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### RESEARCH ARTICLE

#### TREACHEROUS COMFORT: A RARE CASE REPORT

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#### Abstract

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#### Introduction:-

An explosion can be visualized as a “bubble” of highly compressed air that expands until reaching equilibrium with the surrounding air. Explosive detonations create an incident blast wave, characterized by an almost instantaneous rise from atmospheric pressure to a peak overpressure.<sup>1</sup> During explosion, explosive material is converted into large gas volume and there is release of tremendous amount of energy. Pressures of 1000 tons/inch<sup>2</sup> (150,000 atm) and the temperature of 3,000°C can be generated in an explosion.

Explosion injuries can be associated with various activities like military activities or terrorist actions but also occur in civilian life in accidents related to the industrial sector, use of fireworks, blasting of pressurized containers e.g. gas cylinder etc. The associated factors of the blast can vary from poor handling of equipment to inadequate safety precautions.<sup>2</sup> Explosion injuries are subdivided into four groups depending on the cause of injury.

1. Primary injuries: Primary injuries mainly occur in gas-containing structures. The ear is the most sensitive human organ.
2. Secondary injuries: These injuries are caused by missiles which are accelerated by the blast wind.
3. Tertiary injuries: the blast wind can move and displace the entire body, frequently followed by an impact against stationary objects.
4. Quaternary injuries: Burn injuries are produced by the flash (i.e. hot explosion gases) and by secondary fires.<sup>3</sup>

Death and injury from explosives is caused by:

1. blast effects
2. impact of projectiles derived from the explosive device
3. impact from surrounding objects and debris impelled by the explosion
4. burns from hot gas and incandescent objects secondary injuries from falling masonry, beams and furnishings dislodged by the explosion.<sup>4</sup>

An exceptional case of explosion is being presented, that took place in the course of maintenance of the air conditioner (AC) outdoor unit. Exceptional in that sense as usual blast site and typical presentation of injuries as mentioned in theory.

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**Case Report:**

A 27-year-old male came in radius of blast wave generated from outdoor unit of AC compressor explosion that threw him on the ground floor followed by death. The postmortem examination was conducted in mortuary of Pt. B. D. Sharma PGIMS, Rohtak and showed the following on external examination:

1. Scalp hairs, eyebrows, eyelashes, moustaches and beard were singed. Superficial burns were present over the head, face, anterior aspect of neck, abdomen, right arm, dorsal aspect of right hand and left upper limb and patchy burn present over left side of upper back and left side of lower back. Total burnt area constituted 35 to 40 percent of total body surface area. Red lines of demarcation were present between the burnt and unburnt surface of body.
2. A lacerated wound of size 3 x 0.5 cm was present over the lateral end of left supraorbital margin situated 6 cm left to midline. The wound margins were reddish, irregular in shape and tissues bridging was evident. On dissection, underlying layers of scalp were ecchymosed.
3. A lacerated wound of size 1 x 0.5 cm was present over the left side of forehead situated 4 cm above left supraorbital margin and 7.5 cm left to midline. The wound margins were reddish, irregular in shape and tissues bridging was evident. On dissection, underlying layers of scalp were ecchymosed.
4. A lacerated wound of size 4 x 0.5 cm was present over the left fronto parietal region of scalp situated 8 cm left to midline and 9 cm above left supraorbital margin. The wound margins were reddish, irregular in shape and tissues bridging was evident. On dissection, underlying layers of scalp were ecchymosed. On further dissection and reflection of scalp layers, multiple linear fractures were present over left frontal, parietal and temporal bones of skull. Left zygomatic arch was found through and through. On opening the skull vault and removing the dura, diffuse subdural haemorrhage was present over the left cerebral hemisphere and bilateral cerebellar hemispheres of brain. Subarachnoid haemorrhage was present over the bilateral cerebral and cerebellar hemispheres of brain. On removing the brain matter and scraping the dura from base of skull, above described linear fracture was going into the base of skull involving the left anterior cranial fossa of skull over the left orbital plate of frontal bone of skull. The fractured ends of bones showed infiltration of blood in their bony trabeculae.
5. A lacerated wound of size 27 x 16 cm was present obliquely over the right shoulder situated 20 cm above right elbow joint exposing the underlying soft tissue and bones. The wound margins were reddish, irregular in shape and tissues bridging was evident. On dissection, underlying soft tissues were ecchymosed. The muscles were ecchymosed, lacerated and torn with multiple tags. On further dissection, head of right humerus bone, right scapula bone and lateral one third of right clavicle bone were found fractured and bony fragments were embedded into the soft tissues at places. The fractured ends of bones showed infiltration of blood in their bony trabeculae.
6. Multiple superficial to deep reddish abraded contusions of size varying from 1 x 0.5 cm to 2 x 1 cm were present over anterior aspect of torso of the body suggestive of stippling due to blast effect. On dissection, underlying soft tissues were found ecchymosed.
7. A reddish abraded contusion of size 2 x 1.5 cm was present obliquely over the posterior aspect of right elbow joint. On dissection, underlying soft tissues were ecchymosed.
8. A lacerated wound of size 3 x 2.5 cm was present over the dorsal aspect of right thumb involving the tip of thumb. The wound margins were reddish, irregular in shape and tissues bridging was evident. On dissection, underlying soft tissues were ecchymosed. Underlying distal phalanx of right thumb was found fractured through and through in multiple fragments. The fractured ends of bone showed infiltration of blood in its bony trabeculae.
9. A surgically stitched wound of length 7.5 cm was present horizontally over the right side of lower abdomen situated across midline and 6.5 cm above pubic symphysis. On dissection and opening of the abdominal cavity, small intestine and mesentery found contused and perforated at places. On further exploration, a yellowish metallic hollow piece pipe of length 9 cm was found struck in the loops of small intestine.
10. A lacerated wound of size 2.5 x 1.5 cm was present over the lower abdomen involving pubic symphysis. The wound margins were reddish, irregular in shape and tissues bridging was evident. On dissection, underlying soft tissues were ecchymosed.
11. Multiple abraded contusions of size varying from 0.5 x 0.5 cm to 1 x 0.5 cm were present over an area of size 5 x 3 cm over the anterior aspect of upper one third of right thigh. On dissection, underlying soft tissues were ecchymosed.
12. A lacerated wound of size 10 x 2 cm was present over the antero medial aspect of right thigh situated 11 cm above right knee joint and 34.5 cm below right anterior superior iliac spine. The wound margins were reddish, irregular in shape and tissues bridging was evident. On dissection, underlying soft tissues were ecchymosed.
13. Multiple reddish abraded contusions of size varying from 2 x 0.5 cm to 3 x 2 cm were present over an area of size 12 x 6 cm over the antero medial aspect of left thigh situated 16 cm below left anterior superior iliac

spine and 22 cm above left knee joint. On dissection, underlying and surrounding soft tissues and muscles were found ecchymosed.

14. A lacerated wound of size 11 x 5 cm was present over the antero medial aspect of left thigh involving left knee joint and situated 40 cm below left anterior superior iliac spine. The wound margins were reddish, irregular in shape and tissues bridging was evident. On dissection, underlying soft tissues were ecchymosed.
15. A lacerated wound of size 13 x 5 cm was present over the antero medial aspect of left leg situated 6 cm below left knee joint and 28 cm above left medial malleolus. The wound margins were reddish, irregular in shape and tissues bridging was evident. On dissection, underlying soft tissues were ecchymosed. On further dissection, middle one third of shaft of left tibia bone was found fractured through and through. The fractured ends of bones showed infiltration of blood in their bony trabeculae.

### Discussion:-

These type of cases of non-military blast injuries/explosion related deaths are extremely rare in nature. Common basic injury due to fragments of explosion is a triad of small lesions; bruises, abrasions and punctate lacerations intimately mixed on skin giving it a purplish colour.<sup>4</sup>Injuries by blast force, and the fragments are seen on the body. A part of a limb is blown off or a localised area of the body is mutilated. The triad of bruises, abrasions and puncture-lacerations with tattooing of part of the body is diagnostic of explosion. All the diagnostic injuries were present over the deceased in the present case.<sup>5</sup>

The person can be thrown off their feet and injured. The damage is haphazard or diffuse. The flame singes hair and causes localised superficial burns of exposed surfaces. Bodies could be X-rayed before autopsy to identify any radio-opaque objects including those from the bomb mechanism, such as small springs or contacts from the timer or detonator. As in our case the yellowish metallic hollow piece pipe was present in the loops of intestine. Explosion injuries with evidence of retained explosive material suggest sabotage.

In the present case, the deceased was an electrician. Hence, he went to check the ac compressor. The history of the case, the characteristic pattern of injuries and the metallic pipe recovered from abdomen enabled us to conclude the cause of death.

### Conclusion:-

Injuries sustained due to the shrapnel of blast injury may simulate injuries sustained due to other incidents. However, careful examination of the injuries and characteristic findings can conclude the manner of injury sustained.





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