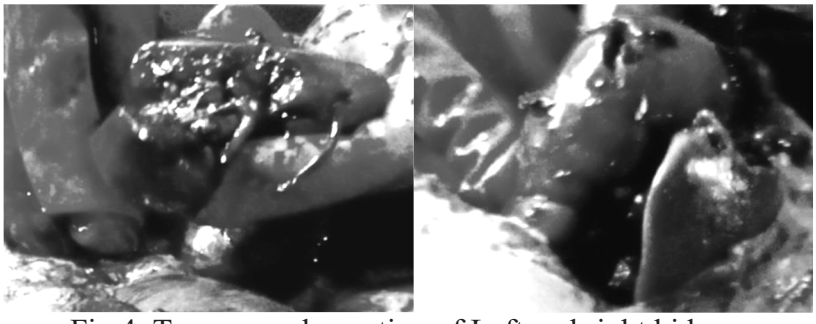

Fig 4: Transverse laceration of Left and right kidney