



## Welder's Pharyngitis: Clinical Profile of a New Type of Chronic Occupational-Irritant Pharyngitis

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### ABSTRACT

*Welding fumes constitute a definite occupational hazard. Chronic indolent Pharyngitis lasting more than 4 weeks is common among the subset of population whose occupation deals with welding fumes. This type of irritant Pharyngitis seems to be a distinct clinical entity. This study aims to spotlight the unique clinical features of Welder's Pharyngitis. Unique clinical features of this entity include "angry red" pharyngeal mucosa, cobble stone like appearance of Posterior pharyngeal wall, hypertrophy of lateral pharyngeal bands, and symptom free "Holiday" periods.*

**Keywords :** Chronic Pharyngitis, hypertrophic granular, Environmental pollution, Chronic irritants, Cough, Occupational disease, Welders, Pharyngeal wall, Posterior pharyngeal wall, Welder's Pharyngitis, Zinc, Cadmium, Beryllium, Mercury, Nickel, Iron Oxide, Lead oxide, Fluorides, Ozone, Phosgene, Nitrogen oxides, Organic halogenated compounds

### INTRODUCTION

Chronic Pharyngitis is persistent inflammation of Pharynx for more than 4 weeks. Welding fumes contain a variety of noxious chemicals which can initiate and maintain inflammation of pharynx. This study aims to highlight a novel persistent type of Pharyngitis seen in Welding workers.

### Type of Study

This was a Descriptive longitudinal epidemiological type of study.

### Materials and methods

A total 55 patients visiting our ENT out-patient clinic were selected for the study. The study was carried out from 1 January 2013 to 30 April 2013(4 months). The patient selection criterion was as follows.

### Inclusion criterion

1. Welder by occupation <sup>(ref 14)</sup>  
Working definition of a welder is a person who engages in welding work more than 8 hours in a day. It was determined if the patient actually was exposed to Welding gases and fumes as a part of their day today work.
2. History of Sore throat, difficulty in swallowing, irritation in the throat, cough, foreign body sensation, bad odor (Cacosmia) in throat lasting more than 4 weeks
3. Oropharyngeal cultures are usually negative for any typical bacteria. <sup>(Ref 16, 17)</sup>
3. Typically the patients had taken long course of Antibiotics; usually more than 10 days, and a strong case for Welder's Pharyngitis is non response to Antibiotics.

### Exclusion criterion

1. Positive culprit pathogen identified by throat culture for instance Group A beta hemolytic *Streptococci*, most common pathogen in Acute and chronic Pharyngitis. This does not include commensals which normally colonize the oropharynx like *Bacteroides Actinomyces*, *Staphylococcus*, *Prevotella*, non-hemolytic *Streptococci* and *Lactobacillus*. <sup>(Ref 16)</sup>

2. Less than 84 weeks sore throat are likely to be infective hence were excluded. Suspicious signs like loss of weight, radiating pain to one side, neck lymph node enlargement, Immuno deficiency were excluded
4. Presence of lymphadenopathy, or hepatosplenomegaly or a grey membrane over tonsils, petechiae on the soft palate (infectious mononucleosis) or fever or ulcerative vesicles (Herpangina) or reflux or evidence of postnasal drip(chronic sinusitis) <sup>(Ref 18)</sup>
5. Any other causative factor identified like for example presence of chronic tonsillitis: tonsillar crypts, positive squeeze test and the enlargement of Jugulodigastric lymph nodes. <sup>(Ref 15, 17)</sup>

Smoking habit acts as a carrier of the noxious fumes, hence smokers were not excluded from the study. <sup>(18)</sup> All the selected patients underwent a Diagnostic Video-endoscopy, Throat swab, Peripheral smear, Blood ASO titer, and complete haemogram. Hospital Ethical committee approval was obtained for the purpose of the study.

### Results

#### Symptoms and signs

The most common clinical presentation of these patients was as follows in table

All the patients gave a history of sore throat and difficulty in swallowing more than 4 weeks in duration(55=100%), most of the patients also suffered from a cough (44/55=80%), cough was typically exacerbated during work. Halitosis and Cacosmia was present in few cases (33%).

Patients also reported a marked improvement in symptoms on weekends and on holidays, (39/55= 71%) implying that it is Welding fume that is the causative agent. Patients experienced a sensation of dryness of throat and metallic taste more in the evenings (23/55=42%). This could be due to cumulative effect of the fumes/ dust during day time.

Figure 1: A typical case of Welder's Pharyngitis showing typical "Angry red" pharynx with Cobble stone appearance of Posterior pharyngeal wall. This patient was a welder by occupation for the past 11 years.



Source: Photographed by the Author

All the cases had congestion and cobble stone like granular posterior pharyngeal wall, (55/55=100%) typical of Irritant and allergic Pharyngitis. In a vast majority of patients the posterior pharyngeal wall was markedly red and angry looking, (51/55=92.7%): this seems to be an important diagnostic criterion. There was associated congestion of tonsillar pillars and uvula in many cases (43/55=78.2%). There was post nasal drip (27/55=49.1%) and features of Allergic Rhinitis in some cases (20/55=36.4%).

**Discussion**

**Pathogenesis of Welder's Pharyngitis**

Occupational Pharyngitis has been thought to be due to a Type IV delayed type Hypersensitivity reaction to foreign antigen (T cell reaction) <sup>(1)</sup>. This is also called Cell-Mediated Hypersensitivity or T cell reaction. Here a subset of Antigen Sensitized T-Helper1 cells release cytokines that activate macrophages or T helper cells which mediate direct cellular damage.<sup>(2)</sup>

The late consequence of which is formation of a granuloma. The cobble stone appearance of mucosa in Chronic Pharyngitis could represent a spectrum in the pathogenesis of Irritant Allergic Pharyngitis. A variety of chemicals are known to induce DTHC reaction, notably Nickel salts and dyes.<sup>(3)</sup>

**A distinct clinical entity**

Group A Beta hemolytic Streptococcus traditionally causes Pharyngitis; this is characterized by acute onset of fever, body pain, sore throat, difficulty in swallowing ear pain and halitosis. Typical signs include inflammation and oedema of Tonsils and posterior pharyngeal wall, neck may reveal swollen, tender Jugulodiagastric lymph node in proximity to angle of Mandible. <sup>(16)</sup>

Infectious mononucleosis is also a very common causative agent of Pharyngitis. Acute onset of symptoms, presence of petechiae on the soft palate, hepatomegaly, splenomegaly, reddish skin rash, grayish membrane over tonsils and atypical lymphocytes in blood smear: point to Epstein-Barr virus as the typical causative factor. <sup>(16)</sup>

Chronic non Specific Pharyngitis is a condition where the patient suffers from long duration, discomfort of throat whose severity varies from time to time. Various factors are attributed to this condition like smoking, GERD, environmental pollution, chronic sinusitis, poor oral-dental hygiene and indoor heat. The clinical signs described include hypertrophy of the lateral pharyngeal lymphoid bands, cobble stone appearance

of Pharyngeal wall and post nasal drip. <sup>(18)</sup> There are typically few clinical signs. This disease seems to be a separate condition from the Irritant Occupational/ Welder's Pharyngitis.

This study aims to systematically *exclude* such causes of Pharyngitis, and establish that Occupational Welder's Pharyngitis is an irritant type of Pharyngeal inflammation *distinct* from the traditional *Streptococcal* Pharyngitis.

Welder's Pharyngitis is more of a chronic hypertrophic Pharyngitis, with a negative throat culture. There seems to be a little role for antibiotic use in this disease.

**Toxins in Welding fumes**

Welding fumes is a cocktail of extremely irritant and immunogenic chemical. Occupational Safety and Health Administration (OSHA) list a number of pathogenic chemicals in welding fumes. These are depicted in the following table. <sup>(8)</sup>

Many western occupational regulatory agencies like National Institute for Occupational Safety and Health (NIOSH) have established recommended exposure limit (REL) for welding fumes.<sup>(4)</sup>

**Table 1 <sup>(Ref 8)</sup> Known chemicals in Welding fumes that are pathogenic**

S.No	Name of chemical
1.	Toxic metallic fumes like Zinc , Cadmium, Beryllium, Mercury, Nickel, Iron Oxide, Lead oxide
2.	Non metallic inorganic gases like Fluorides, Ozone, Phosgene ,Nitrogen oxides
3.	Organic halogenated compounds like Chlorinated hydrocarbon solvents

American Conference of Governmental Industrial Hygienists (ACGIH) has set a upper limit of 5 milligrams per cubic meter per 8 hour working-day.<sup>(5)</sup> The known problems caused by welding fumes is illustrated in the table below.

**Table 2 Known problems caused by welding fume and gases <sup>(Ref 6)</sup>**

S.No	Diseases
	Pneumonia or Lung infection <sup>(7)</sup>
	Chronic Obstructive Pulmonary Disease (COPD) <sup>(12)</sup>
	Occupational asthma <sup>(11)</sup>
	Cancers like Nasopharyngeal carcinoma <sup>(10)</sup> , Lung cancer
	Metal fume fever
	Temporary reduced lung function <sup>(11)</sup>
	Irritation of throat and lungs

**Outcomes of this study**

Irritant Pharyngitis has not been described clearly in any literature, though most of the articles cite welding gases as irritant of the respiratory tree. The unique clinical features of this novel clinical entity are summarized in the following table.

**Table 3: Unique Clinical features of Occupational Welder's Pharyngitis**

S.NO	Clinical features
	Sore throat / Difficulty in swallowing/ Cough > 4weeks
	Cobble stone appearance of Posterior pharyngeal wall
	Angry red pharynx mucosa = Typical
	Holiday/ weekend symptom free periods
	Dryness / Metallic taste in late afternoon and evenings
	Associated irritant/allergic symptoms like Urticaria, Allergic rhinitis, Asthma, Atopic dermatitis,
	Hypertrophy of the lateral pharyngeal lymphoid bands <sup>(16)</sup>

	Sore throat / Difficulty in swallowing/ Cough > 4weeks
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### Conclusion

Though most of the standard textbooks on otolaryngology like Cummings: Otolaryngology: Head & Neck Surgery, 4th

edition<sup>(15)</sup> and Scott-Brown 's Otorhinolaryngology Head and Neck Surgery 7<sup>th</sup> edition<sup>(16)</sup>; mention Environmental exposures and air pollution as cause of Pharyngitis<sup>(15)</sup>, there is very little literature on the clinical features and pathogenesis of Irritant Pharyngitis. This study highlights the unusual clinical features of Welder's Pharyngitis.

### Conflict of interest statement

Declaration of Conflict of interest = None

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