

## Dermal Toxicity from a Paraquat-Poisoned Patient's Urine

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### CASE PRESENTATION

A nurse placed a Foley catheter in an intubated patient who had accidentally ingested approximately 50 mls of paraquat, a corrosive, restricted use herbicide. Despite using standard personal protective equipment for Foley catheter placement, including sterile latex gloves, some of the patient's urine got onto the nurse's right forearm.

### DISCUSSION

Paraquat dichloride, formally N,N'-dimethyl-4,4'-bipyridinium dichloride, is one of the most widely used herbicides in the world. Access to paraquat is limited in the United States and therefore, it is not a frequent cause of poisoning in the U.S. It is widely available on an unrestricted basis in Asia. Its main mechanism of toxicity is through creating reactive oxygen and nitrite species.<sup>1</sup> Paraquat is known to be fatal at very small doses (30 ml), leading to its unfortunate use in low- and middle-income countries as a means of self-poisoning. Paraquat is eliminated primarily through the kidneys and has particular toxicity for the lungs, kidneys, and liver. Clinically, it can lead to nausea, vomiting, and abdominal pain on one end of the spectrum, while in more severe cases it can cause seizures, heart failure, and death.<sup>1</sup> There is no antidote available for paraquat toxicity, although immunosuppressive medications may have a slight mortality benefit.<sup>2</sup> While paraquat is known to cause mucosal and skin toxicity, and it can be absorbed through the skin, the effect of urine from someone who ingested paraquat on the skin is not well described.<sup>3,4</sup>

In the case discussed, the nurse immediately rinsed her forearm with water and washed it with soap and water. Despite this, the nurse developed a 1% body surface area partial thickness chemical burn progressing to blistering within 30 minutes of contact (**Figure 1**). The nurse was evaluated by the burn surgery service and discharged after observation in the burn center. Besides pain, the nurse had some

**Figure 1.** Right forearm 30 minutes after contact with urine from a patient who had ingested paraquat.



**Figure 2.** Right forearm 24 hours after contact with urine from a patient who had ingested paraquat.



nausea which resolved after one dose of ondansetron in the burn center. She had no other systemic symptoms. The blistered skin painfully sloughed off within 24 hrs. (**Figure 2**).

Despite using standard precautions and protective personal equipment (PPE) while inserting the Foley catheter, the nurse sustained a chemical burn due to paraquat in the patient's urine.<sup>5</sup> Based on EPA references and also what is available in an Emergency Department, we suggest extended PPE recommendations for staff caring for patients who have ingested paraquat.<sup>6</sup> Particular attention should be paid to any staff potentially coming into contact with the patient's urine. PPE should include long sleeves, chemical resistant gloves (i.e. nitrile rubber  $\geq$  14 mils), plastic gown, and face shield/eye protection. This recommendation should apply even after external decontamination since the urine itself can be a significant dermal toxin.

## References

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