Latex sensitivity – avoiding allergic reactions in the clinical setting

Allergic reactions to exposure to natural rubber latex have increased significantly over the last two decades, particularly within healthcare. This is due to the implementation of universal precautions in response to the rise of HIV and other blood-borne pathogens and the resulting rise in latex glove use. This article explores the cause, effect, management and prevention of latex allergy.

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Key points

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1. Increased use of gloves in health care has led to an increase in allergic reactions to latex.
2. There are two main categories of reaction; one of which can prove fatal.
3. Regularly updated guidelines for the treatment of latex allergy within each NHS Trust are essential.
4. Synthetic alternatives to latex should always be available.

Natural Rubber Latex (NRL) is a milky fluid obtained from the *Hevea brasiliensis* tree, native to South East Asia, and is widely used as an integral part of everyday consumer and healthcare items. As with many other natural products, NRL contains proteins to which some individuals may develop an allergy. The proteins present in latex cause the allergy either through direct contact with the skin or by inhalation from powdered gloves.

Latex allergy is an important allergic disease for which safe and readily available immunotherapy is currently lacking. Despite advances in latex glove technology and the reduction of allergen content, there remains a core of severely allergic healthcare workers for whom allergen avoidance is insufficient[1]. The Health and Safety Executive (HSE) estimate that 1-6% of the general population are thought to be potentially sensitised to NRL, although they do not all develop symptoms. They report that up to 17% of healthcare workers are at risk of reaction[2]. Meanwhile, studies in one leading children's hospital suggest that about 40% of their patients have antibodies to latex, especially those with spina bifida or those undergoing multiple operations. Their research suggests that up to half of their remaining patients are at risk of reaction to latex due to exposure to the proteins[3]. Also at risk are individuals with food allergies such as banana, avocado, kiwi, chestnut and passion fruit, individuals with atopic allergic disease (estimated to be 30-40% of the UK population), and also those exposed to NRL on a regular basis e.g. mechanics, electricians and caterers[2].

Why is latex used?

Latex is a cost-effective material, which has many benefits. In the author's local hospital, the cheapest Nitrile gloves cost around £1:40 more than NRL ones for a box of 100. NRL qualities are yet to be equalled where there is a requirement for specific tactility and dexterity attributes, for example in surgical practice. Furthermore the majority of the population is not at clinical risk[2].

Within the neonatal/paediatric setting, a multitude of products potentially contains latex **(FIGURE 1)**.

• Examination and surgical gloves	• Nasogastric tubes
• Airways	• Electrodes
• Endotracheal tubes	• Space inhalers
• Intravenous tubing	• Colostomy bags
• Aprons	• Penrose drains
• Catheters	• Pulse oximeters
• Injection ports	• Adhesive tape
• Phial bungs	• Nappies
• Blood pressure cuffs	• Incubators
• Syringe plungers	• Masks
• Stethoscopes	• Dummies
• Teats	• Toys

FIGURE 1 A few examples of latex products in the clinical setting.

Types of latex allergy

The induction of latex allergy commonly occurs after exposure of the skin or mucous membrane to NRL. At risk-sufferers are loosely divided into two categories:

Type IV reaction

This is described as an immune response to chemical accelerators used to set the latex during the manufacturing process. Symptoms include erythema, blisters, constant pruritis/itching and broken skin (which is prone to infection), wheezing,

shortness of breath and chronic rhinitis. This is a delayed hyper-sensitivity reaction which occurs 6-48 hours post-exposure.

Type 1 reaction

This is an immune response mediated by IgE and caused by protein allergies. Individuals can get a life-threatening anaphy-lactic reaction from contact with the dust from a latex rubber product. Almost immediately, hypotension and bronchospasm occur, usually associated with a rash[4]. Deaths have occasionally been reported[2].

Months or even years of exposure without symptoms may precede clinical symptoms of a Type 1 reaction. In many cases symptoms become progressively more severe on repeated exposure to the allergens, so it is important for sensitised individuals to avoid further contact[2].

Diagnosis

Accurate diagnosis and management of NRL allergy is essential because of the potential for severe hypersensitivity reactions[6]. Diagnosis depends primarily on a comprehensive clinical history.

A Type IV allergy is diagnosed by standard patch testing and help and advice should be sought from the relevant Occupational Health Department so that the specific chemicals can be avoided in future.

Type 1 allergy is diagnosed using a blood test known as latex-specific IgE RAST (Radio-AllergoSorbent Test), which measures an antibody directed at the latex proteins[5]. There is no cure for NRL allergy as unfortunately it is not possible to desensitise the sufferer[3]. However, medications are available to treat the symptoms once they develop. Avoidance of the allergen is the best treatment option[2].

Prevention and management of latex allergies

The importance of risk-assessment is to make an informed decision about whether an alternative is effective for the task (**FIGURE 2**). If latex has to be used, the gloves or other product must be low protein (<50mcg/g) and powder free[2]. Preventative strategies should target the 'at risk' population, rather than the population as a whole. Optimal management involves education concerning cross-reacting allergens, reduction of cutaneous or mucosal contact, and minimisation of exposure to latex allergens in the clinical environment.

FIGURE 2 SmartSite needle free system – a latex-free IV administration system for infants. Photo courtesy of Alaris Medical Systems.

Healthcare workers either have to be moved to a latex-free environment, or in extreme circumstances may have to give up their occupation.

For patients undergoing operations, those in high-risk groups should be identified and offered diagnostic testing, especially before procedures that may involve latex exposure. Procedures on all patients with a positive history should be performed in a latex-free environment, where latex gloves are not worn by any personnel and no latex accessories come into direct contact with the patient. Whenever it is not possible to provide a latex-free environment within a theatre suite, latex-sensitive patients should be allocated the first morning session in a clean theatre. The patient's notes should be clearly labelled.

Many items contain NRL but are not always labelled to warn of NRL content. Since a much more serious reaction may occur when these items contact internal body surfaces, e.g. mucosal, parenteral and serosal contact, it is very important for sensitised people to inform healthcare providers of their allergy so that only NRL-free medical equipment is used[2].

However, complete avoidance of latex may be impossible, given the large number of latex products we encounter from childhood. Those who have had serious adverse reactions should wear a Medic-alert bracelet or necklace, and in exceptional circumstances may need to keep a pre-loaded epinephrine syringe on their person[3, 8].

Future strategies should focus on the reduction of allergens during latex manufacture; immunotherapy including desensitisation of latex-allergic individuals; and development of candidate vaccine[8]. Measures taken in health care to reduce exposure to NRL products seem to be effective in reducing the number of new sensitizations[9].

There are preventative measures available to reduce the prevalence of latex allergies, most of which involve converting to powder-free/latex-free products. However, not all NRL-free gloves afford the same protection against blood-borne pathogens so care must be taken in the choice of substitutes; suppliers of these (and other equipment), should be asked to provide test data proving the product's suitability[2].

All Trusts should develop guidelines,

FIGURE 3 Care must be taken to protect both staff and vulnerable infants from development of latex allergy. Photo - Eddie Lawrence.

FIGURE 4 The DermaPrene Ultra neoprene glove – free of latex proteins and accelerators. Photo courtesy of Ansell Healthcare.

which are reviewed regularly, for the management of latex allergy in adults (both staff and patients) and children. This will ensure that staff can improve their understanding of the condition. According to one researcher, there is now enough evidence on latex sensitisation/allergy incidents to suggest that all health providers must provide a 'non-latex' policy and a planned course of prevention[4].

Spina bifida and latex allergy

Latex allergy is also common in patients with congenital malformations, and children with a history of multiple surgical interventions – for instance those with spina bifida and those with problems of the urinary system[1, 3, 7]. Allergies in patients with the latter condition are probably due to particle bound latex proteins in urinary catheters[1].

The incidence of spina bifida has steadily declined due to prenatal diagnosis and termination of pregnancy, as well as folic acid supplementation prior to conception[10]. Nevertheless, up to 65% of patients with spina bifida are thought to be affected[8]. This is probably associated with repeated and early exposure to latex through multiple operations, as well as daily exposure to latex during routine procedures[11]. A recent Turkish study confirmed this conjecture[12]. The incidence of latex allergy in their study of 46 spina bifida patients was lower than reported in other literature, probably due to the low number of surgical interventions.

Spina bifida patients should be treated in a latex-free environment regardless of history (**FIGURE 3**).

Conclusion

It is so important to be aware of the seriousness of latex allergy and to understand the risks factors leading to this devastating and potentially deadly allergy. Healthcare personnel must be well informed about the history of latex allergy and its implications in the healthcare field so that they can protect their patients, latex-sensitised colleagues and themselves[13].

Synthetic materials, such as polyvinyl, polyurethane, nitrile, and neoprene are now being used to manufacture gloves and other products (**FIGURE 4**). Some, but not all, hospitals have adopted the use of these alternatives to provide a latex-free environment. Several manufacturers contacted by the author of this paper reported that sales of latex products have dropped dramatically. The increased expense of latex glove alternatives can be easily justified if reduced productivity, legal and personal costs are considered in expense calculations[5]. As one manufacturer said, units that fail to become latex-free because of increased costs are 'one latex allergy lawsuit away from a higher cost ending'. As an example of this, in 2002, a nurse was awarded £354,000 in an appeal court because she was forced to abandon her career due to an allergy to latex. Although she used vinyl gloves, her reactions were triggered by contact with colleagues who were wearing latex gloves, or even latex-laden dust[14].

Latex does matter, and complete avoidance is the only effective approach in preventing allergy.

References

1. **Sutherland, M.F., Suphioglu, C., Rolland, J.M.O. et al.** Latex allergy: Towards immunotherapy for health care workers. *Clin Experimental Allergy* 2002; **32**(5): 667-73.
2. **Health and Safety Executive.** About latex allergies. 2004. www.hse.gov.uk/latex/about.htm (1/12/04).
3. **Institute of Child Health** Latex allergy. 2004. www.ich.ucl.uk/factsheets/families/F990279 (1/12/04).
4. **Wheatley, C.** Latex allergy may be seen as the latest 'issue', but it isn't going away. *Nurse 2 Nurse* 2002; **3**(1): 33-36.
5. **Noonan, A., Moyle, M.** Latex glove allergy in health care. *Aus Nurs Clin Update* 2004; **75.**
6. **Ebo-Didier, G., Stevens, W.J.** IgE-mediated natural rubber latex: Practical considerations for healthcare workers. *Ann Allergy, Asthma Immunology* 2002; **88**(6): 568-75.
7. **Brehler, R., Kutting, B.** Natural rubber latex: A problem of interdisciplinary concern in medicine. *Arch Intern Med* 2001; **161**(8): 1057-64.
8. **Agarwal, S., Gawkroder, D.J.** Latex allergy: A health care problem of epidemic proportions. *Eur Dermatology* 2002; **12**(4): 311-15.
9. **Turjanmaa, K., Alenius, H., Reunala, T. et al**. Recent developments in latex allergy. *Curr Opin Allergy Clin Immunol* 2002; **2**(5): 407-12.
10. **Liu, S., West, R., Randell, E. et al.** A comprehensive evaluation of food fortification with folic acid for the primary prevention of neural tube defects. *Biomed Central Pregnancy Childbirth* 2004; **4**(20): www.biomedcentral.com
11. **International Federation for Spina Bifida and Hydrocephalus.** Latex Allergies 2004. www.ifglobal.org/spinabifida (7/12/04).
12. **Gulbahar, O., Demir, E., Mete, N.** Latex allergy and associated risk factors in a group of Turkish patients with spina bifida. *Turkish J Pediatrics* 2004; **46**: 226-31.
13. **Reed, D.** Update on latex allergy. *AORN* 2003; **78**(3): 409-26.
14. **BBC NEWS.** £354,000 for nurse latex allergy. 2004. http://news.bbc.co.uk (8/12/04).

Useful contacts

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