

# Provocation Test-Confirmed Chlorhexidine-Induced Anaphylaxis in Dental Procedure

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To the Editor: Chlorhexidine (CHL) is a widely used broad-spectrum antiseptic and disinfectant. First used as a topical antimicrobial agent, CHL is now available in different forms and is present in various settings.<sup>[1]</sup> CHL has the potential to cause Type I and Type IV hypersensitivity reactions, varying from mild cutaneous reactions to anaphylaxis.<sup>[2]</sup> An increased recognition of CHL-induced hypersensitivity parallels the increased use of CHL in medical care and the increased awareness of allergy.<sup>[3]</sup> CHL is an important but easily overlooked allergen, and a provocation test (which serves as the gold standard) is usually difficult to perform. Here, we report a rare case of provocation test-confirmed CHL anaphylaxis during a dental procedure.

A 57-year-old man was being assessed for a dental cast when he suddenly felt a slight itching sensation on the trunk and his face turned pale. Two minutes before the procedure, the patient had received disinfection with CHL acetate. Five minutes later, the patient developed fatigue, blurred vision, and confused consciousness, and the procedure was subsequently abandoned. In the ambulance, the patient became hypotensive (60/30 mmHg; 1 mmHg = 0.133 kPa) and was injected with 0.5 mg epinephrine intramuscularly. After arriving at the emergency department, the patient was given epinephrine and dexamethasone and recovered 6 h later. The patient has a history of hypertension with regular medication. Food or drug allergy was denied. Physical examination revealed no remarkable findings. Considering the typical manifestations, the anaphylactic reaction was suspected.

The patient presented to the Department of Allergy in a hospital, 2 weeks later. Food allergy reaction was ruled out since the patient had not taken any food for over 12 h before the dental procedure. Serum T-IgE was 55.2 ku/L (reference range: 0–100 ku/L), tryptase was 2.62 µg/L (reference range: 0–13.5 µg/L), and Phadiatop and sIgE K82 (Latex) tests were <0.35 kuA/L (Phadia, ThermoFisher, MA, USA). Five days later, rapid patch tests for CHL acetate, alginate impression material, and other relevant materials were performed, but the immediate, 48 and 72-h reactions were all negative. Three days later, skin prick test (SPT) of sodium

alginate and cementin was then performed; however, results were all negative at the normal concentration and at 1:10 and 1:100 dilutions.

Accordingly, a provocation test was considered. Two days later, the patient was asked to gargle with diluent of alginate impression material, and no hypersensitive reaction was elicited. The next day, he was asked to gargle with undiluted alginate impression material. After 3 h, 0.2% CHL acetate was added. No discomfort was reported by the patient within 2 h, and physical examination (including blood pressure) was normal. Approximately 1 h later, he noticed scattered skin itching accompanied with rash and wheal, which was self-limited within 2 h. Six days later, the patient received another provocation test of CHL acetate gargling. Palm and sole itching appeared at 70 min with systemic skin itching and conjunctival congestion several minutes later [Figure 1]. Zyrtec drop 10 mg was given immediately. The patient experienced aggravation of the above-mentioned symptom 20 min later. He reported fatigue and blurred vision and became hypotensive (70/40 mmHg). The patient was then administered epinephrine 0.3 mg, diphenhydramine 25 mg, and methylprednisolone 40 mg, all intramuscularly. He recovered 2 h later.

In this case, anaphylaxis to CHL acetate was confirmed. The patient was informed that he should avoid CHL-containing products. Two weeks later, he received another dental procedure safely without the use of CHL.

As the number of products containing CHL increase, the incidence of hypersensitivity to CHL is rising.<sup>[2]</sup> Sharp *et al.*<sup>[2]</sup> summarized 68 anaphylactic reactions to CHL and reported the most commonly affected medical specialty was urology. Surgeons and anesthetists

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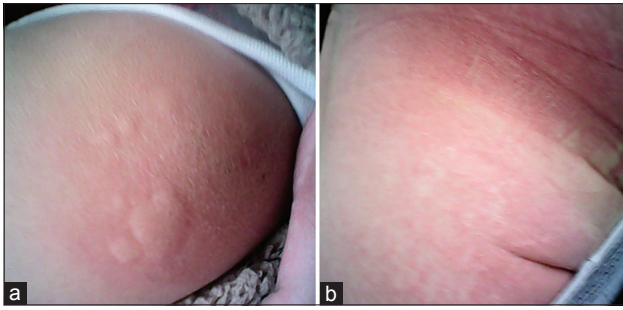
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**Figure 1:** Provocation test of the patient. After receiving another provocation test of Chlorhexidine acetate gargling, the patient developed urticaria at upper extremity (a) and trunk (b).

should be cognizant of the potential danger of CHL-induced anaphylaxis; furthermore, to allow better identification of possible allergens, they should also improve the documentation of medication and material use.

The retrospective analysis found that some patients experienced mild CHL-induced episodes before experiencing anaphylaxis.<sup>[4]</sup> However, mild cutaneous allergic symptoms can easily be overlooked.

The diagnosis of allergy in perioperative anaphylaxis can be especially difficult. Specific IgE and SPT are recommended for highest combined sensitivity and specificity.<sup>[5]</sup> The optimal time for SPT is 4–6 weeks after the anaphylaxis to avoid false-negative results caused by possible depletion of mast cells.<sup>[2]</sup> In this case, rapid patch tests and SPT were performed within 4 weeks after the anaphylaxis, which might partly explain the negative results.

To the best of our knowledge, this is a rare case of CHL anaphylaxis wherein the diagnosis was established using a provocation test. It is noteworthy that higher risk of anaphylaxis may be associated with increased mucosal absorption and prolonged, extensive exposure to CHL.<sup>[6]</sup> In this case, the time interval between CHL contact and

onset of allergic reaction was shorter in the procedure than that in the provocation test, which might partly be explained by a mucosal break during the procedure.

### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the journal. The patient understands that his name and initial will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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### Conflicts of interest

There are no conflicts of interest.

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