Int J Legal Med (2000) 114 : 103–106

CASE REPORT

M. A. Rothschild · H. Maxeiner

Death caused by a letter bomb

Received: 23 November 1999 / Accepted: 8 February 2000

Abstract A 48-year-old man was killed by the explosion of a letter bomb after receiving severe injuries to his face and left hand. The autopsy ascertained that the right eye and orbit had been completely destroyed by a large piece of metal from a tin can that had entered the cranial cavity through the right eye and caused fatal brain damage. The victim had also sustained a severe injury to his left hand. Reconstruction of the metal and plastic fragments showed that the victim had received a padded envelope with a video cassette in which a simple explosive device was hidden in a flat tin. The explosive charge consisted of a mixture (ca. 60 g) of sodium chlorate, sodium chloride and sucrose. The charge was detonated by a nylon cord attached to the inside of the envelope which was stretched when the video cassette was pulled out of the envelope. This removed a piece of plastic from between two contacts, and the explosion was set off immediately by a battery which activated two flash bulbs placed within the charge.

Key words Letter bomb · Explosion injuries · Assassination

Introduction

The relevant literature contains only a few reports on assassination and injuries caused by letter bombs [e.g. 1, 2, 5] but the hands and face are the most common locations of injury and the eye region is particularly vulnerable. We investigated one case of death caused by injuries sustained from the explosion of a letter bomb.

Fig. 1 X-ray of the skull showing several dense objects. The autopsy revealed that these objects were situated in the right temporal lobe of the brain and consisted of thin pieces of metal, apparently originating from a tin can

M. A. Rothschild (✉) · H. Maxeiner
Institute of Legal Medicine, Freie Universität Berlin,
Hittorfstrasse 18, 14195 Berlin, Germany
e-mail: rothschild@medizin.fu-berlin.de;
Tel.: +49-30-84451303; Fax: +49-30-84451353

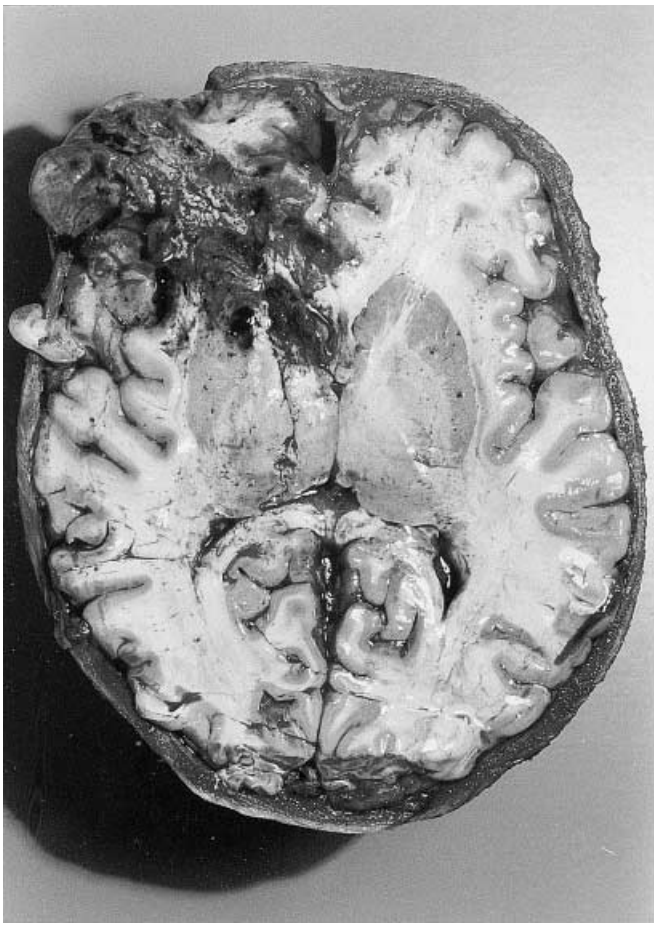

Fig. 2 Horizontal cut surface of the brain (*upper half*). Right frontal lobe with extensive destruction extending into the basal ganglia. Lacerated brain tissue containing numerous tin fragments from the explosive mechanism

Case report

The scene

A 48-year-old high-ranking public servant was found dead on the floor of his study by his companion. The corpse was stretched out in a left lateral position and a large pool of blood had formed around the head. There were many fragments of black plastic fragments as well as a number of pieces of metal and glass on the floor around the corpse. Between the corpse and the undamaged window was a torn padded envelope.

The corpse was fully dressed in a suit, the shirt and jacket showed ragged tears in the left abdominal region as well as thermic lesions interspersed with small plastic fragments. The man had deep injuries to the face as well as some superficial wounds in the abdomen and the left hand showed extensive lacerations whereby the distal phalanx of the left thumb had been ripped off. The findings at the scene indicated that an explosion had taken place and the injuries were consistent with this.

Autopsy findings

The autopsy revealed deep mid-facial lacerations interspersed with abundant punctate epidermal lesions. The left eyelid, conjunctivae and eyeball were badly torn. The nose had been torn open and the right eye with the lid and orbit had been completely destroyed. Lacerated cerebral tissue was found in the right orbit. The X-rays revealed several dense foreign bodies within the skull (Fig. 1). Dissection of the skull revealed that the right frontal bone had burst open leaving a gaping bow-shaped wound which extended from the roof of the orbit to the right temporal bone. The right anterior cranial fossa was crushed and the right frontal lobe of the brain showed extensive destruction (Fig. 2). Parts of the orbit and right eyeball were found in the brain cavity. The medullary layer of the right posterior temporal lobe contained one large and several small thin metal fragments, apparently from a tin can and multiple-layered remnants of adhesive tape were adhering to the largest piece of metal. After the removal of the brain, fractures caused by the detonation were revealed in the roof of the left orbit and extended into the sella turcica and the right wing of the sphenoid os. The left hand showed severe explosion injuries with numerous flap-like

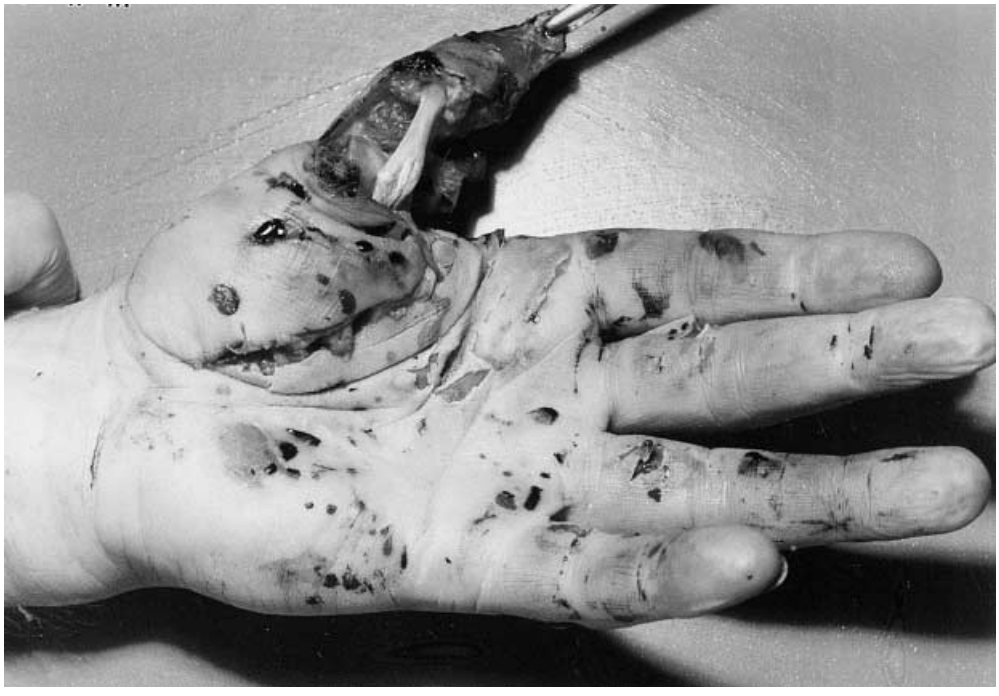

Fig. 3 Palmar surface of the left hand. Tissue lacerations of various sizes with some of the plastic fragments penetrating the soft parts. The distal phalanx of the thumb had been torn off

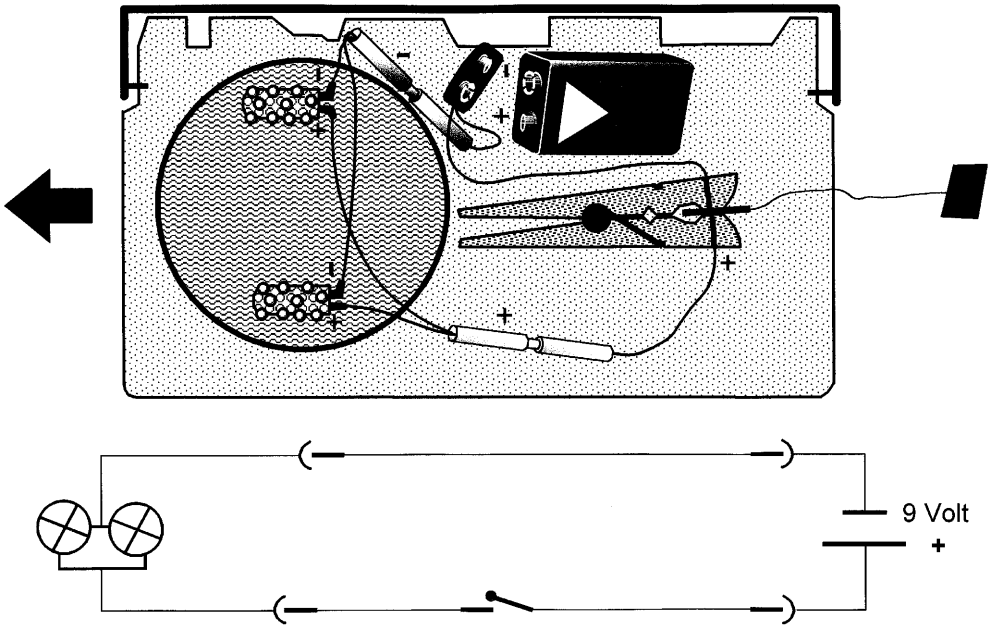

Fig. 4 Diagram of the letter bomb as reconstructed using fragments and explosion debris. A video cassette contained a tin with explosive charge and flash bulbs (*left side of picture*). The explosive mechanism comprised of a clothes peg with electric contacts insulated by a small plastic plate. The plate was connected to a nylon cord which was attached to the inside of the envelope

gashes on the flexor sides of the fingers as well as the entire palmar region (Fig. 3). There were also a number of deep lacerations between the thumb and index finger and the distal phalanx of the thumb had been completely torn off. Some of these wounds had small fragments of black plastic embedded in them. There were splashes of blood on the right hand but no injuries. The inner side of the left arm, as well as the left epi- and mesogastrium, showed numerous round or oval skin lesions, but these were all superficial.

There were no lesions to the internal organs. The blood alcohol level was found to be 0.5 g/l but other toxicological analyses were negative.

The autopsy results showed that death had been caused by a craniocerebral trauma and/or massive blood loss, caused by the explosion. Death was not instantaneous, as was evident from the considerable blood aspiration and loss of blood and the subendocardial bleeding of the left ventricle.

The bomb

Reconstruction of the metal and plastic fragments showed that the victim had received a letter bomb (Fig. 4) concealed in a video cassette placed in a padded envelope. The home-made explosive charge (ca. 60 g) consisted of a powdery mixture of sodium chlorate and sodium chloride as the oxidant and sucrose as the reducing agent. Tamping was achieved by placing the charge in a small tin sealed with adhesive tape and the thermal detonator consisted of two flash bulbs. A 9-volt block battery served as the source of energy. The charge was ignited by a nylon cord attached to the inside of the envelope which was stretched when the video cassette was pulled out of the envelope. The other end of the nylon cord had been inserted into the video cassette and was connected to a small plastic plate. This plate served as insulation between two electric contacts attached to the inner sides of a clothes peg. The stretching on the nylon cord removed this plastic plate thus closing the electric circuit. The explosion was set off immediately by the activation of the flash bulbs.

Discussion

Letter bombs usually have simple mechanisms comprised of an explosive, a detonator, a source of energy and a detonation system. The explosives are mostly home-made by combining oxidizing agents such as nitrates, chlorates, perchlorates or potassium permanganate with reducing agents such as sugar, flour, wood or coal dust [4]. However, conventional explosives such as nitroglycerine have also been used in letter bombs [5]. Unconventional explosives are usually set off by thermic detonators. In view of the large variety and home-made nature of these bombs, an accurate reconstruction and identification of the one used in any particular case is extremely important for criminal investigations, since it may provide valuable clues for the identification of the perpetrator [4].

Many powder-form explosives, like the one used in this case, cause deflagration rather than detonation. Such explosives must therefore be tamped. In our case, this was done by using a 50 ml tin sealed with adhesive tape. The pressure caused by an explosion decreases according to the distance^3 from the centre of the explosion. However, victims of letter bombs are of course always very close to the centre of the explosion, because they are almost always holding the device in their hands. Thus letter bomb explosions must be regarded as potentially lethal, although severe hand and eye injuries can also result [1, 2, 5]. The main damage caused by letter bombs is the result of a pressure wave which causes both severe eyeball injuries [1, 2, 5] and/or ruptures of the tympanic membrane. The more firmly the victim is holding the letter bomb in the hands at the time of the explosion, the more severe the hand injuries, because the act of holding causes an increase in the tamping effect[3, 5]. Since letter bombs cannot be very large or heavy, they usually contain almost no fragmentation material and therefore very rarely produce damage through flying debris. Thus the wounding effects reported in previously published cases were mainly caused by the rupture of blood vessels leading to severe blood loss. Our case differs in that the tin used for tamping was

fragmented and thus added lethal projectiles to the force of the explosion. The autopsy findings showed that the brain injury caused by the projectiles alone would have been fatal.

Our case involved extremely severe injuries to the face and left hand as well as less severe ones to the inner side of the left arm and the left side of the abdomen. The envelope was labelled with the return address of a large mail order book company. The reconstruction based on the pattern of injuries and the construction of the bomb showed that the victim had opened the envelope by opening the flaps intended for this purpose, which ensured that the device would explode. While pulling out the cassette, he was apparently looking into the opening and was holding the lower closed end of the envelope in his right hand while pulling out the video cassette with his left hand. The rim of the tin was torn off by the subsequent explosion and driven deep into the brain through the right eye, which in conjunction with the blood loss, was the cause of death.

In this case the explosion took place without delay. Sometimes, however, the senders of such bombs install warning fuses that first lead to a mini-explosion or burn, and thus give the victim time to throw away the bomb before the main explosion occurs [5].

In conclusion a letter bomb must be considered as a likely cause when faced with a scene with signs of a small explosion near persons. For further clarification and reconstruction of the events it is extremely important to immediately consult forensic pathologists and bomb experts who should perform a joint investigation. All debris and foreign material must be collected, particularly that which has entered the body of the victim, as this ensures an accurate reconstruction of the letter bomb, which is important for identifying the perpetrator.

References

1. Jamra FA, Halasa A, Salman S (1974) Letter bomb injuries: a report of three cases. J Trauma 14: 275–279
2. Jones LE, McGlynn M (1992) Rehabilitation after a letter-bomb attack causing bilateral hand loss and other injuries: case report. Disabil Rehabil 14: 152–155
3. Karger B, Zweihoff RF, DuChesne A (1999) Injuries from hand grenades in civilian settings. Int J Legal Med 112: 372–375
4. Knuth K (1994) Sprengstoffe und Sprengvorrichtungen. In: Kube E, Störzer HU, Timm KJ (eds) Kriminalistik, vol 2. Boorberg, Stuttgart, pp 71–91
5. Missliwetz J, Schneider B, Oppenheim H, Wieser I (1997) Injuries due to letter bombs. J Forensic Sci 42: 981–985

ANNOUNCEMENT

19th International Congress on Forensic Genetics
28 August–1 September 2001, Münster, Germany

Further information:
Prof. Dr. med. B. Brinkmann,
Institute of Legal Medicine,
Von-Esmarch-Strasse 62,
48149 Münster, Germany
e-mail: ISFG@uni-muenster.de
Tel.: +49-251-8355160/1
Fax: +49-251-8355158
Homepage: www.isfg2001.de.vu