

Frequency of Helicobacter Pylori Infection Among Asymptomatic Adults Men With Sulfur Mustard Induced Respiratory Diseases in Iranian Veterans: C13-Urea Breathed Test with New infrared Spectroscopy: A Case–Control Study

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Abstract

Background: *Helicobacter pylori* (HP) infection is one of the commonest contaminations in the worldwide, and particularly in developing countries. It has found in a few of pulmonary disorders. However, the status of HP infection has not been known among the population of Sulfur Mustard(SM) induced respiratory diseases. The purpose of the study was to detect HP infection among asymptomatic SM focus population, and to compare with healthy subjects.

Material and methods: Sample population sequentially enrolled based upon a self-reported questionnaire in chemical veteran's clinic. The HP detected by C13-Urea breath test via infrared spectroscopy method.

Results: The mean age was 46.17 ± 9.21 SD in the case, and 46.27 ± 9.18 SD in the control groups, respectively. The age ranged from 35 to 70 years. The prevalence rate of infection established in case 78.3% and in control groups 50.4%, respectively. the significant differences found between cases with control groups ($\chi < 0.001$).

Conclusion: The significant difference observed between asymptomatic SM induced respiratory diseases with healthy subjects among Iranian veterans. Our results may be related to accruing of HP infection during wartime.

Keywords: *Helicobacter pylori*, sulfur mustard gas, C13-urea breathe test, infrared spectroscopy, respiratory disease, war, asymptomatic, male, adults, Iranian.

Introduction

Helicobacter pylori (HP) infection is one of the commonest contaminations in the worldwide [1], particularly in developing countries [2]. The

prevalence rate of HP colonization is basically related to aging variation¹, geographic location¹ and lower socioeconomic conditions³. Recent knowledge has been suggested that HP plays the broad clinical

significance role in developing pathogenesis of peptic ulcer [4]. Additionally, HP infection strongly linked with limited extra-digestive disorders [5]. It diagnosed in a few respiratory disorders [6], [7], [8]. Asymptomatic individuals should make them more at risk to the transmission of HP infection by person-to-person [9]. Deployment at position with poor hygiene conditions and obtaining unsuitable healthy services' likelihood might be led to an increasing of coincidence transmission of infection during wartime [10], [11].

The Sulfur Mustard(SM) is a serious chemical warfare agent. It introduced in Iran-Iraq conflict during 1980-1988 years [12]. Chemical victims were living in Iran up to 50,000. Intoxication with SM caused numerous disorders in the respiratory system at the long-time, such as, chronic bronchitis, bronchiolitis, asthma, bronchiectasis, interstitial lung fibrosis [13], [14], [15].

This is a new insight to identification of HP infection through the 13C-urea breath test (13C-UBT) among the population of SM induced respiratory diseases. Non-Dispersive Isotope Selective Infrared Spectroscopy (NDIRS) method is now well accepted, commercially available, an inexpensive, noninvasive test. Its accuracy rate of diagnosis is over 90%. It is a quantitative technique for identification of current HP organisms in epidemiological studies [16], [17], [1].

The aim of the seroprevalence case-control study was to determine and compare the status of HP infection among asymptomatic sulfur mustard induced respiratory diseases and healthy subjects among Iranian veterans.

Material and methods:

The study was a cross-sectional, and case-control. It finalized in Shahid Beheshti University of medial

sciences(SBMU), Loqmqn Hakeem general teaching hospital, Tehran, Islamic Republic of Iran since 2008, years. The study population was SM-exposed veterans who served in the Iraq-Iran conflict during 1980-1988 years, enrolled randomly among the outpatients of chest clinic. The participants were investigated by self-reported questionnaire. The highlight topics of the questionnaire consisted of demography data, registered information of SM-exposed and SM respiratory induced disorders-diagnosed by a physician. Aside, gastrointestinal data gathered about surgery, clinical feature of GI diseases, and history of HP infection, or previous eradication therapy and usage of medications.

The inclusion criteria included male sex, positive history of gas-exposed, SM induced respiratory diseases, and there were not gastrointestinal disorders or surgery.

SM-exposed confirmed by in person interview, taking history of symptoms and signs of gas-exposed. The target population examined with one physician through studying, previous medical records, Chest X-ray and pulmonary function testing. Respiratory diseases consisted of asthma, chronic bronchitis, bronchiolitis, interstitial lung fibrosis, and bronchiectasis.

One gastroenterologist performed the assessment of gastrointestinal (GI) disorders. Physician visited participations through taking history, to check out symptoms and signs of GI by questionnaire, and physical examination.

The exclusion criteria included previous eradication therapy such as; using of proton pump inhibitors and or H2 receptor antagonists, bismuth compounds, receiving antibiotics within the last two months. Operation gastric and hepato-biliary, dental disorders and metabolic diseases also omitted.

The first -stage completed in order to investigate

agreement results of the questionnaire with criteria of study. The participations rate was 43% in first stage.

9% of subjects were unable to be continued and or compatible with criteria in the second -stage. And total of 69 subjects followed the study.

The non-exposed group enrolled based on the aged sex-matched and in health subjects. The HP infection also evaluated among asymptomatic healthy subjects [18] ,[19]. All the selection criteria similarly applied on the control as the case group.

13C-UBT is the relatively noninvasive test, which had diagnostic accuracy over 90% for detection of H, Pylori infection. Test was based upon unese activity in HP organism. The labeled urea with Carbone-13 will be rapidly hydrolyzed by unese enzyme of HP. The resulting co2 absorbed across the gastric, and hence via the systemic circulation, excreted as c-13 co2 in the expired breath. The method of (NDIRS) performed for recognition of HP. Equipment applied isomax and mad in isotechnica.inc.

Subjects referred to unique laboratory after overnight fasting. The using test meal was 200 ml citric acid.

Ten minutes after ingestion of a test meal, a baseline exhaled breath sample collected in a standard balloon (300cc volume). Subsequently, 75 mg C13-urea powder (nearly 1mg/Kg) dissolved in 50 ml of water consumed orally. After that, secondary breath samples were taken at 30 minutes in a secondary balloon. All participations kept in sitting position over the whole study period. Two previous balloon samples analyzed with NDIRS method. Ratio of C13/C12 estimated as Delta over Baseline (DOB) and expressed as a millipcentage (‰). The cut –off point of DOB defined as an increased greater than 4.0‰.

All collected data performed with SPSS statistical program, Version 13 for windows. Comparative of means analyzed with Pearson Chi-Squared test. P-value was statistically significant at P<0.05.

Results:

Sixty-nine males' participations as cases sequentially recruited among SM induced respiratory diseases. The Mean age recorded 46.17 ± 9.21 SD years. The age ranged between 35 to 70 years, mode=35 years.

Table -1 shows frequency of H, Pylori infection in Sulfur Mustard induced respiratory diseases and healthy subjects groups

Characteristics of variables	Case group	Control group	
Number of subjects	69	91	
Gender	Male	Male	
Groups	SM exposed	Healthy subjects	
Age/ year	46.17 ± 9.21	46.27 ± 9.18	
Respiratory disorders: Asthma	49.3%	-	
Broncheictasis	27.5%	-	
ILD	23.2%	-	
C13-UBT values	18.17 ± 15.45	14.30 ± 16.86	$\chi < 0.001$
positive C13-UBT	78.3%	50.4%	

ILD=interstitial Lung Fibrosis, C13- UBT= C13- urea breathe test, SM sulfur Mustard gas

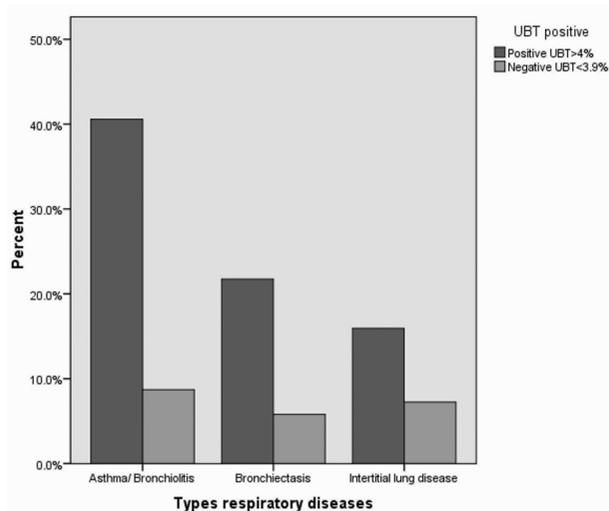


Figure 1 reveals frequency of HP positivity within the group of respiratory diseases

The frequency of respiratory disorders consisted of asthma/ bronchitis (34) 49.3%, bronchiectasis (19) 27.5%, interstitial lung fibrosis (ILD) (16) 23.2%, respectively. Table 1 shows results of the study.

The Mean of C13-UBT measured 18.17 ± 15.45 SD. The overall frequency of positive C13-UBT observed 62.5% in target population. Of those 54% was in cases and 46% detected in the control group. Figure 1 shows frequency of HP positivity within the case group of respiratory diseases. Frequency distribution of HP infected among SM induced pulmonary diseases revealed asthma/ bronchiolitis 52%, bronchiectasis 28% and ILD 20%, respectively.

Ninety-one healthy males enrolled as control groups. The mean age recorded 46.27 ± 9.18 SD years. The mean of C13-UBT detected 14.30 ± 16.86 SD. There were significant differences between case with control groups ($\chi < 0.001$). However, no correlation between age with C13-UBT observed ($r=1$, $p > 0.5$).

Discussion:

The presence study has several distinct features' respects to current studies. Surveys of HP infection

among SM induced respiratory diseases have not been performed with following characteristics as yet. They included long-time postwar (15 years), as comparative study with healthy subjects and detection of the infection by infrared spectroscopy method (NDIRS).

In our study, the significant difference of positive C13-UBT observed between population of the asymptomatic SM induced respiratory diseases with the healthy subjects ($\chi < 0.001$). The frequency of HP infection among SM population was higher than the control group. Our results of study may be an improvement with following evidence.

The most common SM induced pulmonary disorder reported including bronchitis bronchiectasis, asthma/ bronchiolitis and interstitial lung fibrosis. Several epidemiological studies showed that the highly noticeable rate of HP infection carried out in the limited number of respiratory disorders [20]. The first report of increasing seroprevalence of HP infection published in 1998 years. It revealed 81.6% HP infection in the chronic bronchitis. Moreover, another parallel study had also shown that meaningful relation presented between chronic bronchitis and HP [21], and as well as bronchiectatic patients disclosed HP infection at a significant rate [22], [23]. Bronchial asthma is the more prevalent of respiratory disease. There was an inverse association between prevalence of HP infection with the incidence of asthma disease in developed countries [24]. Asthma / bronchiolitis disease has the noticeable of frequency in the SM induced respiratory diseases, and rate of HP positivity was higher than another SM induced diseases. The current concept is disagreement with the early report.

A few reports indicated the role of war on the seroconverting rate of HP infection, [25], [26]. Deployment long-period in the combat areas, poor

sanitation conditions [27] and living conditions in the wartime were the casual risk factors. Data of current epidemiological studies conducted initially at wartime (not a long-time post wartime), and also performed about subjects were living in combat areas. They were soldier or civil public. Therefore, it can be resulted from the fact that a warred condition has the chance to be increased Hp infection rate.

Age distribution plays the role for the infection rate. The natural history of HP infection occurs at young age. The prevalence of acquisition infection increased with rising age, and increasing frequency reported from 23.4% in 12-14- year- old up to 72.7% in 60-64 year- old [11]. The available data of the veterans indicated that the aging at-risk acquired infection might be occurred more in adulthood and young adults in Iraq- Iran's combat at the wartime[28].

Generally, frequencies of HP infection reported among cases and control group revealed 78.3% and 50.4 %, respectively. Epidemiologic studies showed that asymptomatic healthy individuals had been higher seroconverting rate of HP infection [18],[19],[29]. Aaside, overall rate of infection also was noticeable in the public of studies with respiratory disorders [6],[7], [8]. Our resultants are disagreement with current studies. Only a few limited studies from the Bangladesh and the Libya supported strong prevalent infection among asymptomatic subjects in developing countries [2],[30].

SM can develop various pulmonary diseases at long-time [13],[14],[15]. They are more susceptible to respiratory infections [31]. Antibiotic therapy was more commonly used among SM exposed as a management protocol of infection It can be influenced on the rate of developing HP infection [32] through changing both the rate of eradication and or acquired resistant. However, we had a limitation in our study and clearly don't know about type and

duration of long-term multiple antibiotic therapy for chronic respiratory diseases among the sample of study.

In conclusion, the prevalence of HP infection was significantly difference between SM induced respiratory diseases with the healthy population among asymptomatic individuals. The specificity of our study consisted of determination prevalence of HP infection through new infrared spectroscopy method, and within chemical population of SM exposed veterans. However, the study conducted after long- time postwar and in asymptomatic subjects. The future studies will be necessary in order to clarify the effect of HP infection, and followed eradication on prevention and natural quality of respiratory diseases.

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