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Case report

Risks of non-lethal weapon use: Case studies of three French victims of stinger grenades

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ABSTRACT

The development of non-lethal weapons started in the 1960s. In France, they have been used by the police for about 10 years.

We relate the cases of three French women, victims of stinger grenades, non-lethal weapons recently adopted by the French law enforcement to distract and disperse crowds. The three victims presented serious injuries requiring emergency surgical care. One lost her eye.

Based on these cases, we discuss the lethal character of these weapons and propose measures to be taken to prevent their dramatic consequences.

Although the danger is obviously less than for firearms, stinger grenades are nonetheless potentially lethal and cause serious physical injuries.

1. Introduction

In most countries, since the 1960s, non-lethal weapons are being developed under incontestable established development policies [1,2]. They are defined as "*discriminatory weapons that are explicitly designed for and mainly used to incapacitate personnel and equipment while minimizing the risk of death, permanent injury to people and undesirable damage to property and the environment.*" [3] They have taken a central place in military thinking since 1990 but have only been actually used by the French police for about 10 years. The weapons are designed to incapacitate a violent and/or dangerous individual while minimizing the risk of permanent injuries or death: that is as a temporary weapon used to neutralize, not fatal in normal use. Several articles [5,6] have already been published about the potential risk of death by these less-lethal weapons, in particular a recent report in France by the "National Commission of Business Ethics and Safety", which advocates "*the Flashball® should not be used during demonstrations in public places, except on rare occasions which have yet to be defined*" [4].

There are several types, the most well-known and controversial being the Taser® and Flashball®. Others ammunitions are less known like the "bean bag", projectiles fired from a pump shotgun or a 12 gauge shot-gun and used in American policing since the 1970s. These ammunitions are composed of a fabric bag containing about 40 g of Nr-9 lead shot pellets.

Rubber stinger grenades are manual protective devices (hereafter referred to as DMPs) and are a new category of less-lethal weapons, used by French law enforcement. These weapons enable law enforcement officers to distract and disperse a crowd. Up to now no comments or reports concerning their side effects and potential risks have been issued. Does a risk of death in the case of their misuse as for the Gomm-Cogne gun and Flashball® exist? We will study the case of three French young women, victims of stinger grenades to try and find an answer.

2. Report of three cases

2.1. Case 1

A young woman was riding her bicycle in a neighborhood where a demonstration was going on when she received two impacts from a DMP on her face and thigh. She immediately went to the University Hospital. The physical examination revealed two types of recent wounds, inflicted at the same time:

- Her face suffered from a large seeping wound on the right mandible horizontal branch and hypoesthesia, requiring emergency suture by the facial surgeon under local anesthesia (Fig. 1). There was no associated bone fracture.
- The left thigh presented a large bruise (Fig. 2).

She was prescribed nurse's care and blended/liquid foods for 10 days. The forensic examination done the same day emphasized the contused injuries and suggested them being due to a hard and

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Fig. 1. A large seeping wound under the right mandible horizontal branch.

Fig. 2. A large bruise at the left thigh.

small-sized object. It also foresaw significant cosmetic after-effects. The inquest subsequently implied a DPM blast as the origin, supported by the single rectangular hematoma on the thigh.

2.2. Case 2

A student received a shot in the face as she passed near an event which involved the police on her way home. The young woman was taken to the University Hospital by emergency ambulance.

The results of clinical examination and CT scan of the skull showed a transfixing wound in the left eye, a scleral wound, a complex fracture of the orbit ("blow-out") with involvement of the orbital floor and roof and the medial wall. The fracture extended to the upper ethmoido-frontal junction and toward the frontal sinus's rear wall bone with a cerebrospinal fluid fistula and injury to the optic canal but leaving the nerve intact.

Her state required emergency surgery under general anesthesia and several days of hospitalization. The collapse of the eye and orbital cavity shows how violent the trauma was (Fig. 3).

Her state degenerated with atrophy of the eye. This required surgery with enucleation, followed by seven operations to reconstruct the eye with prosthesis. Besides the blindness and the major cosmetic injuries, the victim suffered from impaired hearing, anosmia and headaches.

The inquest implies once again a piece of rubber stinger grenade.

Fig. 3. The left eye which presented a transfixing wound, after the first surgical intervention.

2.3. Case 3

Another young girl was near a crowd. She heard a bang and then felt a sharp pain in her left leg, corresponding to a bruised wound about 6 cm in diameter. She was brought immediately to the University Hospital where she had emergency surgery under local anesthesia. During the same episode, the victim's friend also suffered large bruises on her legs, while an eye-witness suffered from second-degree burns and bruises on the upper limbs. The inquest implies also a piece of rubber stinger grenade.

3. Discussion

In the current observations, we describe severe injuries caused by a French new non-lethal weapon, the rubber stinger grenade. The cartridge of the grenade contains 18 trapezoidal rubber projectiles, each weighing approximately 10 g (Fig. 4). Its base, weighing 19 g, is the powder carrier that contains the pyrotechnical charge (3 g explosive compound). The charge is packed in a tube, which sits in the powder carrier. The whole canister is covered with a plastic sheath that retracts and is screwed to an ignition plug (hard plastic with ridges and indentations). Simply removing the pin on the plug allows deployment. Two types of ignition plugs are available: a distributor cap for manual operation

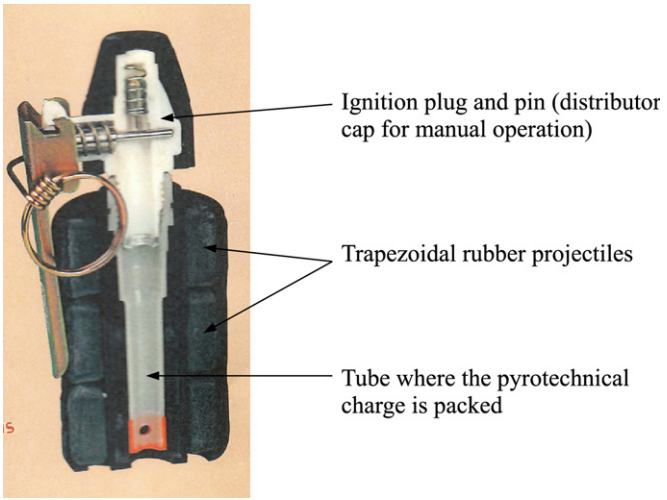

Fig. 4. Rubber stinger grenade (longitudinal cut) made of three different parts: the cartridge, the base and the pyrotechnical charge.