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Case Report

Bomb Explosion Death: A Case Report

*,[1]Pawan Mittal, [2]Amandeep Kaur, [1]J.P.Soni, [1]S.K.Dhattarwal, [1]Kamal Singla, [1]Dinesh Chhillar

[1]Dept. of Forensic Medicine, Pt. B.D. Sharma Post Graduate Institute of Medical Sciences, University of Health Sciences, Rohtak-124001, Haryana, India.

[2]Dept. of Forensic Medicine, Maulana Azad Medical College, New Delhi-110002, India.

ABSTRACT

A blast injury is a complex type of physical trauma resulting from direct or indirect exposure to an explosion. Blast injuries are generally seen in war conditions and terrorist attacks but rarely seen in non military population. But now days their frequencies are increasing due to our decreased alertness and because of this alarming increases in the incidences, the autopsy surgeon should know the peculiarities of blast injuries. The interpretation of blast injuries carry great importance in understanding the patho-mechanism of these injuries which also helps in the management of blast victims. Here we present a case in which an old village lady became the victim of bomb explosion in her village. The source and intention of blast remained untraced. All the peculiarities and typical features of blast injuries were present at autopsy and an effort was made to correlate the autopsy findings with the circumstances of the case.

Keywords: Blast injury, blast lung, burns, interstitial pneumonitis, explosion.

INTRODUCTION

A blast consists of a wave of compression passing rapidly through the air or water. Injuries directly inflicted by sudden increase in air pressure after an explosion are referred to as primary blast injuries. The injuries affect primarily gas-containing structures (lungs, middle ear, and gastro-intestinal tract). Blast lung refers to severe pulmonary contusion, bleeding or swelling with damage to alveoli and blood vessels, or a combination of these.[1] This is the most common cause of death in a person who are initially survived.[2] Secondary injuries are caused by fragmentation pieces and other objects propelled by the explosion. Most casualties are caused by secondary injuries.[3] Displacement of air by the explosion creates a blast wind that can throw victims against solid objects. Injuries resulting from this type of traumatic impact are referred to as tertiary blast injuries.[4] Tertiary injuries may present as some combination of blunt and penetrating trauma, including bone fractures and coup and contre-coup injuries. Other injuries that are not included in the first three classes come under quaternary injuries. These include flash burns, crush injuries and respiratory injuries. Traumatic amputations result in immediate death, and are thus rare in survivors, and are often accompanied by significant other injuries.[3] Blast injuries are mediated by different mechanisms; victims usually suffer from a combination of primary blast effects to gas-containing organs, blunt force injuries, penetrating trauma, and burns. Blast lung injuries are more common after closed-space explosions as compared with open-space explosions with a greater degree of mortality, multiple injuries, blast lung injury, requirement of highly specialized surgery and greater wounding potential in cases of closed-space explosions.[5] Primary blast injuries in survivors are predominantly seen in confined space explosions. The characteristic injury patterns resulting from explosions have been thoroughly

* Corresponding author: Pawan Mittal
E-mail address: drmittalpawan@gmail.com

discussed in the literature. Here we represent a similar case of blast injuries that took place on outskirts of a village, with injuries showing all characteristics typical of a blast, the victim being an old lady.

CASE PRESENTATION

The case relates to an old aged female who was brought to the dep't of accident and emergency, Pt. B.D. Sharma PGIMS, Rohtak, Haryana (India) with alleged history of blast injury. The source of blast was nonspecific and described to be a glass bottle containing some liquid. The deceased had gone to an open place in village to fetch dry cow/buffalo dung cakes (source of fuel for cooking food in villages). While she was collecting them, she touched the bottle and the explosion occurred; as told by her young nephew who was with her when the blast occurred. Being some distance away from the explosion, he survived with minor abrasions and burns. The old lady was immediately brought to the hospital. At presentation, she was having neurological deficit with a Glassgow Coma Scale score of 9/15 ($E_4V_1M_4$), non recordable BP, pulse rate of 120/minute, decreased bilateral air entry in both lungs. Multiple injuries were noted over the face, neck, chest, abdomen and limbs in the form of abrasions, contusions and puncture lacerations. She was immediately tracheostomised along with right sided intercostal drainage tube insertion and endotracheal intubation was done. CECT neck, thorax and abdomen showed few specks of metallic hyperdensities in upper thorax and abdomen and right sided pneumothorax with pneumomediastinum extending into the neck. Ground glass haziness in bilateral perihilar lung fields was seen suggestive of acute respiratory distress syndrome. Fracture manubrium sternii was seen. NCCT head revealed no pathology. The lady was managed with intravenous fluids, oxygen inhalation through T-vent, daily antiseptic dressing and blood transfusion was done as required. Patient's condition deteriorated despite all efforts and she succumbed to her condition and expired after a week. The body was brought for autopsy to the Department of Forensic Medicine, Pt. B.D. Sharma PGIMS, Rohtak. The following observations were made at autopsy:

EXTERNAL EXAMINATION

The length of the body was 160 cm, wearing underwear only. Surgical dressings were present over the areas of burns and other injuries. Scalp was shaved off. Rigor mortis had passed off. Postmortem staining was present over back except over pressure areas and was fixed. Tracheostomy wound was present over front of neck. Venesection wounds were present over the right elbow and left ankle. A stitch wound was present over right chest wall lateral aspect (surgical intercostal drainage wound).

INJURIES

- Multiple blackish scabbed pinpoint to pinhead size abrasions with stippling effects and contused margins (figure 1) were present over front of face, neck, chest, upper abdominal wall, front of both upper limbs, medial aspect of right thigh, both knees and dorsal distal aspects of both feet including toes.
- Multiple lacerated wounds of punctuate size to as large as 20 cm × 12 cm were present over right lateral and front of chest. They were muscle deep, irregular in shape with partially charred margins with areas of foul smelling unhealthy granulation tissue (fig. 1,2). Multiple pinpoint to pinhead size grayish firm to hard particles/granules were found embedded in the lacerations and muscles of anterior chest wall, chiefly on the left side. Manubrium sternii was fractured (fig. 3).
- Traumatic amputation of left hand was present (fig. 4). The margins were ragged with charred tissues at places exposing lower shaft regions of radius and ulna, along with evidence of adherent purulent material. The skin and subcutaneous tissues of palmar aspect of the right hand were whitish, thickened with marked disruption of contour with necrosis and areas of skin splitting at places (fig. 5).
- Superficial to deep burns were present over face, front and sides of chest, both upper and lower limbs. The burns were patchy in distribution in most of the regions. Areas of unhealthy granulation tissue covered with purulent material were appreciable over areas of burns at places. A few fluid filled blisters were present over lower limbs chiefly (fig. 6).
- No injury was noticed over the dorsum of body that suggested the unidirectional nature of the explosion. The direction of the blast wave in front of the body in the present case was justified by pattern of injuries. The source of explosive is a query till date, so is the motive. The relatives of deceased denied of any personal enmity in village.

INTERNAL EXAMINATION

Dura was tense and stretched. Brain was bulging with CSF coming out under great pressure (diffuse cerebral edema). The chest wall was showing pleural ecchmosis in left fifth to seventh intercostal spaces. Each pleural cavity contained 200 ml of blood tinged straw coloured fluid. Left lung was haemorrhagic with contusions chiefly towards the base (fig. 7). Areas of consolidation with gritty feel could be appreciated at places.

Forensic Science Laboratory confirmed the chemical nature of the explosive in the granules as nitroglycerine. The histopathology report revealed congestion with edema in brain, both coronaries showed complicated atherosclerosis along with calcification and mild stenosis, lungs showed congestion and edema with changes of interstitial pneumonitis. Liver, spleen and kidneys showed congestion. The areas of skin around the foreign particles showed necrosis involving epidermis, dermis and subcutaneous tissue.

DISCUSSION

Injury from blast is becoming more common in the non-civilian population. This has been considered primarily a result of an increase in politically motivated bombings within this sector. Explosions unrelated to terrorism though rare may also occur in the industrial setting and scrape yards where these blasts occur when ragpickers try to extractmetal from old unused discarded fire arms.[6] The principle mechanism behind the blast injuries is the creation of tremendous kinetic energy over a short period of time. One of the characteristic features of bomb blast is 'body stippling' with the injury triad of bruising, abrasions and lacerations. These injuries are produced by impaction of the body by tiny explosive fragments and the pattern is produced by fragments of the bomb itself. Post mortem examination in these cases is primarily directed at the recovery of such debris. Stippling injuries are virtually diagnostic of the victim being in the immediate vicinity of the bomb.[7] The explosive force is highly directional. The parts of the body directly exposed to explosive force are only injured.[8] So one can predict the relative position of the explosive and the victim, at the time of explosion, by understanding the pattern of injuries. The autopsy in cases of explosion injuries help significanly in understanding the patho-mechanism that underlie their production. The investigation of explosion-related fatalities can be a substantial challenge in medico-legal casework.[9]

Fig. 1: Blast Injury triad with areas of superficial to deep burns. Tattooing/stippling is present

Fig. 2: Lacerations with burns showing areas of granulation tissue with pus

Fig. 3: Fracture manubrium sternii. Explosive granules in intercostal muscles over left side

Fig. 4: Traumatic amputation of left hand due to blast injury

Fig. 5: Marked disruption of contour of right hand with splitting and necrosis of skin

Fig. 6: Thighs showing healing injuries and burns with blisters

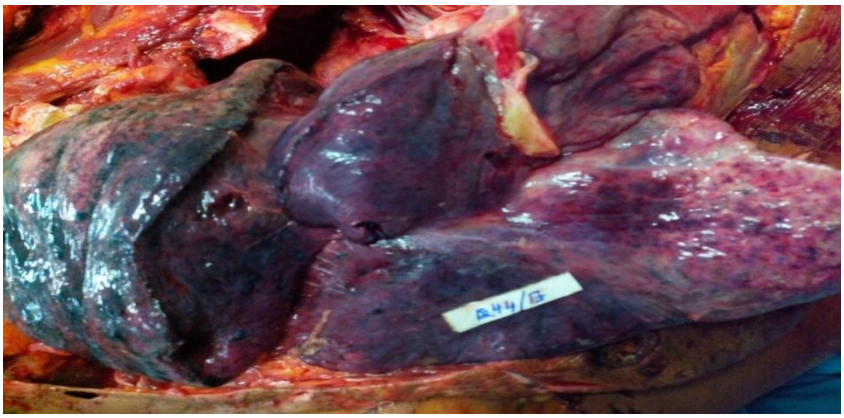

Fig. 7: Blast lung with haemorrhages and contusion over base

CONCLUSION

The present case leaves many queries unanswered like the source of explosive, the motive relating to manner of death and so on. A justifiable reply to all these is entirely dependent on the circumstantial evidences and meticulous investigation by the investigation officer. On our part it may be emphasized:

- The civilian, physicians and surgeons need to have an understanding of the patho-mechanics and physiology of blast injury and to recognize the hallmarks of severity in order to improve survivorship.
- The postmortem examination is critical to the investigation of explosives related deaths for all these purposes.
- The explosive force is highly directional.

Conflict of Interest

None declared.

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REFERENCES

[1] Sasser SM, Sattin RW, Hunt RC, Krohmer J. Blast lung injury. Prehosp Emerg Care 2006; 10: 165-72.

[2] Born CT. "Blast trauma: The fourth weapon of mass destruction". Scandinavian Journal of Surgery 2005; 94 (4): 279–85.

[3] Keyes, Daniel C. Medical response to terrorism: preparedness and clinical practice. Lippincott Williams & Wilkins 2005.201–2.

[4] Cubano MA, Lenhart MK, Banks DE, Eds. Emergency War Surgery. Chapter 1: Weapons Effects and War Wounds 2004.1–16.

[5] Avidan V, Hersch M, Armon Y. Blast lung injury: clinical manifestations, treatment, and outcome. Am J Surg 2005; 190: 927-31.

[6] Ladham S, Koehler SA, Woods P. A case of a death by explosives: the keys to a proper investigation. J Clin Forensic Med 2005; 2: 85-92.

[7] Mathiharan K, Patnaik AK, Eds. Modi's medical jurisprudence and toxicology. 23rd ed. New Delhi: Lexis Nexis Butterworths 2009.742.

[8] Reddy KSN. The essentials of forensic medicine and toxicology. 32nd ed. Hyderabad: Om Sai Graphics 2013. 229.

[9] Tsokos M, Türk EE, Madea B. Pathologic features of suicidal deaths caused by explosives. Am J Forensic Med Pathol 2003; 24: 55-63.

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