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## 98. STATISTICAL VIEWS ON LATE COMPLICATIONS OF CHEMICAL WEAPONS IN IRANIAN C.W.VICTIMS

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### SUMMARY

During the 8 years Iran - Iraq war (1980 - 1988) chemical weapons had been frequently used by Iraqi army against Iranian military persons[1] and also against civilian people of some Iranian border towns and villages[2-10]. During these chemical attacks, several kinds of chemical agents (nerve agents, blistering agents, mixed agents) were used[11]. According to the recorded data from field emergency units, field hospitals of battle zones and the list of evacuated CW victims from the front, more than 100,000 military and civilian persons had received treatment for the acute effects of CW agents in those medical centers and in other hospitals and cities behind the front(both out patient and inpatient treatment). Today, more than 13 years after the end of the Iraq - Iran war, approximately 34,000 Iranian military and civilians are still suffering from the long term effects of chemical weapons deployed by Iraq (especially mustard gas), and they are receiving medical treatment services by the organization of veterans affair (Janbazan organization)[12]. The severity of these late complications in CW victims depends on the rate of exposure, type and dose of CW agents[13], so we have a method in the Janbazan organization for categorizing the severity of complications in the CW victims. According to this method (based on severity of late complications and the clinical status), there are three category of patients: patients with MILD, MODERATE and SEVERE complications. In this article the criteria used in this categorizing method and the statistical results of this categorizing are discussed.

### INTRODUCTION

#### 1) Definition of chemical weapon:

According to article II of the Chemical Weapons Convention (CWC); "Chemical weapon" means the following, together or separately: a) Toxic chemicals and their precursors, except where intended for purposes not prohibited under the CWC, as long as the types and quantities are consistent with such purposes. b) Munitions and devices, specifically designed to cause death or other harm through the toxic properties of those toxic chemical specified in sub paragraph a, which would be released as a result of the employment of such munitions and devices. c) Any equipment specifically designed for use directly in connection with employment of munitions and devices specified in sub paragraph b (14).

#### 2) A brief history of chemical warfare:

The use of poisons as weapons and efforts to ban them dates from ancient times. Despite the Hague convention (1899/1907) and Geneva protocol (1925), chemical weapons were used in World War (WW) 1, Iran-Iraq war, by Italy in Ethiopia, by Japan in China and various other conflicts, and, they remain a serious threat for civilian and military personnel. During WWII chemical weapons were not used (for several reasons) but during the Iran-Iraq war (1980-1988) there were various unconfirmed reports that Iraq had used chemical weapons, but the international community was slow to react at first. However, UN fact-finding teams confirmed that Iraq had indeed been using chemical weapons on a massive scale and that Iran had suffered thousands of military and civilian casualties as a result of these attacks [17].

The first mission came to Iran in March of 1984 and released its official report (No: S/16433). They returned to Iran in 1986 and released their second report (No: S/17911) and the third mission took place on 1987 and the third report released in May 1987(No: S/18852).

The conclusions, based on field inspection, clinical examinations of casualties and laboratory analyses of chemical ammunition, can be summarized as follows: chemical weapons, in the form of aerial bombs, had been used in the areas inspected in Iran by the official UN team, the main type of chemical agent used was bisulfide or mustard gas, on some occasions evidence was found for the use of the nerve agent ethyl N, N-dimethylphosphor amidio cyanidate, or tabun [19]. These reports renewed attention to the dangers of chemical weapons proliferation and to the horrors of chemical warfare [20].

### **THE CATEGORIZING METHOD**

Today, more than 13 years after the end of the Iraq-Iran war, approximately 34,000 Iranian military and civilian people are still suffering from the long term effects of chemical weapons (especially sulfur mustard) used by Iraq, and they are receiving medical treatment by the organization of veterans affair (Janbazan Org). The severity of these late complications in those chemical warfare victims (CWV) depends on the rate of exposure to chemical agents, type and dose of agents, so we have a method for categorizing the severity of complications in these CWV. According to this method there are three categories of patients with chronic effects: mild, moderate and severe complications. The treatment and rehabilitation services and also the disability are based on the result of this categorizing method, so the criteria for this method for each category has been discussed in several professional and scientific committees and evaluated by the results of other researchers in this field. The method is compatible with scientific resources and textbooks and is principally based on physical examination, laboratory and paraclinic findings and the clinical status of patients. In order to avoid any misinterpretation in the paraclinic findings and discrepancies in evaluating physical examination findings, there is a standardized instruction, which is the basis of our clinics' performance.

#### **Principles of the categorizing method**

##### **1. -Determining of severity in pulmonary system lesions:**

- **Mild lesions** - spirometry:  $65 \leq FEV1 < 80$  or  $65 \leq FVC < 80$  physical exam: abnormal lung sounds
- **Moderate lesions** -spirometry:  $50 \leq FEV1 < 65$  or  $50 \leq FVC < 65$  physical exam: abnormal lung sounds
- **Severe lesions** - spirometry:  $40 \leq FEV1 < 50$  or  $40 \leq FVC < 50$  physical exam: abnormal lung sounds probably with scianosis and intercostal retraction or tracheal stenosis in bronchoscopy

##### **2. Determining of severity in skin lesions:**

###### **Mild lesions:**

- 1) Itching or burning without clinical lesions
- 2) Dry skin .
- 3) Hypo or hyper pigmentation or both or depigmentation less than 18% of body surface or in covered area.
- 4) Alopecia areata totalis or universalis.
- 5) Generalized vitiligo.
- 6) Psoriasis (less than 20% of body surface).
- 7) Lichen simplex and limited prorigo.
- 8) Limited and mild eczema.
- 9) Limited scars in covered area .

- 10) Single keloid without limitation in range of motion and in covered area.
- 11) Severe acne vulgaris and nodulocystic or suppurative hydradenitis.
- 12) Chronic hives or angioedema.
- 13) Vesicant lesions (localized).
- 14) Recurrent superficial fungal disease (chronic resistant dermatophytosis).

**Moderate lesions:**

- 1) Hypo or hyper pigmentation or both or depigmentation more than 18% of body surface or in uncovered area.
- 2) Severe and diffuse eczema.
- 3) Generalized prurigo.
- 4) Diffuse scar ( or in uncovered area ).
- 5) Keloid with limitation in range of motion and in uncovered area.
- 6) Generalized recurrent vesicant lesions.
- 7) Generalized and chronic itching with clinical lesions
- 8) Psoriasis (more than 20% of body surface).
- 9) BCC

**Severe lesions :**

- 1) skin or mucosal cancer (except BCC )

**3. Determining of severity in eye lesions:**

1. **Mild lesions:**

(Complains) photophobia- foreign body sensation- tearing- burning- itching - red eye - blurred vision - visual loss - pain - problem in reading (signs) conjunctival inflammation and hyperemia - sub conj. hemorrhage - vessels swelling - blepharitis - Meibomian glands dysfunction - papillary change

2. **Moderate lesions:**

Above complications + mild corneal involvement: epithelial and sub epithelial opacity - anterior stroma in peripheral cornea - perilimbal hyper pigmentation - iron deposit in cornea - band keratopathy - pannus < 2mm - no melting - BUT : 5-10 sec - Schirmer (with anesthesia) : 5-10 mm - red reflex : 9/10 - 10/10

3. **Severe lesions:**

Above complications + severe corneal involvement: Thinning - melting - severe hyaline like deposit - corneal vascularization, BUT < 5 sec - Schirmer (with anesthesia) < 5 mm - red reflex: 1/10-4/10

4. **Very severe:**

- above complication AND very severe corneal involvement: Diffuse corneal opacity - severe thinning - desmatocel - severe vascularization - red reflex < 1/10 - retina is not visible

**CONCLUSION**

Chemical weapons, as a serious threat for world peace and security, have a broad spectrum of harmful damage on different human organs. According to the results of evaluations of the clinical status of Iranian CWVs, and the categorizing the severity of late complications in them (Table 1), the most common complications in these patients are the pulmonary complications (from mild lesions to severe lesions). In general about 42.5 percent of Iranian CWV population are suffering from pulmonary complications (37% mild lesions - 4.5% moderate lesions - 1% severe lesions) (graph 1). In other hand as the nature of pulmonary complications of mustard gas is progressive and some late complications appear many years after exposure so the number of patients with these complications will rise. Graphs 2 and 3 show the percent of complications to the eye and skin. Managing this large

number of patients with different complications (mostly with mixed complications) is impossible without a well-organized care system. So in our country there are now several special clinics and well equipped medical centers for observing these patients, as well as a standard medical care program for management of late complications in these patients (by the periodical visits and follow up of patients).

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#### KEY WORDS

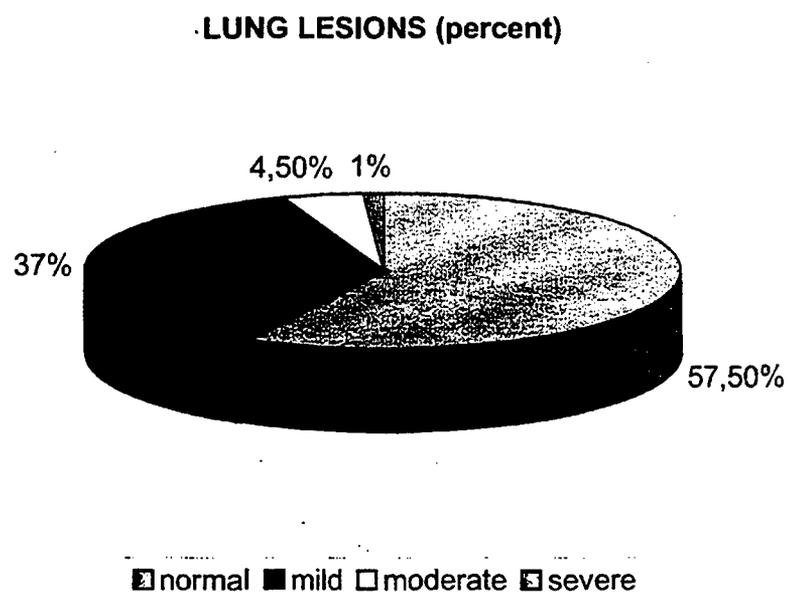
Late complications, mustard gas, categorization method, Iran, Janbazan, CW victims

#### FIGURES AND TABLES

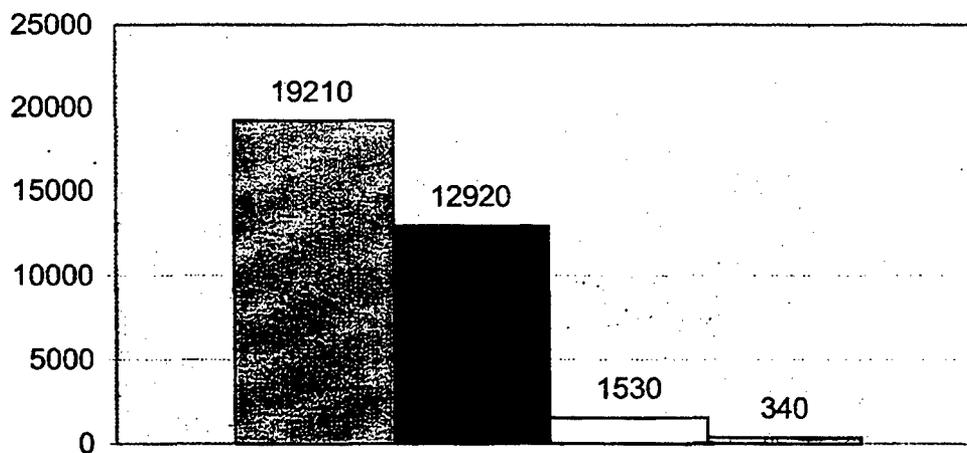
Table 1. The severity of lung, eye and skin complications in Iranian CW victims.

Klinical form	Lung	Eye	Skin
<b>Normal</b>	19550 (57.50%)	20638 (60.70%)	25670 (75.50%)
<b>Mild</b>	12580 (37%)	11900 (35%)	7820 (23%)
<b>Moderate</b>	1530 (4.50%)	1224 (3.60%)	510 (1.50%)
<b>Severe</b>	340	238	8

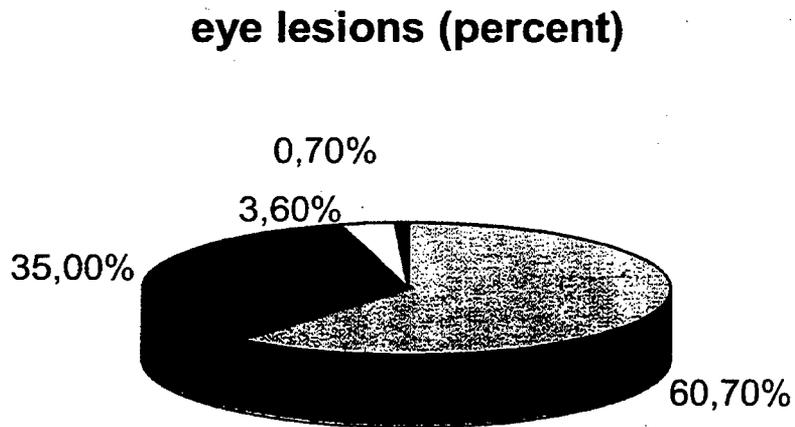
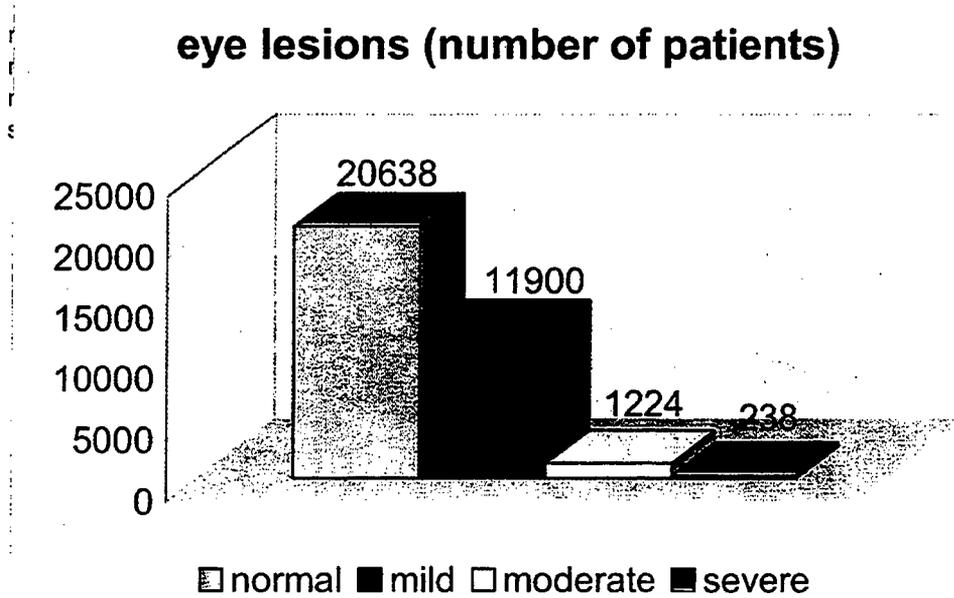
Graph 1: Lung lesions (percent of lesions and number of patients)



**LUNG LESIONS (number of patients)**

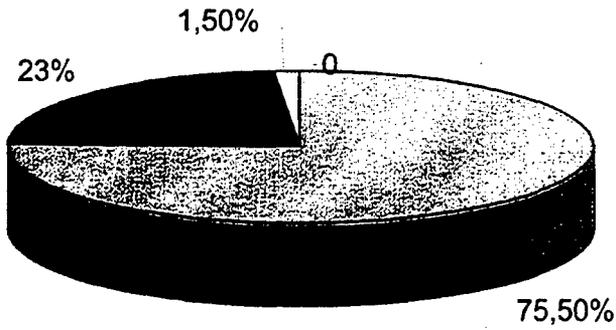


Graph 2: eye lesions



Graph 3: Skin lesions (percent of lesions and number of patients)

### skin lesions ( percent )



■ normal ■ mild □ moderate □ severe

### skin lesions ( number of patients )

