

ALLERGIES IN THE WORKPLACE

LATEX ALLERGY – AN UNUSUAL CASE REPORT

Jim teWaterNaudé, MB ChB, MPhil (MCH), FCPHM
Mohamed F Jeebhay, MB ChB, DOH, MPhil(Epi)
MPH (Occ Med), PhD

Occupational and Environmental Health Research Unit,
University of Cape Town, South Africa

SUMMARY

A worker from an elastic-manufacturing factory that weaves yarn along with latex rubber presented with work-related allergic symptoms. Talcum powder applied to the latex product was aerosolised by the weaving machines, especially when the looms were serviced. He was diagnosed with rhinoconjunctivitis and urticaria. This case illustrates that occupational allergy to latex occurs in non-healthcare settings, and that all role-players – from workers to doctors to management – need to be made more aware of the health risks in the latex-manufacturing context.

Latex is a viscous proteinaceous fluid that exudes from the cut surfaces of the leaves and stems of certain plants, such as the Brazilian rubber tree. The rubber made from such sap is also known as latex. Latex sensitisation is a significant concern in healthcare settings where latex allergens adherent to dust powder particles become airborne and inhaled during glove use. The 10 or so soluble proteins in the latex cause IgE-mediated (type I) allergic reactions.¹ Type IV responses may also occur because of additives and antioxidants used in the manufacturing process.¹ Initial symptoms of latex allergy such as contact urticaria can progress to asthma and also unpredictably to anaphylaxis.²

Presenting complaints

A 41-year-old man complained of a stuffy, runny nose and tight chest when exposed to dust and chemicals at work. He had been working for 23 years for the same employer, a manufacturer of underwear elastic. He was a machine operator initially, but had been a loom tuner for the past 7 years.

Medical history

He had no history of allergies or any surgical opera-

tions. There was no family history of allergies either. He was not on any medication. He was living with his wife and children in a brick house with modern utilities; the floors were either tiled or carpeted. There was no mould visible in his home, and they kept a dog but no cats or birds. He was a non-smoker, and no one at home smoked. He denied any food, fruit or seasonal allergies, and had not used condoms.

Occupational exposures

He worked Monday to Friday, from 07h45 to 17h00, for a company which co-wove rubber (latex or silicone) with yarn (cotton, nylon, polyurethane or polyester) to manufacture elastic material used largely for underwear. His personal protective equipment included an overall top and trousers, safety boots and a mask which was worn when doing blow-downs of the machines, i.e. cleaning them with compressed air. His job was to service machines, where his main exposure was to dust – a fine white powder comprising yarn and rubber. He also used power paraffin to wipe the machines clean.

Health effects

On doing a blow-down on the machine, and especially after cleaning it with the paraffin, he experienced the following symptoms: burny, itchy red eyes, runny nose, sneezing throughout the day, sore throat, tight and heavy chest with a productive tracheitis-like cough, and an itchy rash on his forearms.

There was no sentinel episode of these symptoms; rather, there had been a slow onset over the previous 2 years. The symptoms occurred only at work and never over weekends. Initially sneezing had been the only symptom, but symptoms developed and worsened over time, the worst being after exposure to the dust from machines during blow-downs.

Clinical examination

He appeared well, and described his situation and events clearly. General examination revealed nil of note. Eyes showed slight conjunctival infection. ENT: Nose normal, throat slightly red. CVS: BP 150/110. Chest was normal and there was no wheeze.

Special investigations

Skin-prick tests were negative to common inhalant allergens. Spirometry was normal, as shown in Table I.

Table I. Spirometry results

	Predicted	Pre-bronchodilator	Post-bronchodilator	Percentage change post-bronchodilator
FEV ₁ in ml	3170	3170	3210	1.3
FVC in ml	3770	3850	3850	0
FEV ₁ /FVC %	-	82	84	-
FEF ₅₀ (l/s)	4.41	4.23	4.75	12.3

Correspondence: Dr J teWaterNaudé, Occupational and Environmental Health Research Unit, School of Public Health and Family Medicine, Falmouth Building, University of Cape Town, Observatory 7925. Tel 021-406-6724, e-mail jim@cormack.uct.ac.za

Initial assessment

The initial assessment was latex allergy with rhinoconjunctivitis and urticaria.

Plan

Latex RAST and serial peak flows were ordered, and material safety data sheets (MSDSs) were requested from the employer. The patient was prescribed cetirizine 10 mg daily.

Clinical course

At follow-up a month later, his symptoms had become more specific. He had identified the noxious exposures at work – servicing and cleaning machines had become unbearable with a frequent need to retire outside the factory for air. He had been issued with a better mask, but his facial skin reacted to the rubber it contained, later found out to be latex. He was waiting for his employer to source a non-latex mask. On examination, overt conjunctivitis was newly apparent. The IgE RAST test for latex was 24.1 kU/l, in the 'high levels of antibody' range, normal being <0.35 kU/l. Serial peak flow tests (Fig. 1) and further spiromgrams showed no convincing evidence of asthma, however, and his histamine challenge test was negative.

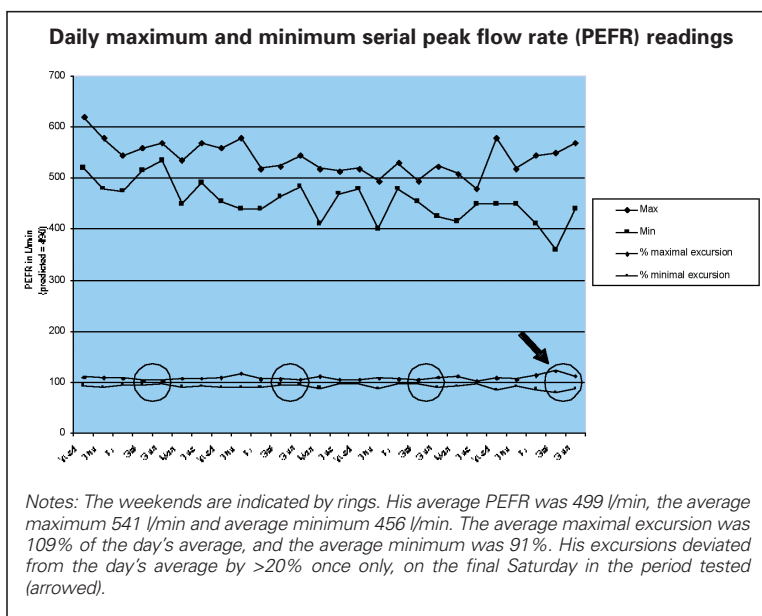


Fig. 1. Serial peak flow rate (PEFR) monitoring record

Workplace visit

A walk-through workplace visit was conducted, followed by a meeting with the factory manager and the human resources manager. Factory-floor informants included the line supervisor, the patient and a number of co-workers. The objectives of the visit were to ascertain first-hand the general conditions at the factory, to identify specific likely sources of exposure, and to seek alternative placement for the worker if and where possible.

The managers were unaware of the health risks associated with latex. There were no surveillance programmes in place. The factory was generally clean, with lines and lines of weaving machines busily working noisily. The nylon and polyester machines were less dusty than those using latex, all of which were very dusty. The source of the dust particles was talcum powder adherent to the outside of the latex ribbon, which was applied by the manufacturer of the latex to keep it from becoming too sticky after heating. It was

observed that as the latex thread was fed into the loom, the talcum powder became airborne and settled as dust onto the machine. With regard to the third objective, there were scant opportunities for alternative placement as the machines using latex were haphazardly interspersed among the other machines, with the result that no area was entirely latex-free.

Discussion

This case is important because while the bulk of literature on and experience with latex allergy focus on healthcare workers and spina bifida patients, the highest aero-allergen exposure generally occurs in the manufacturing industry.³

This worker's allergy symptoms emerged surprisingly after more than 20 years of service. The late onset could be attributed to greater exposure when he became a loom tuner, as blow-downs generate massive amounts of dust, unlike his previous job where he may not have been as extensively exposed. This theory is supported by a previous study of 63 workers with latex allergy where the average latency from first occupational exposure to emergence of symptoms was 5 years.⁴

The worker's chest symptoms were puzzling in the light of his serial peak flow, spiromgrams and histamine challenge tests all being negative. A specific bronchial challenge test was not possible as facilities were not available. His symptoms were possibly due to the irritant effect of the dust, or very early asthma. In support of the latter theory, it is known from baker's asthma that the great majority of baker's asthmatics develop rhinitis and asthma simultaneously.^{5,6} In addition, allergic rhinitis is a known risk factor for asthma.⁷ The worker may yet develop asthma, and will be followed closely for progression in the future.

The specific risk factor for the development of allergy in this worker was the fact that he worked with a high-molecular-weight protein allergen – latex. Other risk factors are atopy and prior allergic conditions,² neither of which was present in this patient. Risk factors for developing occupational asthma in future are ongoing exposure to the latex, whether in duration or in concentration.

It is known that the risk of development of asthma is lower if latex aero-allergens are removed from the workplace.⁸

Following the example of baker's asthma, if sensitisation and rhinitis but no asthma have occurred, the recommendation is for the worker to be relocated to less exposed tasks.⁹ This will contribute towards decreasing his risk of further disease progression.

Should the worker be accommodated elsewhere, however, he may be disadvantaged by unacceptably lower pay. Although the Occupational Health and Safety Act (OHSA) in Section 26 states that in a case like this 'No employer shall unfairly dismiss an employee, or reduce the rate of his remuneration, or alter the terms or conditions of his employment to terms or conditions less favourable to him, or alter his position relative to other employees employed by that employer to his disadvantage...', employers tend to reduce the workers' pay if the new job typically pays less. This may occur because of a collective prior agreement, or because they are not applying the law correctly. Therefore the policies and legislation in this regard need to accord greater protection to improve the prognosis of workers

with occupational allergies. It has been noted that workers who develop occupational asthma suffer financially, and that inadequate compensation may influence the decision of workers to remain exposed after diagnosis.¹⁰ In the meantime his case will be submitted to the Compensation Commissioner under the new instructions for submitting claims,¹¹ and notified to the Chief Inspector in accordance with OHSA.

The mainstay of managing occupational allergy is prevention. There are various options open to the employer in this context:

- **Source:** Eliminate the use of powdered latex if possible, substitute latex for other rubbers entirely or isolate source by moving the latex lines to one designated part of the factory.
- **Path:** Use specific extraction ventilation, stop blow-downs in cleaning machines, use vacuuming only and never blowing, and clean latex machines regularly to stop dust build-up.
- **Workers:** Limit the number of staff working with latex, use non-latex PPE, inform on the dangers of latex and set up surveillance, which could include measuring airborne latex if possible, and a simple allergy questionnaire, followed by tests for allergic sensitisation (specific IgE or skin-prick tests for latex). These could be combined in an algorithmic approach, as has been described for other occupational allergens.¹²

REFERENCES

1. Reddy S. Latex allergy. *Am Fam Physician* 1998; **57**: 93-100. <http://www.aafp.org/afp/980101ap/reddy.html>
2. Charous BL, Hamilton RG, Yunginger JW. Occupational latex exposure: characteristics of contact and systemic reactions in 47 workers. *J Allergy Clin Immunol* 1994; **94**: 12-18. <http://www.aafp.org/afp/980101ap/editorials.html>
3. Sri-akajunt N, Sadhra S, Jones M, Burge PS. Natural rubber latex aeroallergen exposure in rubber plantation workers and glove manufacturers in Thailand and health care workers in a UK hospital. *Ann Occup Hyg* 2000; **44**(2): 79-88.
4. Turjanmaa K, Alenius H, Makinen-Kiljunen S, Reunala T, Palosuo T. Natural rubber latex allergy. *Allergy* 1996; **51**: 593-602.
5. Walusiak J, Hanke W, Gorski P, Palczynski C. Respiratory allergy in apprentice bakers: do occupational allergies follow the allergic march? *Allergy* 2004; **59**: 442-450.
6. Malo JL, Lemiere C, Desjardins A, Cartier A. Prevalence and intensity of rhinoconjunctivitis in subjects with occupational asthma. *Eur Respir J* 1997; **10**(7): 1513-1515.
7. Leynaert B, Neukirch F, Demoly P, Bousquet J. Epidemiologic evidence for asthma and rhinitis comorbidity. *J Allergy Clin Immunol* 2000; **106**(5 Suppl): S201-5.
8. Allmers H, Brehler R, Chen Z, Raulf-Heimsoth M, Fels H, Baur X. Reduction of latex aeroallergens and latex-specific IgE antibodies in sensitized workers after removal of powdered natural rubber latex gloves in a hospital. *J Allergy Clin Immunol* 1998; **102**: 841-846.
9. Brisman J. Baker's asthma. *Occup Environ Med* 2002; **59**: 498-502.
10. Gannon PF, Weir DC, Robertson AS, Burge PS. Health, employment, and financial outcomes in workers with occupational asthma. *Br J Ind Med* 1993; **50**(6): 491-496.
11. Circular Instruction No. 176, promulgated in the Government Gazette (No. 82), January 2003. In: *Current Allergy & Clinical Immunology* 2004; **17**(1): 43-44.
12. Becklake MR, Malo JL, Chan-Yeung M. Epidemiological approaches in occupational asthma. In: Bernstein L, Chan-Yeung M, Malo J-L, Bernstein DI, eds. *Asthma in the Workplace*, 2nd ed. New York: Marcel Dekker, 1999.

CHAIRMAN'S REPORT



On behalf of the Allergy Society of South Africa (ALLSA), I am delighted to welcome you to participate in the Kidz 'n All 2004 Conference, the first joint congress of the South African Paediatric Association, the South African Association of Paediatric Surgeons and ALLSA. The organising committee has arranged an outstanding programme which will address many important aspects of paediatric and allergology practice.

The allergology component has wide-ranging themes including epidemiology of allergy and asthma, early immune development, atopic dermatitis, food allergy and prevention of allergic disease and asthma. One of the highlights of the congress will be the GLORIA Symposium on Immunotherapy, sponsored by the

World Allergy Organisation (WAO). This year's meeting will include presentations from two international speakers and several local allergology experts. We thank Professors Susan Prescott (Australia) and Ronald Dahl (Denmark) for taking time out from their busy schedules to travel to South Africa for this meeting.

This year's meeting, which continues to be well supported by our generous sponsors, promises to combine excellent educational sessions with warm hospitality and interactive social settings in the wonderful city of Cape Town.

I encourage all ALLSA members and our paediatric (medical and surgical) colleagues to participate actively in the Kidz 'n All 2004 Conference, which is sure to be both highly enjoyable and productive.

Cas Motala

ALLSA Chairman