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A suicidal gunshot injury with a homemade zip gun during a traffic stop

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Abstract: The usage of zip guns - homemade self-constructed firearms fashioned out of pieces of metal with a simple firing pin or made by conversion of blank guns into a harmful weapons, is quite rare and sporadic in forensic pathology. To avoid the control and registration of firearm, people with technical skills can make one at home. The atypical homemade firearm can lead to atypical autopsy findings with unusual gunshot wounds on the body. The following article presents an original case of an unusual self-inflicted gunshot suicide committed with a homemade improvised zip gun during a regular traffic stop of the motorcycle. Technical examinations of the disassembled weapon revealed it to be partially handcrafted zip gun that had been constructed as a single barrel gun in shape of a pistol or revolver from metal piping and part of barrel with internal grooves, used from a regular assault rifle. Further police investigation revealed that the decedent did not have motorcycle papers and driving license with him in time of the traffic stop; but he has not had any psychiatric or suicidal history. In his locked room he had a lot of ammunition and old firearms, including one expansion rifle; although he never had a firearms license. The death was classified as a suicide with the handmade zip gun fired most likely from near-contact range to the right temporal region of the head, with complete penetration through the cranial cavity, under the influence of alcohol.

Key Words: homemade zip gun, forensic science, atypical gunshot wound.

INTRODUCTION

The control of weapon possession is a problem worldwide. Since the mass shooting in 2010 in Bratislava, the capital of Slovakia [1], there were several changes in laws leading to restrict the regime related to firearm access. To avoid the control and registration of firearm, people with technical skills can make one at home. The term "zip gun" could be defined as a crude homemade firearm, or a conversion of the blank pistol, tear gas gun, or cap pistol into a firearm [2]. Cases with fatal consequences of using such gun are quite rare. The following study presents a case of an unusual self-inflicted gunshot suicide committed with a homemade zip gun during a regular traffic stop.

CASE REPORT

Circumstances of death at crime scene

On Monday evening a 42-year old man was pulled over by the police officers, because of driving a motorbike in the village without any lights turned on. Immediately after he stopped, he pulled out quite a long homemade firearm from his coat, ran away 15 meters and on the sidewalk to a random family house he squatted and shot himself with the zip gun to the right side of the head. There was one neighbour witness from near house and two police officers, who have seen it too. Further police investigation revealed that the decedent did not have motorcycle papers and driving license with him in time of the traffic stop; he has not had any

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medication problems except for occasionally back pain, any psychiatric or suicidal history. He was a recluse man living in his own room sharing an apartment with his father and brother. He was unemployed for a long time; he used to go daily to some waste yards and always used to bring home some mostly metal stuff from there. On several backyard sales he also has bought couple of old weapons with an official seal applied to prevent them from firing. The police found in his locked room a lot of ammunition and couple of old firearms, including one expansion rifle. The decedent never had a firearms license. The autopsy was performed the following day.

Autopsy findings

On external examination and autopsy of the decedent two gunshot wounds to the victim's head were noticed (Figs 1, 2). Complete penetration - perforation was estimated. Soot and gunpowder tattooing were not detected on the skin or clothes of the decedent. An entrance wound was found in the right temporal area of the head. The wound defect of the skin had a 5-pointed star-shaped character with proportions of 12.5 x 9.5 cm; with non-central minus effect, blackening and soot cavity; the skull was shattered; mild evisceration of the brain tissue was present in the area of entrance wound. The

Figure 1. View on the entrance wound with irregular 5-pointed star-shaped character with little blackening and mild evisceration of the brain tissue.

Figure 2. Detail view of the exit wound in the left frontotemporal area.

Figure 3. Comminuted fracture of cranial vault and skull base.

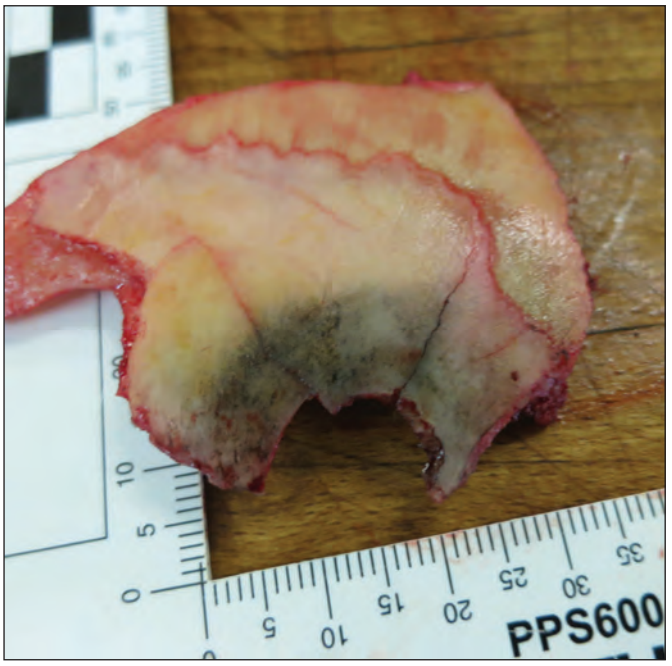

Figure 4. Internal beveling was evident at autopsy with radiating fissure fractures around the main fracture.

skull presented comminuted fracture of cranial vault and skull base (Fig. 3); in the right temporal area with a bone fragment with semicircle defect (Fig. 4). Inward beveling of this defect was evident at autopsy, with a diameter of 12 mm at the outer bone plate and 14 mm at the inner bone plate; with blackening around it. The surrounding area of the defect showed two fissure fractures, 15 mm and 18 mm long.

The path of the bullet consisted of complete perforation of skull and brain with contusion of brain and pons Varolii. The bullet trajectory was oriented from the right side of the head to the left, slightly up- and forward, An exit wound was found in the left frontotemporal area. The wound defect of the skin had an irregular shape with proportions of 3.1 x 2.2 cm. The skull was fractured in the location of exit wound, but on the fragments around was outward bevelling present. No other injuries were noticed on the dead body.

Autopsy revealed a small lesion of tumour of right kidney (Renal cell carcinoma), steatosis of the liver and atherosclerosis of aorta. Toxicological investigations revealed a blood alcohol concentration of 2.02 g/L. Other toxic, narcotic or psychotropic substances were not proved.

The immediate cause of death was attributed to contusion of the brain caused by the bullet's complete penetration through the cranial cavity, under the influence of alcohol. According to the police investigation and autopsy findings, the death was classified as a suicide with the handmade zip gun fired most likely from near-contact range to the right temporal region of the head.

Figure 5. Dismantled weapon.

Examination of the weapon

The firearm was found near the deceased on the front lawn of a house, with total dimensions 48 x 13 cm. Technical examinations of the weapon on the ballistic department, where it was disassembled, revealed it to be partially handcrafted zip gun that had been constructed as a single barrel gun in shape of a pistol or revolver from metal piping, including a spring hammer fixed to a firing pin, which is pulled back manually, connected to a trigger and released for firing. The dismantled weapon (Fig. 5) consisted of three main parts: homemade hollow metallic grip (8.5 x 4.5 cm) welded to the hexagonal shaped frame of the breech (12 x 4 cm), and two metallic pipes screwed together - chamber with the posterior segment of the barrel (length 12.5 cm, outer diameter 2.3 cm) and the anterior segment of the barrel, which was a 29.5 cm long part of regular barrel with internal grooves in the rifling bore, used from an assault rifle called the "Sa vz. 58" (model 58). On the top of the frame of the breech was little brass lever (1.5 cm) connected to a spring hammer. To one side of the hexagonal frame of the breech was welded a metallic guiding bar (bail), most likely for some additional equipment (e.g., laser, scope).

This self-constructed gun was able to carry only one round at a time. An empty steel case of the 7.62x39 rifle cartridge of manufacturer Sellier&Bellot was found inserted within the chamber. Total length of the chamber and both segments of the barrel screwed together was 38.5 cm. When the spring hammer has been pulled back and the rifle cartridge has been loaded to the chamber, cocking the gun was accomplished by manual screwing the chamber with barrel to the hexagonal frame of the breech. During the examination of the weapon repetitional test-shots have been performed. According to the results of the analysis, the spring hammer has not always been able to be properly locked in its back position.

DISCUSSION

Homemade guns, country guns and zip guns are terms used to describe firearms that are often crudely fashioned out of pieces of metal with a simple firing pin [3], or could be made by conversion of the blank cartridge gun, tear gas gun, or cap pistol into a harmful weapon [2, 4]. Definis-Gojanović demonstrated that no matter how simple homemade firearms look, they can be as lethal as other commercial weapons [5]. With having the necessary technical knowledge, weapons with an official seal applied to prevent them from firing could also be modified back to their working condition. Many of such weapons and guns are available on the market and do not require any special authorizations, licensing, or control

because they are presumed to be safe and inoffensive [4]. In the case we describe, the weapon used to commit suicide was mostly crudely home constructed out of metal waste and piping, but the decedent has also used one part of original rifle barrel to help to stabilize the bullet during flight. That was a clever solution, because the construction and quality of homemade guns vary considerably and most zip guns have an oversized chamber and barrel without rifling, resulting in reduced muzzle velocity, unstable bullet flight and significant gas leakage from chamber and barrel [6]. Yilmaz *et al.* stated that whether skilfully constructed or not, the cheap commonly available materials used in the manufacture of homemade guns make them unsafe for use [7]. In fact, most homemade guns are so crude in their construction that they pose a greater danger to the firer than to the intended victim [8]. The zip gun presented here was not reliable too, as the ballistic analysis said, the spring hammer and whole cocking system has not been working always properly.

The law restriction of acquisition, possessing and handling firearms is probably the main reason to make one at home, the price could be the idea too. With technical skills it is not so hard to create a weapon from easy to find hardware, probably as it was in our case. The potential purposes of handmade zip guns are various: from self-defence to homicide, for the protection of property, for sport or as a hobby, for poaching or for committing a suicide [9]. In the presented case the victim's death was self-inflicted, but according to the circumstances (traffic stop, running away from police), it can be concluded that it was not planned. The guiding bar welded to one side of the homemade gun may suggest the gun was made primary for illegal hunting.

Except for the situation on the crime scene and the place of suicide, it was committed in usual way for a self-inflicted injury with the handgun. Despite of using an original rifle cartridge and its "hybrid" character by means of using modified barrel from an assault rifle, the homemade gun presented here should be handled as a type of a handgun. Regarding the location of suicide, the decedent performed the suicide outdoors. This is not in accordance with the study conducted by Blumenthal, who stated that 92% of the suicidal gunshot wounds to the head occurred indoors [10]. Same as La Harpe *et al.* observed [11], that almost three quarters of suicide cases take place at the victim`s home or in a related location (parking, basement, etc.).

Other findings such as the sex of the victim, the usage of handgun instead of a shoulder weapon, the range of fire, the location of entrance and exit gunshot wounds, same as the trajectory of the bullet are in lines with one of previously published studies [10-14]: The majority of suicidal firearms fatalities were male [11] and the head is the most common location in suicidal wounds [11] - for all firearm types together [12], same as for handguns separately [13]. In fact, handguns are the preferred weapon type to commit a firearm related suicide [6, 12]. The right temple is the most common site of gunshot entrance wound [10, 13] and the majority of exit gunshot wounds are located overlying the left frontal and left parietal regions [10]. The vast majority of suicidal handgun wounds are single shots [13]. There are 24 possible directions of the bullet intracranial path in relation to the three planes: horizontal, frontal, and sagittal, regardless of the localization of the gunshot entrance wound. As reported by the family of the decedent, he was right-handed person and the bullet track in our case (with directions right-to-left, back-to-front and upward) was in line with one of three main combinations stated to be typical for right-handed persons [14].

According to the autopsy findings, the range of fire in the head gunshot wound in the current case was determined as a near contact gunshot wound, which is consistent with mentioned studies [10, 13], where 81% and 96% of cases were classified as being contact suicidal gunshot wounds to the head (which included contact or near contact). However, according to Palimar *et al.*, the firearm distance determination is always given as a rough guide and is not a precise measurement, which can be done only when the actual weapon and ammunition are placed through a series of test shots to reproduce the injury [15].

We experienced a rare case of using a homemade firearm in a public place to commit a suicide with some not so usual gunshot wounds on the body. The wounding effect of homemade weapons is usually unpredictable. External appearance of gunshot injuries produced by self-constructed firearms show wide variations and may differ greatly from injuries inflicted with conventional weapons [16]. Wounds caused by zip guns frequently have an irregular and atypical appearance [17]. The entrance wound may be discreet, or by contrast it may exhibit characteristics of a widely forked laceration/ contusion lesion [16], as it was in our case, where the entrance wound had an irregular star-shaped character and was quite larger than the exit wound on the head. The usage of atypical improvised homemade firearm can lead to atypical autopsy findings.

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