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Case report

The unusual presentation of a burn from methyl bromide exposure: A case report and review of the literature

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ABSTRACT

Methyl bromide chemical burns are rare. Only two cases have been reported to date. The presentation of methyl bromide chemical burns is unusual. Patients with an acute exposure should be observed closely as the initial presentation can appear deceptively benign. The latency period lasts several hours prior to the development of chemical burn wounds. In this article, we review the literature on methyl bromide chemical burns and present our experience managing a patient with an extensive methyl bromide burn.

1. Introduction

Methyl bromide is a fumigant used in the agricultural industry. It has been previously used in fire extinguishers and as a refrigerant. Methyl bromide has been increasingly recognized as a health and environmental hazard, and as a result, developed countries have been limiting its use over the past couple of decades.

Methyl bromide is a colorless highly toxic liquid or gas [1]. Its boiling point is 4°C. It is often stored in pressurized cylinders in liquid form, but upon exposure to ambient air quickly becomes a volatile gas. Since it is a gas at ambient temperatures, the most significant route of exposure to humans is through inhalation [2]. Acute exposure can lead to respiratory, neurologic, and renal impairment. Exposure can lead to delayed effects, with symptoms developing anytime from hours to days after the exposure [2].

Methyl bromide burns are rare. Excluding our case, only two cases of burns from methyl bromide exposure have been reported to date (Table 1). The last reported chemical burn from methyl bromide exposure was reported in 1985 [3], and prior to that was a case report published in 1965 [4]. Methyl bromide exposure is a rare cause of chemical burns but has a very unique presentation, as this case demonstrates.

2. Case report

This patient is a 56-year-old man who worked as a manager at a soil fumigation products distributing company. He was

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Table 1 – Reported cases of burns from methyl bromide exposure.

Authors	Case
Longley and Jones [4]	1 patient
Jarowenko and Mancusi-Ungaro Jr. [3]	1 patient

helping to transfer stored methyl bromide when the valve to the storage cylinder was accidentally opened. He was sprayed from short range with a blast of methyl bromide to the bilateral feet. The valve was immediately shut off after the incident occurred, limiting the duration of the exposure to several seconds. Fortunately, the patient was wearing full protective gear. He had on coveralls made up of a blend of polyester and cotton, as well as an overlying disposable laboratory coat. He also was wearing an industrial gas mask with Neoprene boots.

The patient went to the decontamination shower within 30s of the exposure and showered. For unknown reasons, he kept on all his personal protective equipment, including his boots, during the decontamination. He subsequently changed out of his work clothing and went home. He was visited at home by his supervisor approximately 4h after the accident and was noted to be doing well, with no symptoms or evidence of any burns on his body. The supervisor inspected the patient's feet, which by his report were normal in appearance.

Approximately 8h after the exposure, the patient started to note swelling and tingling in his feet. He presented to an outside hospital emergency department (ED) for evaluation. He was noted to have a 1% total body surface area (TBSA) burn on his left leg upon initial evaluation. However, he remained in the ED for several hours due to pain and was noted to have progression of his burn into a 4% TBSA burn. At that point, a transfer to our specialized burn unit was initiated. Upon arrival in our ED, he was noted to have an approximately 13% TBSA chemical burn to the left buttock, left posterior thigh, and bilateral legs and feet (Fig. 1).

He underwent debridement of his burn wounds and was started on wound care with silver sulfadiazine twice daily (Fig. 2). On post burn day #5 he underwent excision and allografting to his burn wounds. On post burn day #10 he then underwent a repeat excision and allografting to all his burn wounds. A rash was noted involving the bilateral lower extremities and the lower back (Fig. 3). Dermatology was consulted and a skin biopsy was taken. The pathology was notable for dermal hypersensitivity reaction with mild spongiosis of the epidermis. This was treated with topical steroids, to which the patient responded well.

On hospital day 14, Neurology was consulted given persistent weakness of the left lower extremity, despite aggressive physical therapy. This symptom was thought to be likely due to critical illness myopathy, but possibly due to deconditioning, or perhaps even a toxic neuropathy from the methyl bromide. He ultimately improved his lower extremity strength with daily physical therapy, so no additional diagnostics were pursued to evaluate for a possible neuropathy.

On hospital day 17, his rash had resolved and he was taken to the operating room for autografting of his bilateral lower extremity burn wounds. The autografts had 100% take (Fig. 4). On hospital day 26, he was transferred to the acute inpatient rehabilitation ward for intensive physical therapy. He was able to regain complete functional mobility with inpatient acute rehabilitation.

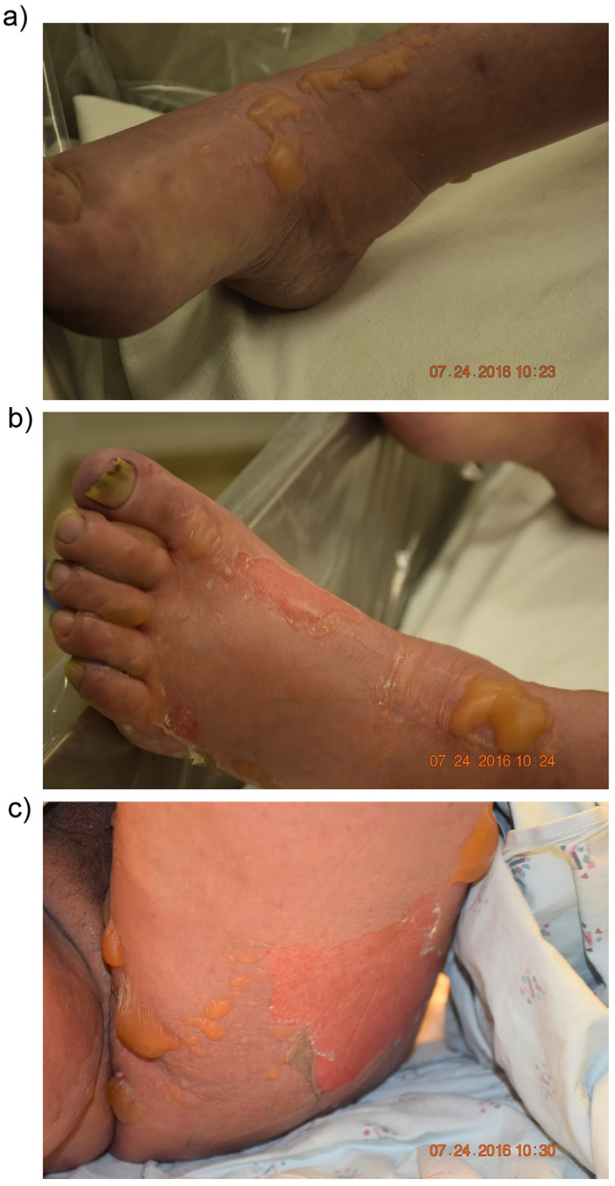

Fig. 1 – Initial patient presentation at our burn center, with predominantly superficial burns but focal areas with fluid filled blisters present on the right foot (a), left foot (b), and left buttock (c).

3. Discussion

This is the first reported incidence of a chemical burn due to methyl bromide since it was last reported in the literature in 1985 [3]. In this prior report, a chemical plant manager was exposed to an explosion of a tank containing methyl bromide. He subsequently developed burns to his feet, and similar to our