

SHORT REPORT

IgE-mediated chlorhexidine allergy: a new occupational hazard?

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Background	Chlorhexidine is an effective antimicrobial agent commonly used in UK hospitals, primarily for skin decontamination. Recent UK infection control guidelines recommend the use of 2% chlorhexidine solution in specific clinical settings, thus increasing chlorhexidine use by health care workers (HCWs). Chlorhexidine has been widely reported to cause IgE-mediated allergic reactions (from urticaria and angioedema to anaphylaxis) among patients undergoing surgery/invasive procedures. Despite its widespread use in health care settings, there are no reports of clinically confirmed occupational IgE-mediated chlorhexidine allergy.
Aim	To identify cases of chlorhexidine allergy among health care workers.
Methods	A questionnaire was distributed among HCWs in wards and operating theatres at a UK district general hospital to raise awareness of potential chlorhexidine allergy and to invite those with possible clinical allergy to come forward for further testing. Diagnosis was based on an appropriate clinical history with positive serum-specific IgE to chlorhexidine and/or positive skin prick testing.
Result	Four cases of occupational IgE-mediated allergy to chlorhexidine were identified.
Conclusions	Despite its excellent antimicrobial properties, chlorhexidine is an occupational allergen. We suggest that chlorhexidine allergy be included in the differential diagnosis of HCWs presenting with work-related allergic symptoms. Increased awareness and easier access to chlorhexidine-specific IgE serological testing should facilitate early diagnosis of affected HCWs, allowing appropriate avoidance measures to be instigated—thus reducing the risk of potentially severe allergic reactions in the future.
Key words	Chlorhexidine; occupational allergy; Type I hypersensitivity.

Introduction

Chlorhexidine, used in the UK since 1954, is a cationic chlorophenyl-biguanide antiseptic and disinfectant with excellent antimicrobial properties. Chlorhexidine has numerous medical and dental uses, most notably skin decontamination. It is a component in medical devices, e.g. urinary catheters, central venous catheters and dental implants, and is widely available to the general public

in products like mouthwash (Corsodyl®) and household antiseptics (Savlon®). However, chlorhexidine is a potential allergen that can trigger IgE-mediated (immediate/Type I) hypersensitivity reactions in sensitized individuals.

Recently, heightened awareness of hospital-acquired infections has resulted in vigorous campaigns encouraging frequent hand decontamination among health care workers (HCWs) [1]. Many HCWs in UK hospitals are regularly exposed to hand washes containing chlorhexidine (including Hibiscrub®, Hydrex® and Hibisol®). The recent UK Department of Health EPIC-2 Guideline [2] recommends 2% chlorhexidine gluconate in 70% isopropyl alcohol solution for skin decontamination before insertion of central venous cannulae and for cleansing when dressings for these devices are changed. We postulate that the incidence of chlorhexidine allergy will increase in parallel with increased exposure to chlorhexidine, just as the latex allergy 'epidemic' of the 1990s followed the adoption of Universal Precautions (1987), mandating the use of latex gloves to

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prevent transmission of HIV and other blood-borne pathogens [3].

Method

We sought to diagnose IgE-mediated chlorhexidine allergy in HCWs at Queen Elizabeth Hospital Woolwich, London (UK) where Hydrex® (chlorhexidine 4% w/v skin cleanser) and Seraman® (a sensitive blend of surfactants) are provided for hand washing. To identify potential cases, a questionnaire leaflet was distributed to 86 HCWs (doctors, nurses, student nurses, health care assistants, theatre support workers, domestics, midwives, student midwives) working in surgical wards, theatres, accident and emergency, maternity, dental and endoscopy units. Fifty-three questionnaires were returned.

Those who reported skin symptoms were assessed by the occupational health department and then referred to the immunology department for allergy assessment and skin prick testing (SPT) if clinically appropriate. Diagnosis of chlorhexidine allergy was made on the basis of a clinical history suggesting Type I hypersensitivity on exposure to chlorhexidine, combined with demonstration of IgE sensitization by serological or skin prick tests.

Specific IgE to chlorhexidine was measured by sandwich immunoassay (solid phase ImmunoCAP™ Allergen c8 Chlorhexidine) on the Phadia UniCAP 100 Analyser (range: <0.10 kuA/l to >100 kuA/l). Specific IgE level >0.35 kuA/l was regarded as positive, levels between 0.20 and 0.35 as borderline and <0.20 negative. This test became commercially available in January 2007 and correlates well with basophil stimulation tests [4], skin testing (SPT and intradermal test) and basophil histamine release [5].

SPT was performed using 0.5% chlorhexidine and 1% chlorhexidine and positive (histamine) and negative (saline) controls. The standard definition of a positive SPT (wheal diameter 3 mm > negative control) was applied [6].

Results

Four cases of IgE-mediated chlorhexidine allergy were diagnosed from 14 individuals reporting symptoms.

Case 1

A 31-year-old oncology nurse noticed itching and redness of wrists and forearms after using chlorhexidine hand wash. This progressed to urticaria over the following months. Specific IgE to chlorhexidine was 1.4 kuA/l and SPT with chlorhexidine was positive. Three months after switching to non-chlorhexidine hand washes, her symptoms had resolved.

Case 2

A 51-year-old theatre nurse reported itching and urticarial rash immediately after using chlorhexidine hand wash, initially occurring several years ago. She therefore opted to avoid chlorhexidine-containing products, substituting an alternative. Her symptoms resolved after making the switch. Chlorhexidine-specific IgE level was 0.27 kuA/l; she was unavailable for SPT.

Case 3

A 35-year-old endoscopy nurse experienced itching, redness of hands and rhinitis soon after wearing powdered latex gloves when preceded by hand washing. He avoided latex gloves, but symptoms continued. Specific IgE to chlorhexidine was 0.20 kuA/l, specific IgE to latex was 0.23 kuA/l and SPT to both chlorhexidine and latex were positive.

Case 4

A 43-year-old hospital domestic who washed her hands 15–20 times during a daily 4-h shift developed hand dermatitis with secondary infection, treated with flucloxacillin and Dermovate. She had avoided latex gloves because of the skin irritation but revealed that several weeks before the onset of dermatitis she had experienced urticaria affecting the forearms after use of chlorhexidine hand wash. Specific IgE to chlorhexidine and latex were 14.8 kuA/l and 28.5 kuA/l, respectively, and SPT to both chlorhexidine and latex were positive.

Discussion

These are the first reports of confirmed occupational IgE-mediated chlorhexidine allergy in HCWs. All the HCWs reported urticaria (typical of IgE-mediated allergy) soon after using chlorhexidine-containing hand washes. Serological and/or skin testing confirmed sensitization and symptoms resolved on withdrawal of chlorhexidine.

Chlorhexidine has been previously reported to cause occupational allergy, but this was not confirmed by clinical evaluation [7]. Garvey *et al.* [8] who sought to identify occupational allergy to chlorhexidine in 104 HCWs in Denmark using SPT, intradermal tests and patch tests, failed to identify a single case; it may be relevant that the Danish HCWs used 0.5–1.0% chlorhexidine hand wash, unlike our HCWs who were exposed to 4% chlorhexidine hand wash.

IgE-mediated reactions to chlorhexidine (ranging from urticaria to anaphylaxis) have been frequently reported in patients [9–11], in contrast to the lack of reports of occupational chlorhexidine allergy. Patients with anaphylaxis often reported previous milder reactions to chlorhexidine

(e.g. itching, urticaria, angioedema), suggesting a need for early investigation of mild symptoms to prevent severe reactions in the future [10].

As with all allergy diagnoses, the importance of a detailed clinical history supplemented with tests to demonstrate IgE sensitization cannot be overemphasized. Chlorhexidine-specific IgE levels decrease with avoidance, therefore a low/borderline level of chlorhexidine-specific IgE does not exclude previous allergic sensitization and the need for appropriate management. Renewed contact could cause relapse of symptoms, as sensitization may persist [5].

Chlorhexidine-allergic HCWs should use non-chlorhexidine hand washes such as povidone iodine 'Betadine' or 70% ethanol 'Spirigel'. Chlorhexidine-containing household products such as Corsodyl® mouthwash and Savlon® antiseptic should be avoided, and chlorhexidine should not be used during invasive/surgical procedures.

Although chlorhexidine is an excellent antimicrobial agent, it is also a potential allergen. We therefore suggest that the investigation of HCWs presenting with work-related allergic symptoms should include investigation for chlorhexidine allergy.

Key points

- IgE-mediated chlorhexidine allergy may occur in HCWs.
- Although initial symptoms may be mild, chlorhexidine allergy carries a risk of anaphylaxis.
- HCWs presenting with work-related allergic symptoms should be investigated for chlorhexidine allergy.

Conflicts of interest

None declared.

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