

Chemical Allergies and Medical Gloves

Today, preventing transmissible infections in the healthcare setting is more important than ever. The appropriate selection and use of personal protective equipment (PPE) are key components in all infection prevention strategies. In this regard, medical gloves are the most common type of PPE used to protect healthcare workers (HCWs) from occupational exposure to blood or other potentially infectious materials¹. As the use of gloves by HCWs continues to increase, so do concerns related to glove reactions.

Most allergy management programs concentrate on the understanding and treatment of latex allergy. However, in many cases, reactions to medical gloves are often chemical allergies. An allergic contact dermatitis (ACD) or Type IV delayed hypersensitivity, as it is often called, to the various chemicals used in the manufacture of both latex and non-latex medical gloves. Of the total healthcare worker population, 33% of glove-related reactions are classified as chemical allergies². In addition, ACD may play a role in latex sensitization, since it reduces the barrier properties of the skin and thus allows absorption of larger amounts of chemicals or proteins; this is thought to increase the risk of latex sensitization³. An increased frequency and progression through ACD may precede the onset of latex allergy⁴. Therefore, it is important to recognize chemical allergies and treat these allergies accordingly.

Causes of Chemical Allergy

Chemical allergies to glove products are generally associated with the chemicals used in the glove manufacturing process with the majority of reported glove associated allergic contact dermatitis attributed to chemical accelerators⁵. Chemical accelerators are added to accelerate the bonding process and stabilize the glove for long term storage. Importantly for the wearer, they give gloves elasticity and tensile strength.

There are four main classes of chemical accelerators that induce the majority of ACD reactions:

1. Thiurams - Short-chain thiurams such as Tetramethyl thiuram disulphide (TMTD) and Tetraethylthiuram disulfide (TETD) are the most frequent glove accelerators causing Type IV hypersensitivity^{6,7}
2. Dithiocarbamates/Carbamates
3. Mercaptobenzothiazoles (MBTs)
4. Diphenylguanidine (DPG)

Diagnosis

The signs and symptoms of allergic contact dermatitis usually appear within 6 to 48 hours after the chemical involved penetrates the skin. The healthcare worker may experience erythema, blistering, oozing, swelling, and itching at the site of contact. Dry, cracked scaly skin may develop and the rash may extend beyond the site of contact if the condition is chronic. In the event of a persistent dermatitis, it is recommended to consult a medical practitioner.

Minimizing Risk factors for Allergic Contact Dermatitis

A common factor contributing to the development of allergic contact dermatitis is a pre-existing skin condition, such as irritant contact dermatitis (ICD), which represents 70% to 90% of all the reported dermatitis cases and is caused by a number of factors such as frequent hand washing, aggressive scrubbing techniques, inadequate drying⁸ and inadequate moisturizing.

Strategies that healthcare personnel can implement to help reduce the risk of ICD and ACD caused by glove use may include;

- Being tested to determine the chemicals to which they are susceptible.
- Minimizing or eliminating contact with the causative chemical.

- Selecting gloves that are manufactured without the causative agent or accelerator, i.e., not all chemical accelerators are used in the manufacturing of medical gloves.
- Instituting a regular skin care regimen to keep hands healthy, since healthy skin is the first line of defense against infection.

Avoidance

If a qualified specialist confirms that the dermatitis is caused by a specific chemical accelerator, then contact with that chemical must be avoided by selecting a glove, either latex or synthetic, which does not contain the chemical accelerator involved.

New Technology

Today, in response to the growing interest in allergic contact dermatitis, new technologies have led to the development of accelerator-free gloves. These gloves are the latest innovation in the ongoing effort by glove manufacturers to provide effective barrier protection without causing allergic reactions. Through understanding the clinical implications of chemical allergies related to glove use, healthcare providers can select and use glove products that promote the highest degree of safety and efficacy for their patients and members of the healthcare team.

References

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