Urticaria in Nurses in the COVID-19 Ward: A Case Report

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Abstract

Introduction*: Chlorhexidine is widely used in health centers as an antiseptic and disinfectant. Several cases of immediate and delayed hypersensitivity to chlorhexidine have been reported.*
Case report*: We reported a case of a 26-year-old nurse working in Hospital X that came with a complaint of itch in several areas of the body that started four days before presenting at the hospital. The itch was continuously felt, and it started to form multiple large red bumps. Redness accompanied by dry skin was present between the fingers and palms. Cetirizine and dexamethasone did not relieve the symptoms. The patient has been working for six years in the inpatient unit and six months in the COVID-19 ward. Since the pandemic, she had been using alcohol-based hand rubs more frequently. The hospital uses chlorhexidine as an alcohol-based hand rub, which may cause hypersensitivity reactions to exposed health workers. The patient was finally diagnosed with acute urticaria. Based on the seven steps of occupational diagnosis of disease, it was still inconclusive whether the urticaria is an occupational disease because there was no data regarding the causal relationship between chlorhexidine exposure and the incidence of urticaria.*
Conclusion*: Hence, it is necessary to carry out further diagnostic test with a puncture test. The hospital is still required to implement control measures toward chlorhexidine exposure.*

Keywords: *Chlorhexidine, Health Workers, Occupational Disease*

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Urtikaria pada Perawat di Bangsal COVID-19: Laporan Kasus

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Abstrak

Pendahuluan: *Chlorhexidine banyak digunakan di fasilitas kesehatan sebagai antiseptik dan disinfektan. Sejumlah kasus hipersensitivitas tipe cepat dan lambat terhadap chlorhexidine telah dilaporkan.*
Laporan Kasus: *Kami melaporkan kasus seorang perawat berusia 26 tahun yang bekerja di Rumah Sakit (RS) X dengan keluhan gatal di beberapa bagian tubuh 4 hari sebelum datang ke RS. Gatal dirasakan terus menerus dan terbentuk benjolan-benjolan merah yang besar. Terdapat kulit kemerahan dan kering di sela-sela jari dan telapak tangan. Cetirizine dan dexa methasone tidak mengurangi gejala. Perawat tersebut telah bekerja selama 6 tahun di unit rawat inap dan 6 bulan di bangsal COVID-19. Sejak pandemi, dia lebih sering menggunakan pembersih tangan berbasis alkohol. RS X menggunakan klorheksidin sebagai pembersih tangan berbahan dasar alkohol, yang dapat menyebabkan reaksi hipersensitivitas terhadap petugas kesehatan yang terpapar. Pasien akhirnya didiagnosis dengan urtikaria akut. Berdasarkan tujuh langkah diagnosis penyakit akibat kerja, masih belum dapat dipastikan apakah urtikaria merupakan penyakit akibat kerja, karena belum ada data mengenai hubungan kausal antara paparan klorheksidin dengan kejadian urtikaria.*
Kesimpulan: *Oleh karena itu, perlu dilakukan uji diagnostik lebih lanjut dengan puncture test. Rumah sakit tetap harus menerapkan tindakan pengendalian terhadap paparan klorheksidin.*

Kata kunci: *Chlorhexidine, Petugas Kesehatan, Penyakit Akibat Kerja*

Introduction

Chlorhexidine is an antiseptic and disinfectant effective against a broad spectrum of bacteria, including methicillin-resistant staphylococcus aureusis (MRSA), viruses, and fungi. It is used mainly in health services such as perioperative medicine, anesthesiology, for skin preparation, and coating of central venous lines and urinary catheters.[1,2] In clinical practice, the concentration range used is from 0.5% to 4%.[3]

Cases of immediate and delayed hypersensitivity to chlorhexidine have been reported.[4–8] Patients typically experienced anaphylaxis, allergies in the respiratory tract, and urticaria all over the body with angioedema, wheezing, and dizziness. In a systematic literature review of cases of allergy-induced by chlorhexidine in health care workers, it was discovered that exposure was mainly caused by washing hands with chlorhexidine-containing products. In most cases, the clinical presentation is characterized by itching, redness, and urticaria.[5]

In Hospital X the study location, 0.5% chlorhexidine is used as an antiseptic agent for alcohol-based hand rubs. During the COVID-19 pandemic, the frequency of using alcohol-based hand rubs increases because nurses do not only apply hand hygiene five times a day, but also as a way to prevent COVID-19 infection.

A study by Sonja C et al,[9] also reported psychological impacts of the pandemic on the health workers, such as stress, depression, and anxiety. The fear of the unknown risks or being infected due to being on the front line, added with the perceived stigma from family members and the community, increases this

impact. Nurcan Metin et al,[10] found that the frequency of handwashing in female respondents was significantly higher before and after the onset of the COVID-19 outbreak and showed a weak but significant correlation with anxiety levels.

Hence, there is a risk of type 1 hypersensitivity reaction, namely urticaria among health workers in hospital X, due to chlorhexidine exposure which can be influenced by the increase of handwashing frequency. Relationship with psychosocial aspect is also little explored. Therefore, it is necessary to apply the seven steps of occupational diagnosis of disease to determine if the urticaria was caused by chlorhexidine exposure and psychosocial aspects.

Case Illustration

A 26-year-old female nurse came to the outpatient clinic with complaints of itch in several areas of the body that started four days before. The itch started after the afternoon shift at around 9 pm. It began from the waist area, then later at night, it spread to other areas such as the forearms, chest, back, and legs. The itch was continuously felt, and it started to form multiple large red bumps. Because this condition interrupted sleep and did not improve, the patient took cetirizine and dexamethasone. However, it still did not improve. The patient denied any accompanying symptoms such as pain in the itchy area, headache, vomiting, palpitation, and shortness of breath. The patient had just realized a redness accompanied by dry skin between the fingers and palms after the itch spread to several areas of the body. The patient admitted that since the pandemic, she used alcohol-based hand rubs more frequently, especially when holding medical records, entering work orders on the computer, using the telephone, walking to and from the dormitory, using the elevator, and inside the dorm room because the sink is quite far. The patient admitted that she used the alcohol-based hand-rubs provided by the hospital on a daily basis.

The patient denied any itch and redness after using latex gloves nor sweating after nursing care with level 3 PPE (nurse cap, N95 mask layered with surgical mask, face shield/goggles, scrubs, coverall spunbond, gloves, and shoe cover). She also denied any medication use currently.

Since adolescence, the patient has been using bath soap, toothpaste, sunscreen, and lotion. She denied using any mouthwash. She rarely washes dishes/cutlery as food is served in disposable boxes/utensils at work and in the dorm. Nevertheless, if she needs to wash the dishes, she uses dishwashing liquid. No family history of asthma, allergies, and skin eczema was recorded. She also denied any history of asthma, drug allergy, food allergy, dust allergy, mite allergy, and cold or heat allergy. She lived in a dormitory provided by the hospital, located inside the hospital environment. She said that she is happy with her current life.

The physical examination showed well-defined erythematous papules of varying sizes on the palmar, posterior antebrachial, scapular, vertebral, pectoralis, anterior abdominal, and inguinal regions. Scaly erythematous skin was also observed on the sidelines of fingers of both hands (Figure A). The results of laboratory tests (complete blood count, clinical chemistry, urinalysis) were within normal ranges. Hospital X has conducted measurement of anxiety and depression using the PHQ-9 and GAD-7 questionnaires in May 2020 in the COVID-19 high-risk work unit. The results showed 17% moderate-severe anxiety and 20% moderate-severe depression; however, the individual data was unavailable. Based on the history taking, the patient stated that she was content enough with her current life, including work life, family, and even the patient herself.

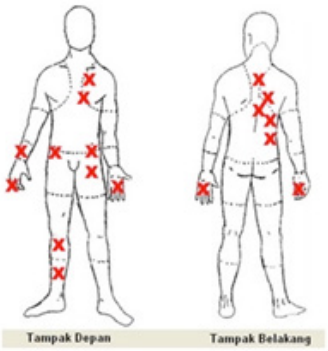

Figure (A), Status of locals

Figure (B) and (C) shows erythematous papules on right arm and leg

The patient has been working as a nurse in the red zone of the COVID-19 ward since April 2020. She works in shifts, i.e. morning, afternoon, or evening shifts. The ward has a capacity of 16 beds with one nurse responsible for 3-4 patients. Every shift will start with the handover from previous shift to the next shift and paperwork activities (checking schedules of each patient as of any actions to do that day, making SOAP, and reporting the results of medical examination to the attending physician). Afterward, she will provide routine nursing care to patients, for example vital signs check, medicine administration, bathing, insulin injection and blood collection, fluid balance calculation, and feeding (including feeding via nasogatric tube as required). The nurses in the COVID-19 ward also have the competence to take swab samples of SARS COV-2 for PCR.

The patient was diagnosed with acute urticaria. Based on the seven steps of occupational diagnosis of disease determined by the Association of Indonesian Occupational Medicine Specialists,[11] we could not conclude whether the patient's acute urticaria is an occupational disease, because it still requires further examination such as puncture test.

Discussion

Generally, cases of acute urticaria do not require diagnostic testing. Further investigation is required if any allergic cause of acute urticaria is found.[12–15] The clinical diagnosis in this patient is based on the history taking and physical examination. Through history taking, physical examination and laboratory investigation, we tried to rule out possible causes of urticarial such as drugs, food, respiratory allergens, physical factors (pressure, heat, cold temperature), and contact urticaria. Using laboratory investigation i.e. complete blood count, clinical chemistry, and urinalysis, we tried to rule out the possibility of systemic disease. Finally, all these possibilities narrowed to chemical exposure to chlorhexidine and the psychosocial impact that may cause the risk of urticaria.[13,14]

In this case, chlorhexidine exposure was clearly present because the alcohol-based hand-rubs used by the hospital was chlorhexidine. The patient also used the same alcohol-based hand-rubs while going to and from work and staying in the dormitory. She did not use bath soap, toothpaste, sunscreen, mouthwash and dishwashing liquid containing chlorhexidine. Therefore, it ruled out the possibility of chlorhexidine exposure outside the workplace.

Figure (D), (E) and (F), scaly erythematous.

While the occurrence of anxiety and depression in the patient's work unit was moderately high, from history taking it could be concluded that the patient was not included in these groups. Thus, we can rule out the increased frequency of handwashing due to psychosocial factors, which can trigger a hyper-

sensitivity reaction to urticaria, such as stress and depression.[13,14]

Sensitivity due to chlorhexidine will usually appear after prolonged and repeated applications, but there is no statement on how long and repeated for these applications.[2] Mi Vu et al. (2018) reported a case of immediate-type hypersensitivity to chlorhexidine which manifested as contact urticaria, and was associated with respiratory symptoms including dyspnea.[16] Previously, the patient had shown a history of urticaria that lasted for six months on the hands and forearms, which occurred 5-10 minutes after entering the endoscopy room. Six months later, the patient had respiratory symptoms such as chest tightness and dyspnoea. The patient had a history of dermatitis on the hands, wrists, and arms for the past two years. As an endoscopy technician, he was responsible for nursing care and cleaning the endoscopy room. The worker washed his hands with a chlorhexidine-containing antiseptic before entering the endoscopy room. The result of the 0.5% chlorhexidine diacetate patch test was negative, while the prick test with 0.5% chlorhexidine digluconate resulted positive.

Compared to this worker, our patient has worked for six years in hospital X as an inpatient ward nurse performing five moments of hand hygiene using chlorhexidine-containing hand hygiene products. She has been working for six months in the COVID-19 ward, where the intensity of hand-rubs use increased. The absorption of chlorhexidine in the human body can be via inhalation, dermal, and ingestion, therefore although she used gloves while doing nursing care, the route of entry can still be through a mask.[17] This, of course, is affected by the density aspect of using the mask. Moreover, the patient admitted that she handwashed more frequently especially after paperwork activities because she did not use any gloves.

A retrospective cohort study conducted by Morten S Opstrup et al. (2015) reported that out of 8479 respondents, 82 respondents showed a positive patch test reaction to chlorhexidine. Of these, three respondents received a positive prick test for chlorhexidine.[18] However, this study did not analyze the relationship statistically, so that the relationship between the two variables was unknown. Sobrina M Khazin et al. (2019) found that there was no significant relationship between the history of chlorhexidine exposure and serum IgE results (p 0.626).[19] This result could be due to the IgE sampling technique, which required the sample to be taken within six months after the reaction or earlier because IgE levels had increased by the time reaction occurred.[20] This study did not clearly state the time of occurrence of history of allergy or hypersensitivity reported on the questionnaire. Another study conducted by Kristina S Ibler et al. (2016) found that one out of 40 respondents had a positive prick test reaction to chlorhexidine. These respondents also had an immediate-type of hypersensitivity reaction to dogs, cats, house dust mites, and latex and a delayed-type to p-phenylenediamine, a mixture of fragrances and nickel sulfate.

Of the above studies, a causal relationship between chlorhexidine exposure and urticaria cannot be established because the study design was not suitable to show a causal relationship, and some studies only carried out prevalence assessments. Therefore, we still cannot determine whether the urticaria suffered by this patient is an occupational disease because the causal relationship between chlorhexidine exposure and the increasing risk of urticaria remains unclear. However, this condition can be treated as an occupational disease if prick test result for chlorhexidine show positive result. Therefore, a diagnostic test using puncture test is necessary.

Conclusion

Further study exploring the causal relationship between chlorhexidine exposure and the incidence of urticaria is still necessary, considering the limitations of the existing studies. Moreover, the effect of the frequency of using chlorhexidine-based hygiene products on the incidence of urticaria remains inconclusive because it is related to the sensitization of each individual. However, as the use of chlorhexidine in health centers is considerably high, control measures must still be carried out, considering that chlorhexidine can cause type 1 hypersensitivity reaction.

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