

# Irritant contact dermatitis due to povidone-iodine following a surgical intervention: An unusual case report

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## Abstract

The most common day-to-day antiseptic preparation used before any surgery usually involves povidone-iodine. Any irritant reaction to it can be devastating for the patient's aspect and would raise the need for a preliminary investigation prior to going through any antiseptic preparation. In literature, very few cases were reported on irritant dermatitis with povidone-iodine in Indian setting. We present a case of an 18-year-old female presented with irritant contact dermatitis due to povidone-iodine following a surgical intervention.

## Keywords

Irritant contact dermatitis, povidone-iodine, surgical intervention, case report

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## Introduction

Routinely, preparing the skin with an antiseptic preparation at the surgical incision site, which is referred to as preoperative skin antiseptics, is performed before beginning any surgery. This is done to remove all the microorganisms from the skin surface and prevent surgical site infection.<sup>1</sup> Povidone-iodine (polyvinylpyrrolidone-iodine (PVP-I)) solution is a water-soluble compound. It includes two components that are molecular iodine and polyvinylpyrrolidone, which is commonly used as a surgical antiseptic and a safe disinfectant agent. It also has been proven to have benefits in wound healing.<sup>2</sup> Although reaction to PVP-I solution occurs relatively rarely, still sometimes extended exposure to it can irritate or, rarely even, cause adverse skin reactions. Skin irritation may occur mainly due to oxidative effects associated with iodine. Due to less free iodine concentration within povidone-iodine, irritation to the skin occurs less frequently due to short contact. In rare cases, skin irritation or iododerma-like eruption could cause possible side effects due to the oxidative effects of iodine and hypersensitivity reaction.<sup>3</sup> The immediate reactions to povidone-iodine are difficult to diagnose due to the widespread use of povidone-iodine as an antiseptic.

## Case report

An 18-year-old female presented with pain and a mass in the axilla for 10 days. The mass started as a 1 cm × 1.2 cm and then progressed to 4.7 cm × 3.5 cm. Three days later, incision and drainage were done, during which betadine/povidone-iodine was used as the antiseptic. The patient complained of burning sensation, which was mistaken as pain. The dressing was done, and the patient still complained the same. In 2 h, upon the patient's complaints, when the dressing was being changed, the skin was found to be discolored, and chemical burns were noticed.

The patient had a history of urticaria, allergic sinusitis, allergic rhinitis, allergic dermatitis, allergic bronchitis, and

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**Figure 1.** Irritant contact dermatitis caused due to betadine.

asthma. The allergens reported were dust, pollen, and some dairy products. The patient gave a history of exposure to povidone-iodine as a child. Familial history of allergic dermatitis to harsh soaps, laundry detergent, and cosmetics was also reported. Familial history of Dercum's disease was present. The patient had no previous history of burns. On systemic examination, all the vitals were within normal range, and there were no clinical signs or symptoms of any systemic diseases. On physical examination, a 16 cm × 7 cm, tender erythematous brown discolored, well-demarcated, irregularly shaped lesions were noted on the woman's right arm and axilla (Figure 1). These cutaneous findings looked similar to a second-degree burn. Unexposed areas were completely normal. The patient was clinically diagnosed with irritant contact dermatitis after detailed history and examination.

### Investigations

The complete blood picture revealed an absolute eosinophil count of 800 cells/cumm (8%) and a decreased differential

lymphocyte count of 11%. The other blood parameters are normal. The lipid profile revealed increased LDL and decreased HDL. The rest of the lipid profile was within the normal range. Thyroid profile, liver and kidney function tests, HBA1C levels, fasting blood glucose level, and urine tests were all normal.

### Treatment

The dressing was done with soframycin ointment, and the patient was asked to avoid betadine, Dettol and savlon to prevent any further complications. A course of paracetamol and montelukast was prescribed in addition to the antibiotics (cefixime) to prevent any further infection. Steroids were avoided because they could cause necrosis and increase susceptibility to infections. The patient did not require any surgical measures or intensive treatment. The healing process was uneventful, and it healed with minimal scarring.

### Discussion

Iodophores like povidone-iodine are known to be used as an antiseptic for the prevention and treatment of wounds. It is a very efficient microbicide with a wide antimicrobial spectrum.<sup>4</sup> Povidone-iodine is considered to be a stable chemical complex consisting of polyvinyl pyrrolidone and elemental iodine. It is known to contain 9%–12% available iodine.<sup>5</sup> Betadine and povidone-iodine are classified as non-irritant antiseptic, but they have corrosive properties. Our case is a presentation of severe corrosive chemical burns caused by the usage of povidone-iodine in surgeries and surgical procedures. In our case, chemical burn occurred in a very short span of time and hyperpigmentation was noticed within 2 h after the procedure. The findings were similar to second-degree chemical burns.

In a study conducted by Borrego et al.,<sup>6</sup> 27 patients who developed post-surgical irritant contact dermatitis were examined. Interestingly, most of these patients exhibited a distribution pattern characterized by a double lumbar parallel pattern. It suggests that povidone-iodine may be responsible for triggering irritant dermatitis in these cases. This highlights the complexity involved in diagnosing and managing irritant contact dermatitis, as it can be challenging to identify specific irritants or triggers in certain individuals. Similar cases have been reported in the literature. Murthy et al.<sup>7</sup> reported a case of severe irritant contact dermatitis caused by the use of povidone-iodine solution as an antiseptic following spinal anesthesia. Another case reported by Kaur et al.<sup>8</sup> described a 50-year-old man who developed disseminated irritant contact dermatitis due to povidone-iodine, 2 days after surgery. Irritant dermatitis occurs when there is direct cytotoxic exposure to the causative agent, while allergic contact dermatitis is characterized by a cell-mediated immune response.<sup>9</sup> In specific cases, the use of outdated povidone-iodine can lead to irritant dermatitis resulting in burns.<sup>10</sup> In rare situations, it may even trigger anaphylaxis.<sup>11,12</sup> When patients are exposed to povidone-iodine and develop skin lesions resembling burns, it is important to first suspect irritant contact dermatitis as a possible diagnosis.

It is recommended that doctors should be aware of the potential for severe irritant contact dermatitis caused by povidone-iodine and other similar antiseptic solutions. Proper precautions should be taken to prevent such adverse reactions, especially in individuals with a history of allergic conditions or sensitivities. In cases where there is a strong clinical suspicion whether dermatitis is irritant or allergic, alternative diagnostic approaches should be considered, such as detailed patient history, examination, and observation of the response to exposure. When using antiseptic solutions, it is crucial to follow the recommended guidelines for their application and to closely monitor patients for any signs of adverse reactions. Prompt recognition and appropriate management can help minimize the extent and severity of chemical burns associated with irritant contact dermatitis.

## Conclusion

Our case highlights the potential for severe irritant contact dermatitis and chemical burns associated with the use of povidone-iodine as an antiseptic. It emphasizes the importance of considering irritant contact dermatitis as a differential diagnosis in patients presenting with skin lesions resembling burns, especially in those with a history of allergic conditions or sensitivities.

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## Author's contributions

Conception or design of the work: Khan, Ramadugu, Vijayalakshmi. First Draft of the article: Khan, Ramadugu. Critical revision of the article: Suvvari TK, Thomas V. Supervision of article: Vijayalakshmi, Thomas V. Final approval of the version to be published: Khan, Ramadugu, Vijayalakshmi, Suvvari TK, Thomas V.

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## Ethics approval

Our institution does not require ethical approval for reporting individual cases or case series.

## Informed consent

Written informed consent was obtained from the patient(s) for their anonymized information to be published in this article.

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## References

1. Dumville JC, McFarlane E, Edwards P, et al. Preoperative skin antiseptics for preventing surgical wound infections after clean surgery. *Cochrane Database Syst Rev* 2013; 3: CD003949.
2. Durani P and Leaper D. Povidone-iodine: use in hand disinfection, skin preparation and antiseptic irrigation. *Int Wound J* 2008; 5(3): 376–387.
3. Sammartino G, Tia M, Tete S, et al. Adverse reaction to irrigation with povidone-iodine after deep-impacted, lower third molar extraction. *J Biol Regul Homeost Agents* 2012; 26(1): 145–149.
4. Makhayeva DN, Irmukhametova GS and Khutoryanskiy VV. Polymeric iodophors: preparation, properties, and biomedical applications. *Rev. J. Chem* 2020; 10: 40–57.
5. National Center for Biotechnology Information. Povidone-iodine, <https://pubchem.ncbi.nlm.nih.gov/compound/Povidone-iodine> (accessed 28 January 2023).
6. Borrego L, Hernández N, Hernández Z, et al. Povidone-iodine induced post-surgical irritant contact dermatitis localized outside of the surgical incision area. Report of 27 cases and a literature review. *Int J Dermatol* 2016; 55(5): 540–545.
7. Murthy MB and Krishnamurthy B. Severe irritant contact dermatitis induced by povidone iodine solution. *Indian J Pharmacol* 2009; 41(4): 199–200.
8. Kaur M, Karadia P and Singh S. Povidone-iodine-induced disseminated irritant contact dermatitis. *BMJ Case Rep* 2022; 15(11): e251926.
9. Sasseville D. Occupational contact dermatitis. *Allergy Asthma Clin Immunol* 2008; 4(2): 59–65.
10. Kara A, Tezer H, Devrim I, et al. Chemical burn: a risk with outdated povidone iodine. *Pediatr Dermatol* 2007; 24(4): 449–450.
11. Gonzalo Garijo MA, Durán Quintana JA, Bobadilla González P, et al. Anaphylactic shock following povidone. *Ann Pharmacother* 1996; 30(1): 37–40.
12. Yoshida K, Sakurai Y, Kawahara S, et al. Anaphylaxis to polyvinylpyrrolidone in povidone-iodine for impetigo contagiosum in a boy with atopic dermatitis. *Int Arch Allergy Immunol* 2008; 146(2): 169–173.