G51 Compressed Gas Cylinder Related Injuries: Case Report of a Fatality Associated With a Recreational Paintball Gun, Review of the Literature and Safety Recommendations

Nabila A. Haikal, MD, and Richard C. Harruff, MD, PhD, King County Medical Examiner's Office, 325 9th Avenue, HMC Box 359792, Seattle, WA 98104*

By describing a fatality involving the pressurized canister of a paintball gun, this case report highlights the potentially serious hazards associated with these devices and reviews relevant safety guidelines in handling pressurized gas cylinders.

This presentation will impact the forensic community and/or humanity by underscoring the serious injury potential of gas powered paintball guns, the authors hope to: i) dispel the misconception that paintball markers are mere toys, ii) promote the safe use of compressed gas cylinder-powered devices, like paintball guns, by encouraging a healthy respect for their injury potential and emphasizing the need for adherence to age restrictions, game rules, and use of protection gear, and
iii) prevent potentially avoidable paintball gun injuries by contributing to accident reporting and statistics and increasing public awareness.

The purpose of this paper is to draw attention to the potentially significant morbidity and mortality that may result from the recreational use of compressed gas cylinder-powered equipment, illustrated by a fatality involving a paintball marker/gun. Because such injuries are more common in a non-commercial setting lacking rigorous enforcement or consistent operator implementation of established paintball game rules, it is important to recognize the need for adherence to safety recommendations common to all devices employing pressurized gas cylinders, irrespective of the application involved.

Compressed gas cylinders, used in a variety of industrial, occupational and recreational devices and settings, present a substantial accident hazard due to the large amount of energy stored in the pressurized gas cylinder, which is released upon sudden decompression. Property damage and serious, or even fatal bodily injury may result from the careless or improper handling of gas cylinders, modification of equipment, or device malfunction.

This report describes a case of severe, fatal blunt force injury of the head sustained when a compressed carbon dioxide gas cylinder decompressed suddenly upon disconnection from a paintball gun. The gas cylinder was propelled from the gun, striking the head of the 15-year-old who was holding the gun. The impact resulted in craniocerebral injuries including depressed, comminuted skull fractures and cerebral contusions leading to death. Subsequent inspection of the device found that the gas cannister separated from its own coupling rather than from the connector attached to the device. The operator was apparently oblivious to the dangers inherent in handling pressurized cylinders when he unscrewed the cannister from the gun.

Although there have been numerous anecdotal and well documented reports of paintball equipment-related injuries, this appears to be the first report of a fatality involving a paintball gun. Previously, the most commonly reported injuries have involved ocular trauma resulting from paint pellets striking the eyes. Considering the current case report and previous reports of non-fatal injuries, it is apparent that failure to adhere to established safety standards accounts for the vast majority of serious injuries involving paintball guns.

Initially designed for the purpose of marking trees in the setting of forestry, the use of gas powered paintball markers/guns has gained increasing popularity over the last decade as a 'toy weapon' used in combat simulation or 'war games,' whether for sport or military training. As gas cylinder-powered devices, paintball guns are subject to the standard safety recommendations addressing the physical, chemical, mechanical, and inhalation hazards of compressed gas cylinders, tailored to the specific purposes of recreational combat simulation maneuvers. Users of compressed gas cylinders are strongly advised to follow the manufacturers' and suppliers' safety instructions with regard to proper storage, labeling, hazard designation, transport, inspection, handling, and maintenance of cylinders and their connections as well as operator age restrictions and recommended personal protective gear.

High pressure gas cylinders present a multitude of hazards including sudden decompression, flammability, inhalation toxicity, cryohazard, heavy object hazard, risk of explosion, and asphyxiation. For these reasons, pressurized gas powered devices are essentially accidents waiting to happen with potentially lethal outcome. The fatality reported herein illustrates the serious accident hazard of gas cylinders, particularly in a non-commercial recreational setting and emphasizes the need for awareness and strict adherence to relevant safety practices.

Paintball Marker/Gun, Compressed Gas Cylinder, Fatality

 ** Presenting Author*