

CASE REPORT

STONES AS A MISSILE IN BOMB EXPLOSION: A CASE REPORT

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ABSTRACT: The most commonly employed instruments of destruction by terrorists worldwide are conventional weapons and explosives. Such attacks are occurring with increasing frequency and ferocity. The effects of bombings and blast injuries are both physically and psychologically devastating. Missile injuries on the head are mostly due to firearms. Atypical missiles may be encountered in case of shrapnel of bomb explosions but rarely because of stones. Here we report case where a stone propelled due to bomb blast and struck the head of a 40 year old female and we found traumatic intracranial stone as foreign object resulting in fatality.

KEYWORDS: stone, missile, bomb blast, terrorist.

INTRODUCTION: Bombing and blast have the potential to inflict multiple and devastating injuries to large number of victims simultaneously and without warning. Because of variety of circumstances involved in such an event like indoor or outdoor, size of the explosive charge, distance of victims from explosion, presence of secondary debris and of biological or radiological contaminants, structural collapse, each bombing event is unique.¹ Worldwide; bombings are an increasingly effective and frequent terrorism tool. Explosives are the most common cause of casualties associated with terrorism.² Biological and chemical weapons are often mentioned and are much feared as terrorist tools, but it is bombs that have actually produced the majority of injuries, deaths, and societal disruptions in the modern era.³ Atypical missiles may be encountered in case of shrapnel of bomb explosion but rarely because of stones.

CASE REPORT: A 40 year old lady sustained fatal injuries consequent to bomb explosion by unknown terrorist when she was waiting for city bus at BMTC bus stop accompanied by her husband in Bangalore city. A case was booked under 302 IPC and body was brought to department of Forensic Medicine, Victoria Hospital for post mortem examination.

External examination: Dead body was that of a female measuring 148 cm in length, wheatish complexion, moderately built and moderately nourished. Rigor mortis was confined to whole of the body. Livor mortis was present over the back of the body which was faintly visible. Dried up blood stains were present all over the head and neck of deceased.

External injuries: The following injuries were noticed on external examination of the body: -

1. Two lacerations over the left occipital region measuring 4cm×2cm, cavity deep and 4.5cm×2cm, cavity deep, 2cm apart from each other and 4.5 cm behind the left ear. The first laceration showed pressure abrasion of size 2cm*1cm over the lower margin. Multiple pieces of varying sizes of stones (pebbles) were found around-the lacerations.

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2. Multiple reddish abrasions of size varying from 0.3cm×0.5cm to 0.5×0.1cm almost circular in shape, situated over the left side of face and nose, left ear and the upper part of neck.
3. Pressure abrasions, reddish in colour, two in number measuring 5cm×1cm and 2cm×1cm, being 2 cm apart from each other situated over the right side of forehead.
4. Multiple reddish abrasions of size ranging from 0.5×0.5 to 1.5×1.5cm situated over the upper and outer aspect of the left shoulder and forearm.
5. Multiple reddish abrasions of varying shapes and size ranging from 0.3cm×0.5cm to 0.5cm×1cm situated over the dorsum of left hand over an area of 9cm×5cm.
6. Multiple reddish contused abrasions, almost circular in shape and size varying from 0.5cm×0.5cm to 0.3cm×2cm situated over the postero-lateral aspect left thigh over its lower two thirds over an area 15cm×18cm.
7. Lacerations three in number of varying size from 1 cm×0.5cm, skin deep to 3cm×2cm, muscle deep over the back of right thigh over an area 11cm×4cm.
8. One perforating wound over the outer aspect of left thigh with entry wound measuring 4cm×3cm, muscle deep with the margins abraded and exit wound measuring 2.5cm×2cm, was seen over inner and front aspect of upper thigh.

Internal injuries: On reflection of scalp, extravasation of blood was set over the left temporal and occipital regions over an area 15cm×11cm. Skull showed comminuted depressed fracture over left occipital bone over an area of 5cm×4cm. Another comminuted fracture was present in front of the earlier fracture, showing inward depression and a gap of 1.5cm×1.5cm, with the corresponding bone fractured in multiple small pieces. Fissured fracture extending from fracture no. 1, running along petrous part of temporal bone on left side to right middle cranial fossa for the length of 10.5cm—was present. Trabeculae of the fracture ends of the bones showed infiltration of blood.

The membranes (meninges) of the brain were found to be lacerated along the fracture lines. On further dissection and then opening the vault of the skull, a piece of stone measuring 1.5cm×1.5cm was found in the groove between right temporal and right frontal lobe, base of brain along with midbrain was disturbed, left cerebellum was lacerated. The tracks was directed backward and towards the left side of midline and traced back to injury no 1 and fracture no. 2 described above. Apical lobes of both lungs were collapsed. On cut section, these exuded froth mixed with blood. All the other organs were healthy. All the injuries were ante mortem in nature and fresh/recent in duration.

Opinion as to the cause of death: The death in this case—was due to shock and cranio-cerebral damage as a result of penetrating injury sustained to the head region.

DISCUSSION: A bomb is a container filled with an explosive mixture and missiles, which is fired either by detonator or a fuse. Terrorist bombs often involve only 2 to 10kg of explosives. When an explosion occurs, the explosive material produces a large volume of gas, and release a large amount of energy. Pressure of up to 1, 000 tons per sq. inch. Can be generated, a minimum pressure of about 700 kilopascals is necessary for tissue damage in humans. A person can be

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injured by an explosion in number of ways like disruptive effects, burns, air blast, flying missiles, falling masonry and fumes.⁴

Explosives cause the rapid conversion of a solid or liquid to a gas, resulting in a sudden release of energy. Explosives are categorized as either high order explosives or low order explosives. High order explosive blast injuries are categorized as primary, secondary, tertiary, and quaternary injuries and these may occur individually or in any combination. A primary blast injury is caused by the direct effect on tissue of the blast overpressure wave. Primary blast injuries affect air filled structures such as lung, ear, and hollow viscous of the gastrointestinal tract. Flying objects that strike victims cause secondary blast injuries.

Such injuries are penetrating trauma and fragmentation injuries. Tertiary blast injuries are a feature of high energy explosions only and occur when people fly through the air and strike other objects. Quaternary blast injuries encompass all other injuries caused by explosions. This include burns, crush injuries, toxic inhalation, asphyxia and exacerbation of victims underlying medical condition.⁵

The most common cause of death in blast event is secondary blast injuries, which results from the effect of projectiles.³ Projectiles may include objects that were intentionally included in the device or those that were propelled as a part of blast effect. Such object includes nails, bolts, nuts included in the blast mixture, military shrapnel, flying glass and human parts. Flying debris may injure individuals far from the blast.

Penetrating injuries are much more common than primary blast injuries and they represent the leading cause of death in blast victims, except in the case of major building collapse.² the most common types of secondary blast injuries are trauma to the head, neck, chest, abdomen and extremities in the form of penetrating and blunt trauma, fractures, amputation and soft tissue injuries. Mayo et al reported that projectiles like steel balls, nails, screws and nuts packed in increased mortality.⁶

Yavuz et al reported head injuries as the leading cause of deaths due to bomb explosion.⁷

CONCLUSION: A thorough understanding of detonation and blast dynamics is required to better correlate the injury pattern. To determine the attribution of events and type of bomb, the foreign materials removed from corpses are important. Because of the constant risk of civilian incidents and increasing risk of terrorist attack, health care providers must become familiar with the characteristics of explosives and of explosions and of nature of injuries they may inflict.

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Fig. 1: Lacerated wound present over back of left occipital region.



Fig. 1

Fig. 2: Stone measuring 1.5cm*1.5cm present in the groove between right temporal lobe and right side of frontal lobe.

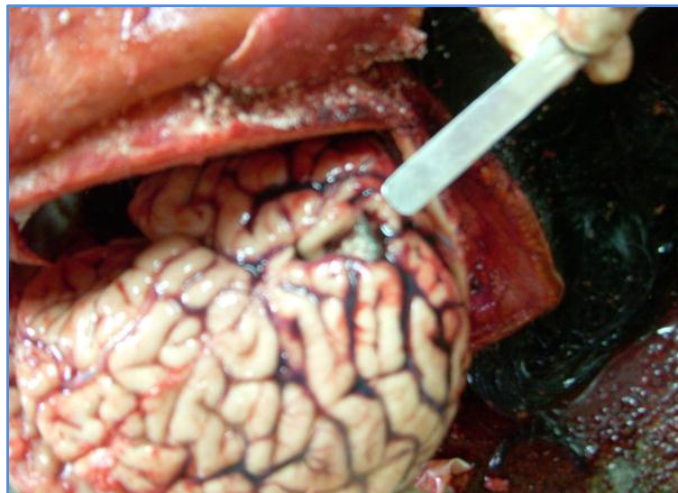


Fig. 2

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Fig. 3: Stone fragments recovered from the body of victim.



Fig. 3

Fig. 4: Showing multiple abrasions of varying in sizes present over lower two third of outer aspect and back of left thigh, nearly circular in shape, areas surrounding the abrasions shows contusion.



Fig. 4

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Fig. 5: Showing skull fractures.



Fig. 5

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