

The Compass

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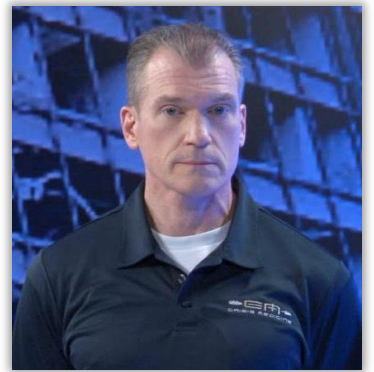


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Foundation



Case Report

Sulfur mustard exposure with Dr. Michael Shertz



Dr. Michael Shertz
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While providing medical coverage for an NGO, an Iraqi security guard presents to your clinic with extensive redness, superficial swelling and blisters across his right buttock. He states he sat on some ground that was damp about 24 hours ago. He got up when he realized the wet ground had seeped through his pants. About an hour later he noted burning pain across his right buttock. He states the area had been previously mortared by ISIS.

Review of Systems: He has no systemic complaints, nor fever, facial swelling, conjunctivitis, or SOB.

Physical Examination: Completely normal vital signs with what appears to be over 4% body surface area (BSA) partial thickness burn across his right buttock. No skin involvement elsewhere.



Differential Diagnosis: Thermal burn, contact dermatitis, or chemical warfare vesicant exposure (mustard agent).

The patient would have been aware if he experienced a thermal burn. Contact dermatitis can occur when the skin reacts to an irritant, but typically doesn't develop larger blisters or bulla. Sulfur mustard agent has been used by ISIS in Iraq.

Diagnosis: Likely sulfur mustard exposure.

Treatment: Supportive care similar to that for any thermal burn. Mustard agent burns are not as deep as thermal burns and subsequently don't require as much IV fluid for resuscitation. If no secondary infection, he will completely recover without any scarring in a few weeks.



Sulfur mustard is a chemical warfare agent first used by the Germans at Ypres in 1918. As a liquid, its color can range from dark yellow to black depending on purity. The vapor is heavier than air and will collect / persist in low laying areas. The vapor is often described as having an odor like garlic, onions, mustard, or an "industrial" smell. It was felt to be responsible for 70% of all WWI chemical warfare casualties.



WWI British troops wearing gas masks

Sulfur mustard is an alkylating agent that binds to cellular DNA resulting in cell death. Onset of symptoms occur within one to several hours depending on concentration of substance exposure. Overall mortality is about 5%.

Mustard gas's benefit on the battlefield was because it causes damage to intact skin, gas masks alone weren't sufficient protection. If inhaled, it can cause central airway damage, essentially a respiratory "burn", laryngeal spasm, airway obstruction and resultant death. Secondary bacterial pneumonia can occur. COPD can be a late term effect in survivors. Treatment of respiratory exposures are supportive.

Even large surface skin exposures (>20% BSA) can be fatal. If exposed skin is decontaminated within two minutes, there is no pathologic effect. If not removed until five minutes, 50% damage, and by 15 minutes, 90% damage will occur. Less significant exposures can cause mucus membrane irritation, conjunctivitis, and temporary blindness.

Though some say the fluid in the "mustard" blisters contains residual mustard agent, the US DOD has tested this, and it does not, nor is it a source of secondary contamination. However, with the persistent nature of mustard agents, it is worthwhile to always decontaminate the patient's skin, even hours later, as often some agent remains. Use of Reactive Skin Decontamination Lotion would be the decontamination substance of choice and has good efficacy against mustard agents. 0.5% bleach and simple soap and water would be second choices. Traditionally, Fuller's earth, a clay soil, was used to physically remove the oily agent from contaminated skin.

Reference: Medical Aspects of Chemical Warfare, 2008, available online at: <https://ckapfwstor001.blob.core.usgovcloudapi.net/pfw-images/borden/chemwarfare/FM1.pdf>

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