

Hydrofluoric acid burn

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A 52-year-old man presented to the outpatient department with severe pain, right palmar erythema and blanching for 3 days, and necrosis on the tips of 2 fingers for 1 day. Three days earlier, the patient had worn cotton gloves to twist off the cap of a bottle of 40% hydrofluoric acid to prepare a solution for crop pest control. At first, erythematous patches developed with minor discomfort, and he delayed first aid treatment, including water rinsing. Several hours later, grey patches and worsening pain developed, leading to progressive necrosis of his fingers (Figure 1A).

Results from physical and laboratory tests were unremarkable, except for a slight reduction in his serum calcium level (2.03 [normal range 2.25–2.75] mmol/L). Histopathology of 1 of the skin lesions showed poorly defined tissue structures of the full-layer dermis owing to severe liquefactive necrosis (Figure 1B). We diagnosed burns caused by contact with hydrofluoric acid. Surgical débridement and soaking of the hand with a calcium solution relieved the excruciating pain. The patient had recovered well without any residual damage 1 month later, accompanied by the loss of 2 finger tips after the surgical débridement.

Hydrofluoric acid is a dangerous inorganic acid that is widely used in electronics manufacturing, glass etching, removal of rust, pest control in agriculture and heavy-duty domestic cleaning.¹ The fluoride ions in hydrofluoric acid are strong scavengers of bivalent cations, such as calcium and magnesium, and can slowly penetrate skin tissue, resulting in necrosis. Many workers using this acid may not be aware of the hazards and protective measures that are needed.

Early symptoms of hydrofluoric acid burn can be insidious at concentrations of less than 50%, and reactions to the acid may be confused with allergic contact dermatitis. Accurate diagnosis and timely management of burns caused by hydrofluoric acid are crucial. Failure to recognize this type of burn may lead to irreversible local tissue necrosis, systemic poisoning (hyperkalemia, hypocalcemia and hypomagnesemia) and even death.²

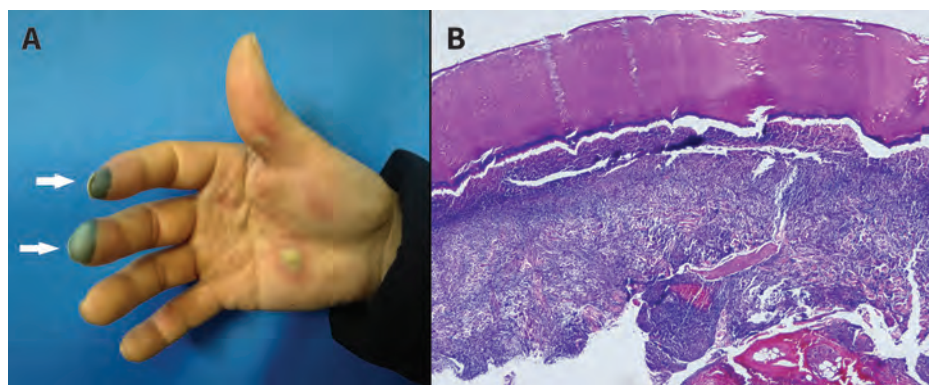


Figure 1: (A) Edematous patches, grey patches and necrosis (white arrows) on the right hand of a 52-year-old man, caused by contact with hydrofluoric acid. (B) Histopathology of a skin lesion showing poorly defined tissue structures of the full-layer dermis owing to severe liquefactive necrosis (hematoxylin and eosin stain). Original magnification $\times 100$.

The critical procedures in treating burns caused by hydrofluoric acid are prevention of absorption of the acid and blocking the progressive destruction caused by fluoride ions. The mainstays of treatment are early water irrigation, topical application of calcium gluconate reagents and surgical intervention.^{3,4}

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