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HEALTH #23 TEAR GAS

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WHAT IS TEAR GAS?

Tear gas, also known as riot control agents (RCA), is a blanket term referring to several different chemical agents used to disperse crowds or change their movement trajectory (1,2). The most common types are CS (2-chlorobenzalmalononitrile) and CN gas (chloroacetophenone) (1,3,4). The chemical agents used are commonly solid at room temperature, appearing as white crystalline powders. When dissolved in organic solvents, the powders are dispersed as aerosolized solids into the air (1,5). They can be deployed by being fired in the form of canisters from tear gas guns, defense sprays or grenades (6,7).

Tear gas was originally created as weapons of war. Although it is absolutely prohibited as a method of warfare, it is still used as a domestic law enforcement method (1,8). Uses, other than when it is legal, necessary, proportionate and as a last resort, may amount to torture, inhuman or degrading treatment (9,10). International authorities have criticised its uses in confined spaces, such as places of detention (11), at an already arrested individual (12) and when aimed directly at protestors (13).

IN PRACTICE

Tear gas is primarily used for crowd control by civil law enforcement to curtail civil disobedience, gatherings or processions by large crowds (14,15). Use of tear gas has dramatically increased over the years, with large amounts released in population centers in Turkey, the United States, Hong Kong, Greece, Brazil, Egypt and Bahrain, for example (6,16). Amnesty has verified incidents of tear gas misuse in 115 countries and territories since 2020 (17).

HEALTH CONSEQUENCES

Tear gas are often used as aerosolized solids, which are functional and reportedly less hazardous at low concentrations (15). Even though they are categorized as non-lethal, the use of tear gas can lead to several acute and long-term health consequences. A systematic review of 9,261 injuries classified 25.7% of them as moderate or severe based on acuity and resources required to manage them (4). The presence of pre-existing conditions, environmental factors and the amount and duration of tear gas exposure all influence the severity of health consequences (4,5). The acute effects of tear gas are primarily (but not only) ocular (sight), respiratory (breathing), and dermatological (skin).

When tear gas is deployed, it irritates mucous membranes in the eyes, nose, mouth, and lungs (1). Ocular effects are immediate and painful. This includes intense burning sensation, redness, excessive tearing, conjunctivitis, and temporary blindness (5,6,18). Individuals may experience photophobia (sensitivity to light) and blepharospasm (involuntary eye closure), which can cause disorientation and panic (5).

Respiratory symptoms are common and can range from a burning sensation and pain in the nose, throat and lungs, excessive nasal discharge, coughing and sneezing to more severe reactions like chest tightness, and shortness of breath (3,7). People with underlying respiratory conditions are at higher risk of bronchospasm (tightening of muscles around bronchi causing narrowed airways) that may lead to acute respiratory distress (breathing problems) (18,19).

Skin contact with tear gas can lead to immediate burning, blistering, redness, itching, and rashes (3,6).

Tear gas exposure can also cause gastrointestinal symptoms such as nausea, vomiting, and excessive salivation, often due to ingestion of the chemical (5,6,15).

Psychological symptoms include anxiety and fear, which can further complicate the acute presentation (5,18).

Furthermore, tear gas canisters are potential sources of blunt trauma and burns if they strike individuals. Injuries due to the direct impact of gas canisters have ranged from chemical burns and contact burns on the skin to ocular injuries, vascular injuries and nerve damage, potentially leading to loss of functioning and limb amputations. Finally, the canisters have been shown to cause soft-tissue damage and even penetrating head trauma which in some instances has been fatal (1,4,6,18,20). Cases of penetrating head injuries have been reported in Iraq, France, India, and Turkey including both cranial and severe maxillofacial injuries (16).

If tear gas is fired in closed environments, the concentration of the gas and extended exposure has in some instances led to death (4,6,7) Regarding long-term health consequences, repeated or high-concentration exposure to tear gas can lead to chronic respiratory issues, such as persistent coughing, asthma, and chronic bronchitis (4,14). There are also risks of prolonged ocular damage, including chronic irritation, corneal abrasions and permanent vision loss, especially if decontamination is delayed (4,21). Dermatological effects like dermatitis or chemical burns may persist in individuals with sensitive skin or those expo-

sed repeatedly (15,18). Psychological effects are possible long-term consequences. In one US study, 1,635 (72.5%) of 2,257 respondents reported increased anxiety, startle response, fear, fatigue or sadness/depressive feelings after their exposure (22). A study in Turkey found that 43% of exposed persons met criteria for acute stress disorder, 23% for PTSD and 8% for major depressive disorder (4,23).

CONCLUSION

While some acute effects of tear gas may be manageable with prompt medical attention, the potential for serious long-term consequences necessitates cautious use and consideration of alternative methods.

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Written by: Maja Sofie Nørkjær Jensen and Maha Aon with contribution from Brenda Van den Bergh and Marie Brasholt.

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For questions and comments, please contact: factsheets@dignity.dk