

Iraq-Iran chemical war: calendar, mortality and morbidity

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【Abstract】 Objectives: To review the calendar, mortality and morbidity of Iraq-Iran chemical war among Iranians based on researchers' reports.

Methods: We used national and international databanks such as PubMed, ISI, Scopus, Irandoc and Iranmedex and studied 350 articles related to chemical agents and their effects on different organs. The main criteria for qualification of articles were relevancy orientation and being published in approved medical journals.

Results: The Iraqi army invaded to west and southwest Iran using chemical weapons such as nerve agents (NAs) and sulfur mustard (SM). Most victims

were civilians including women and children. These attacks had imposed more than 150 types of diseases and complications on Iranians and the frequency of death was 2%-3%. Most reports were about respiratory problems and a few were in the domain of socio-economic damages.

Conclusion: At present, 25 years after the end of war, the victims are faced with different complications induced by chemical agents and it is estimated that they will be continuously troubled by these problems in future.

Key words: *Chemical warfare; Wounds and injuries; Iran; Iraq*

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During the Iraq-Iran war (1980-1988), Iranian people suffered more than 200 000 deaths and about 400 000 injuries that require prolonged care.^{1,2} At present, about 30 000 Iranian chemically injured veterans are under follow-up treatment, most of whom were exposed to sulfur mustard (SM) agent.³ Approximately 100 000 military and civilian people have been injured by this agent.⁴

Iraq firstly used chemical weapons in an area between Halaleh and Ney Khazar located in southern Iran in January 1978, in accordance with Iranian month of Dey (23/10/1359).⁵ At the beginning of the war, the use of chemical weapons was limited,

but in March 1985, Iraq used large amounts of chemical agents against Iranian military and civilian people.^{2,6}

Such chemical agents caused extensive physical, mental, emotional and financial losses on Iranian people. SM has less lethal effects but mostly produces long term disabilities.⁷ On the contrary, nerve agents (NAs) have more acute effects and less long term complications.⁸ Therefore, the main purpose of this study was to review the calendar, mortality and morbidity of Iraq-Iran chemical war among Iranians based on researchers' reports.

METHODS

In a systematic search, we studied 350 articles including 10 reports related to NAs, 29 to dermatological studies, 21 to hematological diseases, 10 to cancer; 50 articles about SM, 31 about ocular system; 44 in the field of psychology, 10 in the field of endocrinology; and 90, 15, 30, and 10 articles in respiratory system, prevention, immunology, and mortality domain respectively. In this study, we used more than 40 key words to obtain the best articles. We used national and international valid medical databanks such as PubMed, Scopus, ISI, Irandoc and Iranmedex.

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Titles and abstracts were assessed by two experts separately and unrelated papers were excluded from the study. Then subjects were classified and used. The main criteria for qualification of articles were relevancy orientation and being published in approved medical journals.

RESULTS

Calendar of chemical warfare in Iran

For a period of about 5 years from August 1983 to July 1988, Iran was attacked several times with chemical weapons by the Iraqi army. During the year 1983, due to the presence of some problems in building Iraqi bombs, most attacks were not successful. Therefore, in this year the lesions and damages were not as devastating or severe, but from 1984 onwards, after solving the technical problems of the bombs, damages became more severe.⁹

Sardasht (one of the Kurdish cities in the North West of Iran) was attacked by several bombs in July 1987 and June 1988. These bombs contained 250 kg of SM that was released in the city center. At the time of the attacks, 8 025 people of 12 000 residents in this town were chemically injured and 130 civilians were killed.^{10,11} The last Iraq chemical attack was in Feb 1988 in the town of Oshnaviyeh (in the North West of Iran) which left 2 680 injured civilians.^{12,13} The use of chemical weapons against civilian population in 8 locations at Sheikh Othman District in Oshnaviyeh has been confirmed by United Nation's experts.²

Frequency of deaths and injuries

Most deaths among chemically injured Iranian victims were in the battle fields¹⁴ and the main lethal types of chemical weapons were NAs. Khateri and colleagues² reported that during chemical war, about 100 000 Iranians received medical treatment and they estimated that there were 25 000 civilians and thousands of veterans who were injured by chemical agents not registered.

Gilasi and colleagues⁷ studied the causes of mortalities among martyred veterans in Isfahan province (a central province in Iran) in 2006. The frequencies of deaths were related as follows:

neoplasms (30%), accidents (30%), myocardial infarction (20%), renal failure (10%) and respiratory disorders (10%). SM has low lethal effects.¹⁴ The frequency of acute lethal rates of SM is about 2% to 3% but the frequencies of chronic lethal effects are not well documented.¹⁵ A lethal dose of SM in human beings is 200 mg (oral) and 3-5 g via long standing exposure to bare skin.¹⁶ The deaths probably occurred due to pulmonary edema.¹⁴ Mortality caused by SM during the first weeks was due to heavy exposure and severe respiratory problems.¹⁷ Low dose exposure to SM associated with redness and mild dermatologic vesicles would not increase the probability of deaths.¹⁸

Chemically induced diseases and complications on Iranian people considering the type of agents

NAs After the first attacks by Iraq, international authorities for several years refused Iran's claim of the use of chemical agents by Iraqi armies. But finally, a 28-page report about chemical attacks by a team from the UN who traveled to Iran was published. In this report, it was mentioned that "for the first time in the world, NAs were used in chemical warfare." The UN team announced the composition of the applied agents in a bomb as: Tabon 75%, chloronenzene 12% and three acetyl phosphate 3%-10%. In the analysis of components of another bomb, the compound consisted of 50% Tabon, 20% chlorobenzene and some impurities.⁶ The applied poisons included organophosphorous agents such as Tabon, Sarin and in limited cases, cyanide, arsenic and the phosphorus compounds.¹⁹ In the tests performed on several samples of peripheral blood, skin, urine and stomach contents of the martyred victims, the use of Tabon and SM has been proven.^{20,21}

NAs have various toxic effects on human beings via over stimulation of muscarinic and nicotinic receptors as well as direct effects on central nervous system.²² Clinical findings of muscarinic effects are sweating, lacrimation, salivation, dryness of eyes, myosis, visual impairment, respiratory problems, nausea, vomiting, diarrhea, colicky abdominal pains, bradycardia and hypotension. Nicotinic effects are shown as mydriasis, weakness, chills, muscular convulsions and paralysis. Patients are at risk of sudden respiratory arrest during awareness due

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