

Multiple suicidal injuries with shotgun slugs

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Abstract Shotguns are usually used to fire multiple pellets, but they are capable of firing single projectiles. Shotgun slug injuries are rare, severe, and fully comparable to those inflicted by high-velocity projectiles. A case of gunshot suicide of a 59-year-old man with a shotgun loaded with shotgun slugs is presented. The first two shots were fired into the heart region, but did not hit the vital organs of the victim's thorax and did not cause immediate incapacitation. The man was able to reload and re-fire. The third shot was fired into the region of right temple; the last shot caused severe cerebrocranial gunshot injury and was fatal. The victim did not pull aside his clothing to expose his skin before shooting into the heart region.

Keywords Gunshot wounds · Multiple gunshot suicide · Shotgun slug

Introduction

Shotgun shells are packed with a wide scale of projectiles which range from multiple small pellets (birdshot), to fewer larger pellets (buckshot), and to single large slugs of various designs. The single shotgun slugs are predominantly used for shooting from smooth bore barrels for specific hunting purposes [1–4]. In middle and eastern Europe, shotgun

slugs are used only for hunting wild boar during a battue [3]. In some countries, slugs are used for deer and bear hunting as well [5, 6]. Law enforcement agencies are also equipped with shotgun slugs [7, 8]. The wounding effect of shotgun slugs is based predominantly on the large mass of the projectile (weight of slugs varies from 18 to 32 g). The shotgun slugs usually have a lower muzzle velocity than projectiles fired from long-barreled rifles because the maximal pressure of muzzle gases is limited by the structural design of shotgun barrels. The accuracy of shotgun slugs is reduced due to the absence of rifling in the interior part of the shotgun barrel, thus there is only slight stabilization of the projectile. The effective shooting accuracy is limited to a distance of approximately 45–50 m [4, 8]. The average dispersion of shotgun slugs at a distance of 50 m is approximately 10–30 cm. Some types of slugs can also be used in fully choked shotgun barrels. Besides extraordinary ballistic characteristics, shotgun slugs and their numerous manufacturing modifications very often have unique designs [9, 10]. The case is characterized by the use of a special single slug form for gunshot suicide. The case is also interesting due to the multiplicity of suicidal shotgun wounds and that the victim shot himself through his clothing.

Case report

A 59-year-old man shot himself in the garden of his house with a double-barreled over-and-under 16-gauge shotgun (mod. ČZ Brno Super 573) loaded with an S-BALL Plastic shotgun slug (Sellier and Bellot®, Vlašim, Czech Republic). The body of the victim was found lying on the right hip, and next to the body lay the shotgun. The closed lower chamber

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of the gun contained a spent cartridge case (67.5 mm S-BALL Plastic). Two other spent cartridge cases lay on the ground 1.5 m from the victim's legs. In the right temporal region, there was an oval entry defect 15 mm in diameter. The area around the entrance wound was characterized by a ring of contusion up to 2 mm wide (Fig. 1). An incomplete muzzle imprint (dimension 18×10 mm) of the upper barrel in the form of an oval abrasion was situated in the posterior part of the entrance wound. In the left temporal region, the exit wound was identified in the form of an irregular laceration (dimension 25×15 mm). Thus, the victim sustained point-blank penetration of the head caused by a single slug S-BALL Plastic. The projectile path was from right to left, horizontally and slightly upward. The subsequent medicolegal autopsy revealed two other tangential, non-perforating gunshot wounds to the left anterior part of the thorax. Entrance wounds were located above and below the left nipple with a diameter of 25 and 24 mm, respectively (Fig. 2). Both wounds had wide abrasion margins up to 8 mm. There were no punctate abrasions in the surrounding area (powder stippling). At the 2 o'clock position of both wounds, pear-like zones of fouling were found present extending from 3 to 5 cm. These eccentric areas of fouling indicated that contact between the barrel of the gun and the surface of the body was at an acute angle (angled contact). The trajectories of both projectiles were anterior to posterior, right to left, and slightly upward. Both



Fig. 1 The male victim with entrance wound in the right temporal region



Fig. 2 Entrance and exit wounds on the left side of the victim's chest with eccentric zones of the fouling

projectiles perforated only soft tissue of the left thoracic region without penetrating the left pleural cavity. In the left middle axillar line, two exit wounds were identified and characterized as irregular lacerated wounds, 45 and 30 mm in diameter, respectively (Fig. 2). In the posterior axillar line, a supernumerary slit-like exit wound was situated (dimension 15×10 mm), caused by a secondary projectile represented by the fragment of the plastic slug cover from the lower wound (this fragment of the plastic cover was

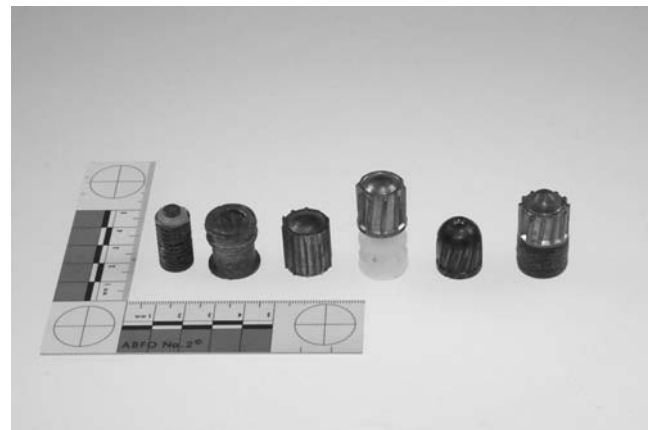


Fig. 3 The most common types of shotgun slugs, currently in use, seen as individual projectiles. From *left to right*: the core of S-BALL Plastic, Ideal slug, S-BALL, Sellier Bellot Special Slug, Foster slug, and classic Brenneke slug

found lodged in the clothing in the left posterior axillar region of the victim). On the fold between the thumb and index of the left hand, there were multiple blood spatters. On the interior part of index of the right hand was a zone of grey-blackish fouling.

The examination of the victim's clothing revealed gunshot defects to the sweater, shirt, and T-shirt, corresponding to the gunshot wounds to the left part of the trunk. Both entrance wound marks on the victim's clothing were characterized by large zones of soot. The blood and urine alcohol concentrations were zero. Other toxicological investigations of blood, urine, and vitreous fluid, applying routine methods, were negative. Following the completion of the investigation and autopsy, the death was classified as a suicide.

Discussion

The most famous type of shotgun slug is the Brenneke slug (Brenneke©, Hannover, Germany; Fig. 3), which is still in use (this type of projectile is now packed by the original manufacturer as well as by other ammunition manufacturers under license). The original Brenneke slug was developed by Wilhelm Brenneke at the end of the nineteenth century [2]. A characteristic feature of this slug is 12 slanted guide ribs and a felt wad. The center of gravity is far towards the front, just like with an arrow or a shuttlecock. The projectile is hence stabilized in flight and has great accuracy. Typical diagonal ribs on the surface of the slug do not contribute to the stability but allow for the use of choked shotgun barrels [5].

A variation on the Brenneke design is the Foster slug (Winchester©, East Alton, IL, USA; Fig. 3). Foster slug is designed with a deep cup in the back so that the center of mass is far forward. Many Foster slugs are also rifled. The forward mass of the slug helps to keep it stable until the rifling begins to provide spin. S-BALL (Sellier and Bellot©, Vlašim) and S-BALL Plastic were well-known slugs in middle and eastern Europe. The S-BALL was very similar to the Foster slug, but had a flat nose and vertical grooves. The S-BALL Plastic projectile has two basic components. The first component with great penetration capacity was its own projectile represented by a steel core. The second component was an elastic plastic jacket, which generally allows for the use of choked shotgun barrels. The bottom part of the slug simultaneously forms a wad. The front part of the slug has a stabilizing effect, as well as the cutting edge situated at the upper third of the slug.

The propulsive capacity of shotgun slugs is great and can produce massive internal injuries comparable in severity to those caused by a high-velocity rifle bullet [12–15]. The large caliber of the slug can even be increased by secondary deformation. The considerable penetration

capacity of slugs commonly results in exit wounds despite their deformation capabilities. Owing to the slug's caliber, great weight, and higher muzzle velocity, shotgun slugs crush large amounts of tissue and frequently cause huge, deep, gaping, and mutilating wounds, especially to the head [16]. It must be also emphasized that sometimes homemade firearms or firing mechanisms may cause gunshot injury very similar to shotgun slug injury [17].

In this case, the first two shots did not hit the vital parts of the victim's thorax and did not cause immediate incapacitation. The man was able to reload and refire. The ineffectiveness of the first two shots was produced by a "wrong" shooting barrel–victim angle. Consciousness and locomotive capabilities of the man were saved. Thus, the actual locomotive state of the victim after two shots to the thorax allowed for the opening of the locked shotgun, extraction of two spent cartridges, and reloading and refiring in the region of the right temple. The autopsy did not show a biometric discrepancy between the muzzle–trigger distance of the shotgun and the length of the victim's right upper limb (shoulder–index finger distance). We determined that the victim's right upper limb was the shooting hand and the left upper limb was the steadying hand which held the muzzle of the shotgun next to the right temple.

The gap between muzzle and skin was obviously sufficient for muzzle gases to escape. For this reason, the wounding effect of the slug was not enhanced by the large amount of muzzle gases. The victim did not pull his clothing aside to expose the skin of the left part of the thorax during the first two shots to the trunk. This is other remarkable thing about our case. Thus, this case is another example that the old empiric rule repeatedly stressed in the literature that gunshot suicides will rarely shoot through the clothing is not absolutely correct [18]. The projectiles penetrated all three layers of the victim's clothing. This empirical rule is a myth based on an old misconception rather than a generally applicable imperative [19].

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