

## CLINICAL VIGNETTE

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# Military Burn Pit Exposure and Subsequent Chronic Vasomotor Rhinitis

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Monica Tsai, MD and John Le, MD

### *Introduction*

Veterans exposed to fumes from open air burn pits during military service are vulnerable to the effects of these airborne hazards on their health and quality of life. On August 10th, 2022, the Promise to Address Comprehensive Toxics Act (PACT Act) was signed into law by President Biden to improve healthcare access and benefits for our Veterans. In the first year of its implementation, nearly 5 million Veterans have undergone toxic exposure screenings through the Veterans Health Administration. We present a Veteran who was exposed to military burn pits in Iraq from 1990-1991 and subsequently developed new onset chronic rhinitis which has persisted for over three decades. This case sheds light on a classic presentation of the health hazards of toxic airborne exposures that negatively impact quality of life for Veterans. Increased awareness of risk factors for diseases may improve patient aligned care sensitive to the unique needs of our Veterans.

### *Case Presentation*

A 65-year-old Veteran presented for Allergy and Immunology for chronic rhinitis. He was referred for evaluation after completing the Toxic Exposure Screening questionnaire in Primary Care clinic. He reported prior exposure to military burn pits, along with presumptive condition of chronic rhinitis. He served in the military during Operation Desert Storm in Iraq and experienced daily exposure to burn pits fumes from December 1990 to June 1991. He was in close proximity to thick smoke from the burn pits and recalled that “the smoke turned the air brown, and it stayed like that every day.”

Symptoms of chronic rhinitis began shortly after returning from Operation Desert Storm and included constant nasal congestion, rhinorrhea, post nasal drip, cough, sinus pressure, and itchy watery eyes. He denied recurrent sinus infections, asthma, or other atopic conditions. Prior treatments included fluticasone nasal spray which helped during brief periods of use, but was limited due to glaucoma requiring treatment with brimonidine, latanoprost, and netarsudil eye drops, as well as intravitreal injections.

Physical examination of the nasal passages revealed significant enlarged, pale bilateral inferior nasal turbinates. Allergy testing was negative for environmental allergies to tree pollens, grass pollens, weed pollens, molds, dust mites and animal dander. Further history regarding chronic rhinitis revealed nonallergic triggers including hot/cold temperature changes, spicy foods,

and particulate exposure. His presentation was consistent with chronic nonallergic vasomotor rhinitis.

Treatment focused on avoidance measures and medications for rhinitis. He began to use a HEPA air filter to improve air quality in his residence. He was started on nasal cromolyn and ipratropium nasal sprays. Intranasal steroid sprays were held indefinitely due to his history of glaucoma. At six weeks follow up, he had excellent response on this regimen.

### *Discussion*

More than 4 million service members were exposed to burn pits over the past three decades.<sup>1</sup> Multiple health agencies are examining the health effects of burn pit exposure. In 2014, the Veterans Administration created an open registry called Airborne Hazards and Open Burn Pit Registry (AHOBPR) which allows Veterans to voluntarily fill out a questionnaire to potentially link burn pit exposure to health conditions.<sup>2</sup> As of September 2022, over 336,000 Veterans have completed the questionnaire per the Veteran Affairs website.<sup>3</sup> Epidemiological studies using this database have associated chronic respiratory conditions including emphysema, chronic bronchitis or chronic obstructive pulmonary disease with burn pits.<sup>4-6</sup> These studies suggest a dose-response association between increased days of deployment around burn pits and the risk of lung disease.<sup>7</sup>

Open air burn pits have been used in US military operations for waste disposal for decades. Active burn pits operate 24 hours a day, 7 days a week, and emit toxic fumes. Objects burned in the pits include plastic, styrofoam, rubber, petroleum, chemicals, paint, and munitions including unexploded ordinance. Jet or diesel fuel is often used to start or accelerate the fire. Burning releases an array of harmful compounds such as dioxins, polyaromatic hydrocarbons, heavy metals, particulate matter, and other potentially dangerous airborne pollutants.<sup>8</sup> The complexity of these emissions makes it challenging to precisely quantify the short- and long-term health risk to exposed Veterans.

Acute reactions to exposure to the fumes include irritant reactions of the eyes, skin and airways, as well as cardiovascular and gastrointestinal tract conditions. Long term health conditions can result from burn pit exposure. The PACT Act added 23 presumptive conditions associated with airborne hazards and

burn pit exposure. These include 21 types of cancers, and disorders of the respiratory tract including asthma, chronic sinusitis and chronic rhinitis.<sup>9</sup> Because these are listed as presumptive conditions, it is presumed that these conditions were caused by prior military toxic exposure. The implementation of the PACT Act will improve health care access and eligibility for millions of Veterans affected by prior toxic exposures.

Burn pit exposure is associated with subsequent chronic rhinitis due to allergic and nonallergic mechanisms. The underlying pathogenesis of chronic rhinitis is thought to be multifactorial involving several components of airway mucosal tissues. Healthy sinonasal tissues rely on the epithelial cell barrier and mucociliary clearance for physiologic function. Impaired mucociliary clearance can result from exposure to environmental toxins. In addition, mucostasis leads to relative tissue hypoxia which affects ion transport in ciliary tissues and causes ciliary dysfunction. Compromised epithelial cell barrier function can be seen in chronic rhinitis as a result of inhaled irritants, allergens and pathogens.<sup>10</sup> A cohort study of 186 patients presenting to a US military rhinology clinic found that patients who were exposed to burn pits had increased subjective and objective sinonasal disease compared to those with no exposure.<sup>11</sup>

In this case our patient's exposure to burn pit fumes caused vasomotor rhinitis which developed into chronic rhinitis. The patient had an excellent response to the standard therapies for vasomotor rhinitis. This highlights the potential to improve the health and quality of life of our Veterans by addressing conditions that may arise subsequent to military burn pit exposure.

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