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SEVERE EYE INJURY AS A RESULT OF THE SHOOTING OF AN ELASTIC BULLET OF A 12-GAUGE CARTRIDGE "TEREN-12P" - CASE STUDY

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Abstarct

The misuse by law enforcement of regular smooth-bore rifles, loaded with bullets with elastic bullets, to end a group disruption of public order or riots, usually leads to untold injuries of a large number of people and can lead to unpredictable social and political consequences. During the period November 2013 - February 2014 in Kiev and other cities of Ukraine during the mass protest actions numerous cases of application by individual officials of law enforcement bodies of pump guns of the 12th caliber of the Fort-500 model series, equipped with cartridges of non-lethal action "Teren-12P" and "Teren-12K". As an example of the use of shock-traumatic firearms, we cite a case from our own practice (a gunshot wound to the eye of a participant in mass protests, February, 2014 y. Kiev).

Key words: forensic medical examination; gunshot wound; eye; elastic bullets; cartridge of non-lethal action "Teren-12P".

Introduction. A number of publications by doctors from different countries cite numerous cases of eye injuries in protesters as a result of non-lethal use of kinetic weapons by law enforcement. In Egypt, during the Revolution of January 25, 2011, 162 people with gunshot eye injuries (caused by plastic bullets) turned medical center for help [1]. There were reported about 5 eye injuries by plastic bullets in public protests in Switzerland during the 6 months 2000-2001 [2] and 8 victims in Nepal in April 2006 [3]. In Turkey in the summer of 2013, 31 people were hit by plastic bullets, of which 1 bullet struck the eye and destroyed the eyeball [4]. Studies by Israeli physicians have provided statistics for a prolonged period of civil conflict regarding the significant number of eye injuries caused by rubber bullets and their nature [5 - 9].

During the period November 2013 - February 2014 in Kyiv and other cities of Ukraine, during numerous public protests, numerous cases of injuries to various parts of the body of protestors were recorded as a result of the use of the 12th caliber pump guns "Fort-500", equipped with cartridges of non-lethal action" Teren-12P "(with an elastic bullet) and" Teren-12K "(with an elastic cartridge), by law enforcement officials [10, 11]. Members of the Kiev Regional Center of Forensic Medical Experts-Scientists of the Association of Forensic Medics of Ukraine (AFMU), who conducted more than 400 forensic medical examinations of the victims, participated in the investigation of crimes against the excesses by law enforcement authorities and official powers. It has been established that in 55 cases the victims received gunshot injuries, including from the action of elastic bullets and cartridges, including 2 eye injuries, which were accompanied by his loss [12]. A similar case of injury when fired by an elastic bullet at a protester that resulted in eye loss was reported by AFMU members [13].

The Teren-12P cartridge is equipped with an elastic coil-shaped ball, felt or wood-fiber wadding, two cardboard gaskets, a powder charge and a capsule, which are connected into one whole by means of a sleeve.

The body of the cartridge case is made of white polymer material, and the base is made of gray metal, attracted by a magnet, with a yellow coating (manufacturer - hunting ammunition factory in Pionki, Poland). At the bottom of the sleeve there are markings "12 *** 12 ***". The KV-22 igniter capsule contains a stainless initiating composition. The ball is a body of rotation of a coil-shaped gray color with a dull silver luster, with leading obturation belts on the front and cylindrical parts. The front (main) part of the ball has a disc-shaped shape, which is connected to the leading cylindrical part by means of a transition section of

cylindrical shape and in the form of a truncated cone. On the front section of the main part of the bullet in a circle is the marking "TEREN P".

Any other non-lethal 12-caliber bullet cartridges in Ukraine are not certified and, accordingly, cannot be in the service of law enforcement agencies and in free sale.

The aim of the study. On the basis of an example from own practice to show the possibility of causing severe eye injury when fired from a close distance by an elastic bullet of a cartridge of non-lethal action "Teren-12P".

Materials and methods. To determine the nature of the injury and the type of firearm, a computer tomogram of the head, performed on a «Siemens Somatom Emotion 16 slice CT Scanner» system; scan mode 120 kVP, 300 mA, 750 ms, 225 mAs, Thk 1.5 mm.

The study of presented material evidence was conducted in natural, daylight and using a comparing microscope the Peleng MS-3 (magnification to 80) and the microscope "MBS-2" (magnification to 48) in obliquely incident light. The determination of linear values was performed using the caliper SC-1 GOST166-89 and the caliper with electronic reference (article 15-241) of the Ukrainian company "Miol Instrument", as well as using an eyepiece micrometer microscope "MBS-2". The shooting was done using the Canon Power Shot SX20 digital camera and the Olympus SP-510UZ digital camera in automatic mode. The weighing was carried out with the help of electronic laboratory scales of model CBA-600-0,02 (factory number «3719042003») manufactured by the Ukrainian firm «CERTUS Balance» (certificate of verification of working equipment of measuring equipment №87193 / 1).

Determination of the speed of the damaging elements was carried out using the measuring optoelectronic complex "IBX-731/2" (factory number "XK 029", the certificate of verification of working equipment of measuring equipment №03 / 1805), as well as the measuring optoelectronic complex "IBX-731.3" (factory number "HC 036", certificate of verification of working tools of measuring equipment №03 / 1804), according to the passport data, the measurement error is 0.5%.

For testing during field tests, a pump gun of the 12th caliber model "Fort-500A" with a barrel length of 510 mm was used. In addition, the gun used a pump gun of the 12th caliber model "Fort-500M1" with a barrel length of 345 mm.

For the experimental firing of the specified samples of smooth-bore weapons of the 12th caliber, cartridges of traumatic action "Teren-12P", equipped with an elastic bullet (TU U 29.6-19485052-014-2002 made by LLC NPP "Ecologist") were used;

Experimental studies were conducted in the conditions of a ballistic track with a total length of 25 m in a specialized room of the Kharkov Research Institute of Forensic Experiments at ambient temperature + 4 ... 5ºC.

Research results and discussion. During the pre-trial investigation it was established that during the exacerbation of protests 18 - 19.02.2014 due to the use of law enforcement officers of a special gun person A. received a gunshot wound to his left eye. An examination of the medical records revealed that first aid had been provided by an ambulance medical staff, after which the victim was taken to a Kyiv city hospital, where a computed tomography scan revealed a foreign body in his left orbit. The patient was transferred to a specialized ophthalmological medical center, where he underwent urgent surgery - removed a "rubber" foreign body measuring 3.5x2 cm, sutured the periosteum of the lower orbital wall, removed the inner membranes of the eye.

During the study of medical documentation, it was found that in person A. had a blind bullet wound of the left eye in the form of hematoma of the eyelids, wounds of the upper eyelid, damage to the cornea and crush of the membranes of the left eye, fracture of the lower wall of the orbit. At expert research of the tomogram of the head the presence of a solid of nonmetallic density, characteristic shape, and size corresponding to the bullet of a non-lethal cartridge of the 12th caliber "Teren-12P" in the left orbit was determined (Fig.1).

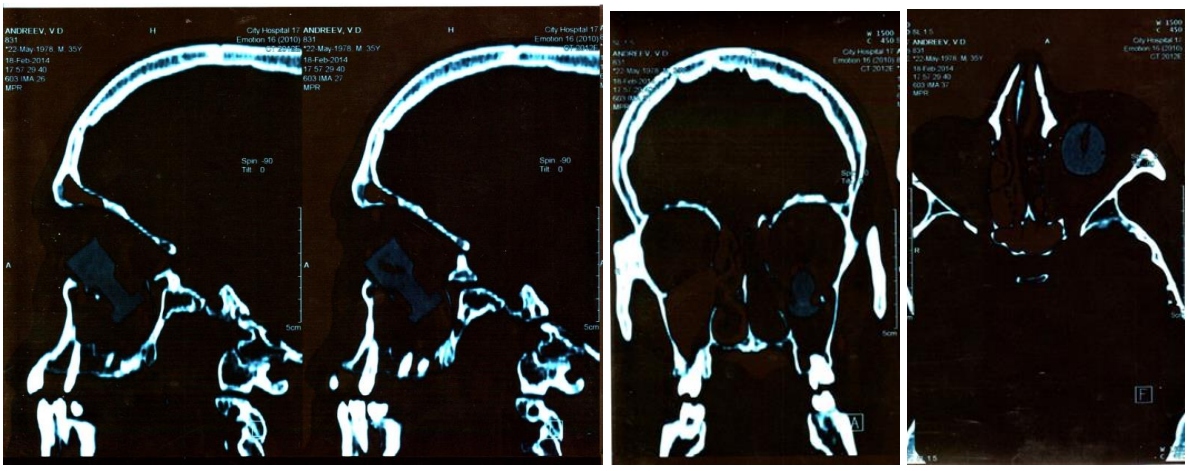


Fig. 1. Tomogram of the head of a person A. with the presence of a bullet cartridge of non-lethal action of the 12th caliber "Teren-12P" in the left orbit

Despite a life-threatening wound, doctors managed to save the life of the victim.

According to the expert conclusion, the following injuries were revealed: a foreign body of the left eye, damage to the cornea of the left eye, crush of the membranes of the left eye, hematoma of the eyelids. The nature and morphological properties of the injuries found

indicate that they were formed from a single action of a blunt object with a limited contact surface, which could have been caused by a shot fired by rubber bullets. Bodily injuries belong to serious bodily injuries on the criterion of threat to life.

According to the results of the forensic ballistic examination, it was determined that the bullet that was removed from the patient's left orbit during surgery is a bullet of the cartridge "Teren-12P" (Fig. 2) manufactured by "Ecologist" (Kyiv). The manufacturer of ammunition prohibits shots from a distance of less than 20 m from the muzzle of the barrel to the person in the head, neck, genitals, mammary glands in women.

Fig. 2. Picture of the cartridge shock-traumatic (non-lethal) action "Teren-12P" of the 12th caliber and the elastic bullet with which it is equipped

It was established that a gunshot wound of the eye in was formed as a result of a single shot from a short distance, and the shot could be fired from a 12-caliber smoothbore pump-action rifle of the "Fort-500" model range (Fig. 3).

Fig. 3. Picture of rifles"Fort-500M1" (top) and "Fort-500A" (bottom)

According to the instructions of the manufacturer LLC SPE "Ecologist" on the use of cartridges 12-caliber traumatic action "Teren-12P", which are equipped with an elastic bullet, the effective firing range is from 20 m to 35 m. The specified cartridges manufacturer prohibits shooting at distances up to 20 m During the experiments when firing from pump-action rifles of the "Fort-500A" and "Fort-500M1" models, it was found that it is possible to consider safe firing distance of more than 15 m, because at this distance no elastic bullet is fired within the established experimental range. about the range of initial velocities 86.5… 209 m / s is not able to inflict penetrating wounds on a biological object (person) in one of the body cavities.

Injury to the human visual organs, in case of impact, is possible at much greater distances; if we consider the limit value of the kinetic energy of the striking element of 3.9 J, which is characterized by the destruction of the human eyeball, then at the specified initial speed range, the safe distance (the distance at which the bullet has a kinetic energy less than the limit) can be considered more than 68.0…124.7 m

The analysis of these data shows that taking into account the energy characteristics of the fired elastic bullet of the cartridge of traumatic action "Teren-12P" injury to the left eye of the victim could be caused by shooting from a distance of 57.4 m, and from a distance of 30.2 m (according to the protocol of the investigative experiment).

Given the specified firing distances, as well as lowering the trajectory of the bullet, based on calculations of the parameters of the external ballistics of the elastic bullet of the traumatic action cartridge "Teren-12P" it can be argued that the throw angle was not more than 1º… 4,5…, which is typical for shooting from standing ». Based on the calculations and data on the experimentally established range of initial velocities of the balls, the following was established:

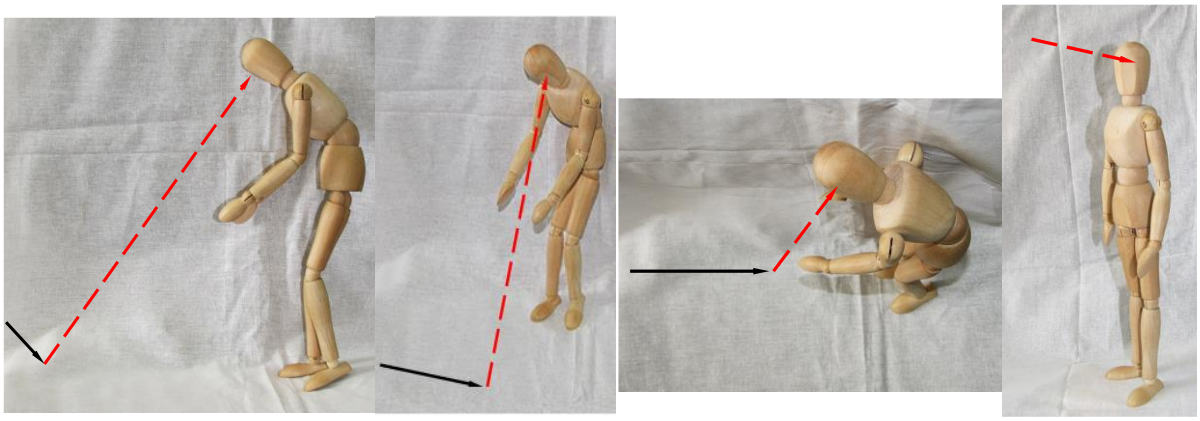
- at a distance of 30.2 m the velocity of the bullet could be 54.9… 132.7 m / s, the value of its kinetic energy could be 12.67… 73.94 J, and the value of the specific kinetic energy - 0.049… 0.284 J / mm2;

- at a distance of 57.4 m, the velocity of the bullet could be 36.0… 86.9 m / s, the value of its kinetic energy could be 5.43… 31.71 J, and the value of the specific kinetic energy - 0.021… 0.122 J / mm2.

Comparison of the calculated values of kinetic energy with the limit value of the kinetic energy of the striking element 3.9 J, which is characterized by the destruction of the eyeball, it can be concluded that when firing from a distance of 30.2 m or from a distance of

57.4 m, with direct impact the bullet can cause an eye injury, which is similar in nature to the injury of the left eye in the victim.

However, taking into account the energy characteristics of the elastic bullet at the specified firing distances, it is impossible to exclude the possibility of ricocheting the bullet from the road surface of the roadway, due to the following circumstances. When firing from a "standing" position on the lower extremities of the victim, the bullet may hit the road surface prematurely by lowering the trajectory, if it was not taken into account when firing and the appropriate correction was not made when aiming. At a slight angle of contact with the obstacle surface, this can cause the ball to ricochet. During the ricochet, the bullet loses some of its kinetic energy and gains additional movement around its polar axes (begins to "roll over") with a simultaneous gradual movement "forward" ("forward - sideways"). Thus, it can be argued that under certain conditions after the ricochet, the elastic bullet of the Teren-12P cartridge can cause bodily injuries that are similar to the injuries of the victim. Therefore, if the victim is in a bent position, it is possible that the bullet after a ricochet and a change in the direction of flight could hit the left eye of the victim (see Fig. 1). After the victim straightened, the direction of movement of the striking element relative to its body position at the time of infliction "bottom - up" changed to "top - down" relative to the vertical position of the body (see Fig. 4, D).



A B C D

Fig. 4. Reproduction by means of a mannequin of the probable "bent" position of the victim ricochet of an elastic ball of the cartridge of traumatic action "Teren-12P" from a road surface (A - a side view; B - a view in isometry); direction "left - right"); C - top view; D - direction of the wound canal after straightening); the direction of flight of the bullet to the ricochet is indicated by a black arrow, the direction of flight of the bullet after the ricochet is indicated by a red arrow.

During the complex examination of the weapon and forensic examination it was established that at the time of the shot the victim could be in a standing position or in a

vertical position close to him and was facing the muzzle of the barrel. It cannot be ruled out that the injury of the left eye could also be caused by the ricochet of a bullet in its bent position. The shot from the rifle could be fired from the distances established during the investigative experiments (from the places where law enforcement officers were at the time of the incident) - 30.2 m and 57.4 m, i.e. from the distances allowed by the cartridge manufacturer.

Through a series of experiments and calculations, it was found that elastic bullets of non-lethal ammunition "Teren-12P" at firing distances of 10 - 20 m, as well as 30.2 m and 57.4 m are usually able to cause only minor injuries to surface soft tissues, but at these distances in the case of direct impact fired elastic bullets can injure the human visual organs (destroy the eyeball).The shot could have been fired from a standing position. Relative to the horizon of the weapon, the estimated value of the angle of the bullet was not more than 1º… 4.5º, and the person who fired could be at the place established during the investigative experiments.

According to the results of experiments and calculations, elastic bullets of cartridges of traumatic action "Teren-12P" when firing from pump-action rifles models "Fort-500A" and "Fort-500M1" are able to inflict penetrating wounds on the body of a person not covered with layers of clothing, at distances up to 5 m. At rather high initial velocities (of the order of 200 m / s, which is a rather rare phenomenon for the indicated cartridges), this distance can be 10… 12 m.

The nature of the gunshot wound to the eye and the absence of signs of action of the factors accompanying the shot when firing at close range, suggest that this is a gunshot wound to the left eye in the victim A. formed as a result of a single shot from close range.

Conclusions

This case confirms the potential danger of using large-caliber non-lethal weapons loaded with ammunition with elastic bullets, which can cause severe gunshot wounds to the eyes, even when fired from a distance allowed by the manufacturer of ammunition. The fruitful cooperation of clinicians, forensic medical experts and law enforcement agencies, especially in the investigation of high-profile cases involving the use of firearms by law enforcement officers, ensures high-quality and complete examinations of the circumstances of gunshot wounds and increases their probative value.

Studies have shown that a comprehensive approach: ballistic examinations combined with a careful description of injuries in medical records by doctors and forensic medical

experts give 99.9% accuracy of the circumstances of the event (establishing the location of the victim and weapons, as well as identification of weapons and projectiles, etc.)

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