Povidone-iodine-induced disseminated irritant contact dermatitis

Maninder Kaur , Priyanka Karadia, Saurabh Singh

Dermatology, Venereology and Leprology, All India Institute of Medical Sciences, Jodhpur, Rajasthan, India

Correspondence to
Dr Saurabh Singh;
saurabhdoc@yahoo.co.in

Accepted 1 November 2022

DESCRIPTION

A man in 50s was referred from the department of cardiothoracic surgery with pruritus, burning sensation and associated blistering over his neck, chest and legs for 2 days. There was a history of coronary artery bypass grafting (CABG) for double-vessel blockage 2 days prior to the onset of these symptoms. Physical examination revealed dusky-red to dark brown macules extending linearly over lateral aspects of the neck, upper back, shoulders and axilla, outlining the ECG electrodes originally placed during the surgery (figures 1 and 2). There were scattered vesicles and bullae especially around the ankle areas (figure 3). Their linear configuration including bizarre dribbling marks on convexities was suggestive of a liquid as the cause of the presentation. Further probing revealed that a 5% solution (w/v) of povidone-iodine (PVP-I) (containing 0.5% iodine with purified water as excipient) had been painted profusely from neck to toes preoperatively, and the CABG, which had lasted close to 7 hours, had been performed in supine position with abducted arms. There was no history of any exposure to iodine-containing topical preparations. With a diagnosis of severe irritant contact dermatitis (ICD) to PVP-I, lesions were treated with fluticasone propionate 0.05% cream and H1-antihistamines. They resolved completely in a week with slight post-inflammatory hyperpigmentation. Following the resolution, the patient was offered repeat open application test (ROAT) to confirm the diagnosis but he refused owing to the severity of the reaction.

PVP-I solution is used worldwide as a surgical paint because of its potent germicidal activity.[1] In most of the reported cases of ICD secondary to PVP-I, the clinical presentation resembled chemical burns, showing clearly marginated infiltrative erythema often accompanied by bullae, vesicles and erosions.[2] Other observed patterns are lesions beneath the cotton or gauze pads used to protect the medical devices (eg, beneath the tourniquet) or around the device glued to the skin of the patient, as reported in dermatitis occurring after spinal anaesthesia that follows the folds or grooves of surgical drapes.[2] The outlining of

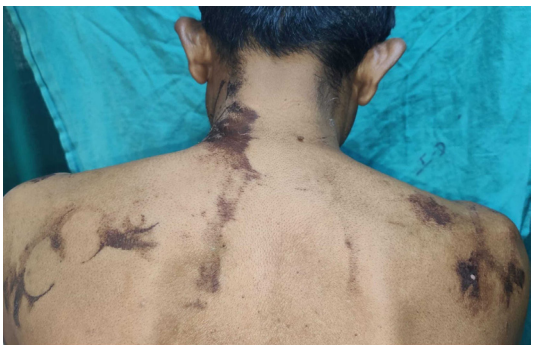

Figure 1 Dark brownish plaques with linear configuration over neck, shoulders and upper back with circular areas around the placement of ECG electrodes.

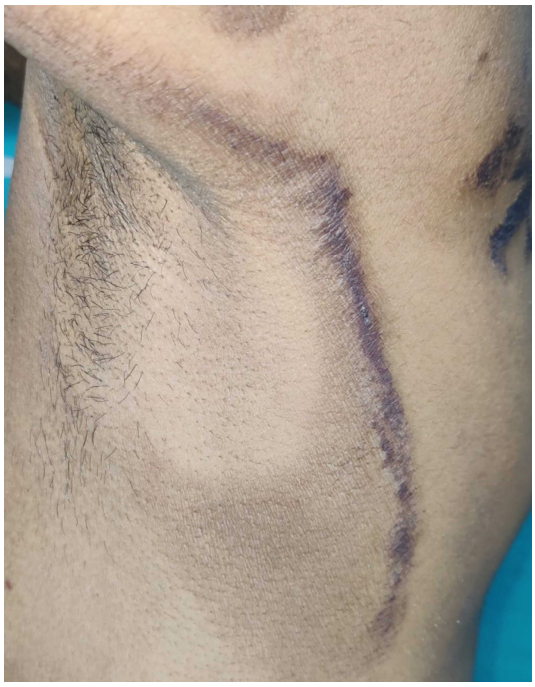

Figure 2 Plaques in the form of dribbling of povidone-iodine during draping.

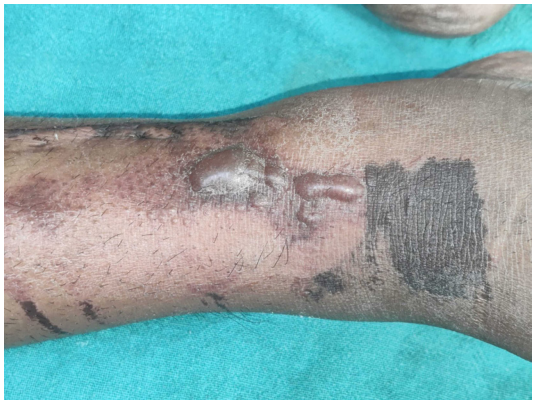

Figure 3 Fluid-filled blisters present over the ankle areas.

To cite: Kaur M, Karadia P, Singh S. *BMJ Case Rep* 2022;**15**:e251926. doi:10.1136/bcr-2022-251926

adherent ECG electrodes in our patient was similar to the above presentation.

Iodine of PVP-I is broadly divided into two major types: the effective iodine (nhi3, I3 and I2) with oxidative and bactericidal effect and the inert iodine (I^-).[3] Irritation is due to iodine with oxidative capacity. Because of the low free iodine concentration in PVP-I, skin irritation is usually less marked for short contact. When oxidation process of PVP-I continues, cutaneous irritation increases, as long as PVP-I remains liquid.[2] Thus, PVP-I solution in the wet condition can continuously release free iodine. As a result, when the skin is exposed to the solution over a long period, it continuously causes chemical and oxidative damage to the skin.

Patient's perspective

We were highly frightened after the new onset rash after the major cardiac surgery. But the doctors helped us understand that this is just a reaction to antiseptics. Within span of 7 days my itching got reduced and I felt good.

Learning points

- Irritant contact dermatitis to povidone-iodine is an uncommon entity. Most of the cases are reported in case of long-standing surgeries causing pooling.
- Clinical presentation can vary from erythema with vesicles/pustules, blisters and peeling of the skin.
- Appropriate clinical set-up of prior surgery and clinical pattern of involvement clinch the diagnosis.

In order to confirm the diagnosis of ICD to PVP-I solution, ROAT is a test of choice as the conventional patch test can yield false positive reactions due to occlusion.[4]

Our patient had the classic yet severe clinical presentation of ICD secondary to PVP-I following a prolonged surgery. To conclude, this ICD can be easily avoided by allowing the iodine solution to dry before the patient is draped to avoid pooling and subsequent long contact.

Contributors All the authors have contributed to the manuscript. MK and PK were responsible for gathering the clinical information. MK, PK and SS prepared the manuscript and approved the final version.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient consent for publication Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

Case reports provide a valuable learning resource for the scientific community and can indicate areas of interest for future research. They should not be used in isolation to guide treatment choices or public health policy.

ORCID iD

Maninder Kaur http://orcid.org/0000-0002-6369-7445

REFERENCES

1 Lachapelle J-M. A comparison of the irritant and allergenic properties of antiseptics. *Eur J Dermatol* 2014;24:3–9.
2 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;55:540–5.
3 Lepelletier D, Maillard JY, Pozzetto B. Mechanisms of Action, and Role in Infection Control and *Staphylococcus aureus* Decolonization. *Antimicrob Agents Chemother* 2020;64:e00682–20.
4 Lachapelle J-M. Allergic contact dermatitis from povidone-iodine: a re-evaluation study. *Contact Dermatitis* 2005;52:9–10.