J Forensic Sci, May 2004, Vol. 49, No. 3
Paper ID JFS2003024
Available online at: www.astm.org

CASE REPORT

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Suicide with a Butcher's Bolt

ABSTRACT: The captive bolt pistol is an atypical firearm exclusively produced and used for butchery of breeding animals, but in some rare cases, it has been used as a lethal weapon for committing suicide by butchers, breeders and other people who have access to such weapons during their professional activities. This study describes the suicide committed by a butcher in the province of Udine (N. Italy) in 2001 who shot himself with his own captive bolt pistol that produced in the right temporal region a circular wound and a bone lesion of the temporal squama with a groove involving the frontal lobe; he died five days later of the fatal consequences of the meningo-encephalic lesions. The medico-legal issues implicated in this case, seen in the light of the data reported in the international literature, illustrate the difficulties faced when diagnosing these types of lesions, bearing in mind their rarity and peculiar nature, and introduce elements of differential diagnosis regarding lesions produced by similar weapons that lead to ascertainment of the event as accidental, suicidal, or homicidal.

KEYWORDS: forensic science, butcher's bolt, humane killer, nailgun, studgun, captive bolt pistol, atypical firearms, penetrating cranial wound, meningo-encephalic lesions, suicide, Glasgow Coma Score

The use of the captive bolt pistol, an atypical weapon designed and sold solely for putting down breeding animals, as a suicide weapon is extremely rare, especially when compared with the data on the other methods used for committing suicide. According to the most recent statistics (1), there were 404 cases of suicide committed using a firearm in Italy in the year 2000, of a total of 3096 suicide cases, 1106 of which had been brought about by hanging, that is sadly still the most common method used, and 583 by people throwing themselves down from a height. Cases of drowning (179) and asphyxia by gas (176) were the least common.

However, the above statistics do not report the number of suicides committed using humane killers because these are too rare, despite the relative ease with which such weapons can be obtained bearing in mind that they are not subject to the restrictive legislation for carrying a firearm in Italian and European law (EC Directive of 18/6/91 n. 477), then Italian Law (n. 527 of 30/12/92 and Decree n. 635 of 30/10/96).

This is because they are available for use exclusively by breeders, butchers, and the other professional individuals involved in this kind of activity. For this very reason, because the forensic specialist is rarely likely to observe lesions produced by this tool or similar ones, it may be of interest to study the cases of death by the nailgun, studgun, bolt, and other humane killers, in order to be able to differentiate between suicide, homicide, or accidental death.

The works in the literature, in fact, concentrate on the characteristics of the lesions according to which model was used, and on the different circumstances whereby the event occurred. Many of the reports have been made by Germans, since Schönberg first described this occurrence in 1928 (2) up to the most recent German report by Betz and colleagues in 1993 (3), although other European countries have also supplied many interesting accounts observed by Italian, French and British authors (4–10).

In this case, we describe a butcher resident in the province of Udine (N. Italy) used his bolt to commit suicide. According to the statistics published in 2000 (1), Udine is one of the Italian areas most commonly affected by the suicide phenomenon, having an incidence of 12.5 per 100,000 inhabitants compared with the national figure of 6.5, while the statistics for the whole region (Friuli Venezia Giulia) yield an incidence of 13.2, the highest in Italy.

Case Report

A 40-year-old butcher was admitted during the night of 24 April 2001 to the Casualties Department of a hospital in the province of Udine with a voluminous hematoma of the right eye, subconjunctival hemorrhage with a mydriatic pupil, nonreactive to light, and a circular wound about 1 cm in diameter in the right temporal region, with slight bleeding from the homolateral ear. The patient was accompanied by his father and sister, could walk unaided, was breathing normally, lucid, cooperative and complained only of intense headache.

Cerebral CT scan without contrast medium excluded the presence of endocranial foreign bodies but showed a comminuted fracture due to "explosion," of the temporal bone, the floor and medial wall of the orbit, while some fragments had been projected as far as the median line of the cranium. There was associated subarachnoid hemorrhage at the level of the right frontal and temporal lobes.

Because of the gravity of the lesions the man was sedated, intubated and transferred to the Trieste Hospital, where his conditions

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Received 31 Jan. 2003; and in revised form 6 Sept. 2003 and 10 Jan. 2004; accepted 10 Jan. 2004; published 7 April 2004.

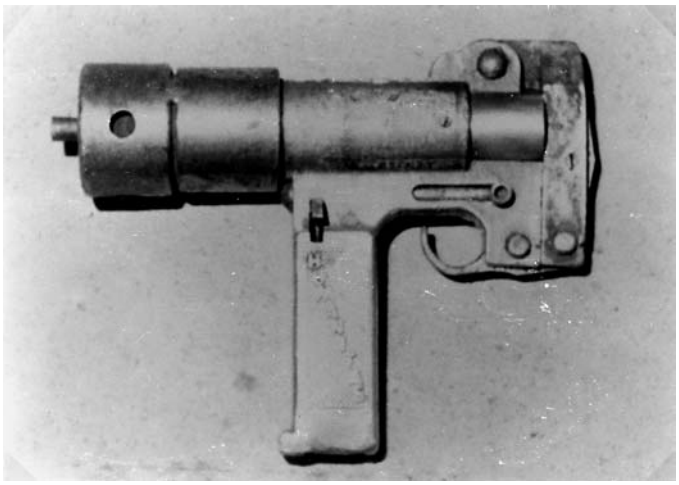

FIG. 1—*The licensed Humanitas B4005-Mac. Com. Ud. bolt, with a .22 caliber cartridge, found by the Carabinieri in the butcher's shop. Note the side holes for gas dispersal.*

FIG. 2—*The base of the skull showed a direct channel, 7 cm long, running from right to left in a slightly forward direction, virtually horizontally, involving the right orbit of the frontal bone up to the level of the crista galli ethmoidalis.*

rapidly deteriorated due to diffuse encephalic inflammation and after a few hours from admission, he went into irreversible coma (GCS = 4). He died five days later, of the fatal consequences of the meningo-encephalic lesions caused by the penetrating cranial wound.

The family reported that the man was depressed because of legal separation from his wife, who had taken the children with her, and that he regularly indulged in alcohol abuse in an attempt to find oblivion. A few hours before being admitted at the local hospital, he had tried to commit suicide using his humane killer.

During inspection of the site by the Carabinieri, a licensed bolt, caliber .22, of the model Humanitas B4005-Mac. Com. Ud., was found in the butcher's shop owned by the victim and taken away as evidence (Fig. 1). It showed the captive bolt ejected, 7–8 cm long and 10 mm in diameter; an exploded cartridge was present in the chamber and there were unexploded caliber .22 cartridges in the magazine. Apart from involvement of the right eye, that appeared to be reduced to a large blood clot due to profuse conjunctival and bulbar hemorrhage, external examination of the victim presented a big clot in the right pre-auricular site, 12 mm in diameter that once removed, showed a circular, 9 mm in diameter, with a small yellowish halo around it of abrasion type, slightly wider along the postero-inferior margin. There were no signs attributable to damage by smoke or gunpowder.

After detaching the soft tissues, autopsy showed a bone lesion involving the right temporal squama at the level of the small skin lesion described above. The bone lesion was ellipsoid, 17 × 10 mm in size, with a wider antero-posterior axis, opening out towards the inner surface and with irregular margins. There were no traces of gunpowder at the level of the bone, periosteum or channel.

On opening the cranium, clots were found in the subdural space of the right hemisphere, as well as right subarachnoid hemorrhage. The encephalon, fixed in formalin solution, presented subarachnoid fronto-temporo-parietal hemorrhage on the right side and at the level of the pons. In the right frontal area, a groove 12.5 cm long ran from right to left in a slightly forward direction, involving not only the base of the frontal lobe but also the medial half of the base of the left frontal lobe.

Sections of the right frontal area of the brain revealed small intra-parenchymal bone fragments and at the base of the skull there was a direct opening from right to left, almost horizontal, involving the right orbital plane of the frontal bone and ending at the crista galli ethmoidalis, 70 mm long (Fig. 2).

Discussion

The medico-legal issue to be solved in cases of death due to lesions like the one we describe is that of precisely identifying the instrument responsible for the fatal wound, by differentiating among firearms and other special tools, to be able to make a precise reconstruction of the dynamics of the event, and to ascertain, if possible, whether it could have occurred by accident or intent, and whether in the latter case, it was of suicidal or homicidal nature.

A review of the literature on such cases shows that homicide or manslaughter, as well as accidental death, are less frequently the cause than suicide. This can be explained by the fact that the nail-gun, one of the two variants of the humane killer (10), is gradually being abandoned as a means of putting down breeding animals because this tool, used in large animals, employed a ballistic agent and was therefore able to induce lesions from a distance. Instead, the humane killers more commonly used nowadays (11) can cause lesions only on contact or from a very short distance, less than 10 cm (3). In fact, they feature a "captive bolt" (12) consisting of a steel cylindrical rod, of variable length (at least 7–8 cm), that shoots out of the barrel when a blank cartridge is exploded and immediately retracts, after producing the lesion, due to a strong retracting spring mechanism.

Nailguns, or rather their more modern version, the studguns, are now more commonly used in the carpentry and upholstery trade. However, cases of violent death, generally accidental, have occurred even in these settings, most of the reports having been described in the American literature. These are to be attributed to the high speed of expulsion of the studs, that can reach 392 m per second, and to the inadequate safety measures adopted up until the 1960s. Although less frequent, some suicide cases have also been reported (13–15).

In our case the subject had a circular wound 9 mm in diameter in the right temporal site, with a surrounding area of asymmetrical abrasion and an ellipsoid area (17 × 10 mm) of missing bone in the corresponding right temporal area, forming an intracranial groove 7 cm long running from the right to the left lobe in a slightly forward direction up to the ethmoid bone. There was no sign of foreign bodies apart from bone fragments that had been projected against

the sagittal line: there was no bullet to be seen and only an entry wound but no exit wound.

It was therefore a lesion that could on first sight have been mistaken for a closed firearm wound from a large caliber shotgun with a single bullet, in which the bullet had apparently exploded at a distance of at least 50–60 cm and had not therefore left gunpowder, smoke, flame or gas residues.

The lesion could thus resemble the entry wound of a bullet or else a pointed instrument, as the latter can also leave atypical lesions, as in the case of the wound in the head produced by an electric drill (16).

Some peculiar features that can guide the diagnosis of a wound from a humane killer are the lack of traces of smoke or burning by gunpowder on the soft tissues or underlying bone, because in the modern versions of the humane killer, the residues are eliminated through holes running along the side of the gun barrel, unlike the older versions in which the holes ran along the top (11,12). For the same reason, the entry wound is not star shaped as it would be in the case of a bullet shot at point blank range. The only visible finding is the entry wound alone, without internal retention of a bullet, as the metal bolt is ejected from the barrel of the gun and then retracted.

In our case the wound was circular with the same diameter that the captive bolt of the humane killer examined, with no sign of gunpowder, at either the superficial or the deep layers, and featured a groove length compatible with that of the bolt range and cranio-cerebral lesions with no sign of a bullet and a closed wound. The skin and bone damage was therefore entirely compatible with that produced by a foreign body acting as a bolt, i.e., entering the skin, damaging the bone and then retracting through the wound produced. The captive bolt pistol has a smooth front plane and lateral holes to dispel the gas and gunpowder residues (hence the lack of such signs on the skin of the victim, that may at most show signs of pressure from the bolt exit hole on the front of the gun barrel). The objective and circumstantial evidence was therefore compatible with use of the butcher's Humanitas humane killer, a bolt that requires the use of special blank .22 cartridges, that violently propels a captive rod through the barrel.

This was not in itself a certain indication that the event was a suicide, as the weapon could easily have been fired against the head of the subject while he was asleep or incapable of reacting for some reason (drinking, trauma, drug effects). Such cases have been described in the literature (3) but when coupled with other observations such as the lack of signs of defense, the subject's known psychological state and the fact that the weapon was readily at hand and the butcher was an expert in its use and aware of its effects on animals, the unequivocal conclusion is that the man must have attempted suicide with his humane killer, without succeeding in bringing about immediate death.

The question as to why the man survived so long and was initially in fair condition with apparently preserved brain function, not only of motor type, can be explained by the fact that death after brain lesions produced by such instruments often occurs after several days (3,16). It can be due not only to massive destruction of the parenchyma or rupture of the deep encephalic vessels but also to infectious processes secondary to penetration of the foreign body or of skin fragments, or to bronchopneumonia and inflammation secondary to confinement to bed. According to some authors (17), it is possible to assess prognostic signs of prolonged survival, such as a Glasgow Coma Score of 7/15 or higher, the presence of isochoric pupils reactive to light stimulus and a stable systolic arterial pressure above 90 mmHg.

In our case, the man lived for five days, a very long time, but was in continual coma that gradually led to death, with cerebral edema, endocranial hypertension and secondary hemorrhage of the brain stem, as could be expected in absence of the favorable prognostic signs listed above. Autopsy of the brain showed not only the deep meningo-encephalic groove caused by penetration of the bolt into the brain, involving the entire base of the right frontal lobe and part of the left, but also severe subarachnoid hemorrhage of the right fronto-temporo-parietal area and small fragments of crushed bone thrust into the parenchyma by the action of the bolt.

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