

## **Chemical Warfare: Experience of Iran - Iraq War**

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**Introduction:** Chemical warfare agents (CWA) are weapons that work principally through toxicity, causing death, permanent harm or temporary incapacitation. They are classified into six groups: 1, Nerve agents: Sarin, Soman, Tabun and VX. 2, Vesicants: Sulfur Mustard (SM) and Lewisite. 3, Choking Agents: Phosgene and Chlorine. 4, Blood Gasses: Cyanide. 5, Psychotropic Agents : Quinuclidinyl- benzilate. 6, Tear Gasses: Chloroacetophenon. Chlorine and SM were largely used during the World War I. SM, tabun and sarin were widely applied during the Iraq-Iran war in 1983-88. They induced a lot of morbidity and mortality.

**Sulfur Mustard** is an alkylating agent that initially reacts with ocular, respiratory and cutaneous tissues resulting in acute poisoning and even death (1). Acute toxic effects of SM appear after variable periods of latency (minutes to weeks) depending on the dose, mode of exposure, environmental temperature, and on the individual. Delayed toxic effects of SM in Iranian veterans 16 - 20 years after SM exposure were found in lungs, peripheral nervous system, immune system, skin and eyes (2), which are different from the early toxic effects (3). Early toxic effects of SM were mainly skin blisters, epidermolysis, acute conjunctivitis, acute bronchitis, bronchopneumonia and ARDS, whereas the late complications were skin and eye dryness, hyper/hypopigmentation, chronic obstructive pulmonary disease, bronchiectasis, asthma, large airway narrowing, and pulmonary fibrosis. Initial leukocytosis and lymphopenia were observed in severely intoxicated patients leading to aplasia and septic shock in fatal cases, but was returned to normal range within four weeks in survived patients. Immunosuppression has been a main problem for the moderate to severely SM poisoned patients since their exposure which has caused recurrent infections and even mortality.

**Nerve Agents:** Iraqi army used tabun in Majnoon Island (1984) and Sarin in Halabjah (1988) which induced a lot of morbidity and mortality (4), Sarin was also used as terrorist attacks in Matsomoto (1994) and in Tokyo metro (1995). The nerve agents are organophosphorous (OP) compounds, chemically related to OP pesticides, but are more toxic than the pesticides. Clinical toxicology of the nerve agents was described in details (5).

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