

Contact Dermatitis and Allergy

Natural rubber latex allergy in a health-care population in Wales

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Summary

Background Type 1 natural rubber latex (NRL) allergy prevalence rates quoted vary due to the different populations studied and methodologies used for assessment and investigation of NRL allergy. **Objectives** To investigate the rate of type 1 allergy to NRL in health-care workers (HCWs) in a single NHS trust in Wales.

Methods A response rate of 3716 of 5548 (67%) of the employees was obtained with a latex allergy questionnaire administered by the occupational health departments. Type 1 NRL allergy was diagnosed by correlating clinical symptoms, skin prick testing and IgE RAST to latex in the dermatology department.

Results The period prevalence (1998–2001) for type 1 clinical latex allergy in HCWs was 25 of 4439 (0.56%). Of the 25 positive HCWs, 18 (72%) were nurses.

Conclusions The low prevalence rate of type 1 NRL allergy should not lead to underestimating the importance of clinically significant NRL allergy and the risks that need to be minimized.

Key words: health-care workers, IgE RAST, natural rubber latex, skin prick test, type 1 allergy, Wales

The prevalence rate of type 1 (IgE mediated) allergy to natural rubber latex (NRL) in health-care workers (HCWs) has been reported as between 1% and 40%.^{1–5} These rates may vary due to the different populations studied and methodologies used for assessment and investigation of NRL allergy.^{6–12} Serological and skin prick tests (SPTs) may not correlate with clinical reactions to NRL and false negative and false positive results can occur.¹³

The prevalence rate of type 1 NRL allergy in Wales is unknown and therefore a single NHS trust based study was undertaken by three occupational health departments and one dermatology department (Singleton Hospital).

Patients and methods

Patients

The study was conducted between 1998 and 2001 at the Swansea NHS Trust Hospitals including Singleton

Hospital, Morriston Hospital, Cefn Coed Hospital and the District Services Unit employing district nurses, health visitors, chiropodists and dental practitioners. This work was part of the occupational health surveillance to provide a safe working environment for all employees. The Swansea NHS Trust Latex Allergy Policy specifies the collection of latex-specific information by means of a questionnaire and testing where clinically appropriate. This information was thus for the direct benefit of the employees in safeguarding them in the workplace and thus specific ethical approval was not required.

All 5548 employees who were deemed to be regular users of latex gloves were targeted with a short questionnaire enquiring about symptoms suggestive of NRL allergy, use of latex gloves during work, and other associations with latex allergy such as food allergy. Of these 5548 employees, 3723 were nursing staff, 716 were medical and dental professionals (4439 clinical) and 1109 were other diverse occupations including laboratory, pharmaceutical, domestic and laundry staff. The questionnaire answers were scrutinized within the occupational health departments and subjects with symptoms suggestive of NRL allergy such

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as contact urticaria of the hands, periorbital or perioral swelling, chest symptoms such as wheezing, or anaphylaxis secondary to latex gloves were referred to a dermatologist. The occupational health departments followed up all non-responders to the latex questionnaire. In addition, the survey was supported with an NRL allergy awareness raising exercise with mail circulars to all staff and group lectures with all staff encouraged to attend. A trust-wide NRL policy was also introduced to emphasize the importance of NRL allergy and the support available for those diagnosed with NRL allergy to enable them to continue in their present employment.

Skin prick testing and specific IgE assay

SPT or specific IgE RAST for type 1 latex allergy was performed where appropriate. Clinical NRL allergy was diagnosed in correlation with the symptoms. SPT was performed according to standard methods. The test battery included negative (saline) and positive (histamine) controls with latex (ALK-Abello, Hungerford, Berks, U.K.) tested at three dilutions as necessary (Hep 1, 10 and 100). A test was considered to be positive after 15 min if a weal of diameter equal to or greater than 3 mm compared with the negative control was observed. None of the subjects who had an SPT took any antihistamine therapy during the week preceding the test. No staff refused skin prick testing where it was deemed clinically appropriate. Specific IgE RAST to latex was done in 13 patients on contraindicated concomitant medication for SPT, dermatographism or atypical clinical history.

Statistical analysis

All the groups were compared statistically with the paired *t*-test with statistical significance at $P < 0.05$.

Results

A total of 3716 HCWs and non-HCWs (67%) responded to the latex allergy screening questionnaire distributed by the occupational health department either during employment or at pre-employment screening. Data for HCWs only are reported further in this paper and non-HCW investigation results have been excluded. Of the 3716 subjects screened, 25 of the 4439 (0.56%) HCWs employed in the trust had confirmation of clinical suspicion of type 1 NRL allergy. Of the 257 HCWs investigated, the other 232 had negative results.

Of the 25 positive HCWs, 18 (72%) were nurses or nursing assistants. The other seven consisted of two doctors, and one each of dentist, chiroprapist, support worker, dental and laboratory technician. Of the 3723 nurses employed in the trust, 18 (0.48%) were positive.

Two HCWs included in the survey were already known to the occupational health departments but completed the latex questionnaire and had their investigations (SPT) repeated with the informed consent of the patients. It was deemed necessary to repeat investigations due to the possibility of previous false positive reactions and the low risk of anaphylaxis to the investigations was explained clearly to both patients. Both changed their employment due to anaphylaxis (one case due to banana ingestion during lunch) occurring at work, and one eventually gave up her nursing career. Had a latex allergy policy been in existence at the time of diagnosis, it might have been possible for employment to have continued in an environment modified to minimize the risk of latex exposure.

Four of the 257 HCWs had only IgE latex RAST performed due to concomitant medication with one positive result (grade $> 2/6$). Nine of the 257 HCWs had both RAST and SPT; two with dermatographism (positive saline controls), three with both RAST and SPT positive with a delayed history of > 40 min or redness without clear swelling and four with both RAST and SPT negative results in spite of a suspicious history. Among those with symptoms suggestive of latex allergy, hand eczema was present in 137 of 232 (59%) of the non-NRL allergic and 18 of 25 (72%) of the NRL allergic HCWs, and other forms of eczema or asthma occurred in 105 of 232 (45%) or 18 of 25 (72%), respectively (Table 1). Of the HCWs with NRL allergy, two subjects had had acute anaphylaxis and none had multiple (more than four) surgical operations. No statistically significant differences were found between both groups.

Discussion

Type 1 allergy to NRL has been recognized as an occupational problem particularly among HCWs and can have a variable presentation such as urticaria, asthma or acute anaphylaxis.¹⁻⁵ Positive serology results can be found in those who report no symptoms of latex sensitivity. It is clear that the assessment of latex allergy in a health-care population by currently available methods is not 100% reliable.⁶⁻¹³ Atopics can be over-represented in SPT-positive groups compared

Table 1. Details of symptoms in 25 latex-positive subjects

	Latex-positive	
	No.	% total
Total number	25	
Hand eczema	18	72.0
Eczema/asthma	18	72.0
Rhinoconjunctivitis	11	44.0
Food allergy	1	4.0
Onset < 40 min	9	36.0
Onset > 40 min	2	8.0
Anaphylaxis	2	8.0
Glove use > 4 h	8	32.0
> four operations	0	0

with serology and this raises questions of the predictive value of SPT in atopic individuals exposed to latex.¹³

The response rate of 67% to the screening questionnaire is low but compares favourably with other similar studies in the UK.² Our study has found a prevalence rate of 0.56% in HCWs of type 1 NRL allergy. This rate is much lower than in most studies. This may be due to excluding asymptomatic individuals from investigation and including only those subjects with symptoms suggestive of NRL allergy rather than non-specific symptoms. In addition, we used a combination of a questionnaire, SPTs, specific IgE and clinical examination to diagnose NRL allergy prospectively. We attempted to screen all individuals employed by the trust between 1998 and 2001 with the total number of employees being stable in these years with ongoing surveillance by the occupational health departments. However, our quoted prevalence rate is an approximate figure owing to the unavoidable flux in employees with or without NRL allergy. In addition, only 13 of our symptomatic subjects underwent serological testing for NRL allergy. Hence a small percentage of type 1 allergy may have been missed if they were investigated with a negative SPT only, even though SPT has greater sensitivity than the specific IgE test.¹³ However, it is extremely unlikely that subjects with persistent clinical NRL allergy, working within the NHS trust, would not have been referred to the dermatology department and investigated further during the period of the study.

If the HCWs with symptoms suggestive of NRL allergy are analysed separately, as reported in some previous studies,^{6–12} we would have a much higher type 1 NRL allergy prevalence rate of 9.7% (25 of 257). There was no statistically significant association between NRL allergy and factors such as hand eczema, atopy, food allergy, glove usage or total number of previous surgical operations. This compares those with

NRL negative and positive investigations whereas a more valid comparison would be the latex-allergic individuals vs. the whole population surveyed but these data are not available.

This study is the first to show an overall low prevalence rate of type 1 NRL allergy in one NHS trust in Wales and indicates similar results to a recent study in England.² However, the importance of clinically significant NRL allergy cannot be overestimated. It can have serious consequences, particularly for highly trained staff who may require a change of career. Therefore, we need to minimize the risk of acquiring NRL allergy by ensuring that latex gloves are worn only where significant risk of exposure to body fluids exist. Where latex gloves are required the provision of non-powdered gloves must be the accepted standard. Long-term follow-up studies of asymptomatic subjects developing latex allergy are required to define risk factors and the natural history with various levels of exposure to NRL. Health education and surveillance programmes should encourage early reporting of any symptoms suggestive of NRL allergy secondary to glove use.

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