

Sensitisation to 1,3-diphenylguanidine – an underestimated problem in physicians and nurses using surgical gloves?

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Keywords

1,3-diphenylguanidine, surgical gloves, allergic contact dermatitis, patch test, cetylpyridinium chloride, healthcare workers, hand eczema

Conflict of Interest

The authors declare no potential conflict of interests.

This article has been accepted for publication and undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process which may lead to differences between this version and the Version of Record. Please cite this article as doi: 10.1111/cod.13713

Case Reports

Patients

A 55-year-old male anaesthesiologist with hand eczema was patch tested in our department in 2016 revealing sensitizations to 1,3-diphenylguanidine (DPG, D3 +) and cetylpyridinium chloride (CPC, D3 +). In 2020, we saw a 45-year-old female surgeon with hand eczema who presented with a patch test protocol from 2018 indicating that she was sensitized to DPG (D3 ++) and CPC (D3 ++). In the same year, a 56-year-old female surgical nurse and a 59-year-old male surgeon both suffering from hand eczema had positive reactions to DPG (D3 ++ and D3 +, respectively) in patch tests performed in our department. In the latter two cases, patch testing with CPC was not possible since the test substance previously produced by SmartPractice Europe (Greven, Germany) was not available. All patients reported that they had used a polyisoprene sterile surgical glove from the Protexis™ PI product line (Cardinal Health, Waukegan, Illinois) at work. Upon request, the manufacturer revealed that the glove line contains DPG and has a CPC inner coating. Patch testing of the glove as is was done in three of the patients and revealed no positive reaction. In all cases, occupational allergic contact dermatitis of the hands was diagnosed and the surgical glove replaced by alternative gloves free of DPG or CPC according to the manufacturer's information. Three of the patients were able to continue their profession with markedly improved skin condition. No follow-up information was available for the female surgeon.

Discussion

Healthcare workers have an increased risk of sensitization to vulcanizing agents due to extensive use of protective gloves. In Germany, sensitization to thiurams has been much more common than to DPG¹ which is probably related to a less frequent use of DPG in gloves.² Moreover, interpretation of patch test results is difficult as DPG is known to induce irritant reactions.¹ Therefore, DPG is sometimes overlooked as a relevant allergen in healthcare workers. All four presented patients came from different areas in Germany and had worn sterile DPG-containing polyisoprene surgical gloves from the same glove line at work indicating a wider distribution of this product. Also others reported that DPG is a relevant allergen in sterile polyisoprene gloves.^{3,4} Notably, a recent study from Belgium demonstrated that the majority of patch tested healthcare workers (n=44) with hand eczema after wearing rubber gloves and who reacted positively to glove samples or rubber accelerators had a sensitization to DPG (86%).⁴ An experimental study discovered that alcoholic hand disinfectant increases the quantity of DPG detected on the hands after wearing DPG-containing gloves.⁵ The DPG release was higher from the investigated polyisoprene glove (same product line as in our patients) than from a nitrile glove. The inside of these gloves released more DPG than the outside which was suggested to be related to CPC, an antimicrobial agent in the coating of the inside of the polyisoprene glove.^{3,5} Interestingly, two of our presented patients were also sensitized to CPC. In the other two, CPC

was not patch tested because the respective test substance was no longer available. In conclusion, DPG and if possible CPC should be patch tested in healthcare workers wearing sterile surgical gloves and suspected allergic contact dermatitis. Moreover, DPG- and CPC-free gloves should be promoted and full labelling of glove constituents on product labels enforced.

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