

Incidence rates of occupational contact urticaria caused by natural rubber latex

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The prevalence of natural rubber latex (NRL) allergy in different populations has been reported (1–13), but little on incidence rates.

Materials and Methods

In Finland, occupational contact urticaria (CU), including protein contact dermatitis (PCD), has been classified as a separate occupational skin disease since 1989 (14,15). The incidence rates of occupational CU, including PCD, caused by NRL in different occupations over a 6-year period (1991–1996), were calculated from the data of the Finnish Register of Occupational Diseases (14,15) and from statistics on the working population in different occupations (16). Analyses were done using the Finnish classification of occupations (17), the structure of which has been reported earlier (14). In this study 1-, 2- and 3-digit coding levels were used (Table 1).

Results

A total of 1079 cases of CU or PCD were reported to the Register during the 6-year period. 288 (27%) of the cases were caused by NRL. There were more than 10 cases in only 6 occupations (at 3-digit level): physicians, nurses, assistant nurses and hospital attendants, dentists, dental assistants, and cleaners (Table 1).

Incidence rates were calculated per 10,000 employed worker years (Table 1): the highest were found at the 1-

digit level in health care and social work (1.3), at the 2-digit level in dental care work (9.3), and medical and nursing work (1.8), and at the 3-digit level in dental assistants (11.8), dentists (6.0), physicians (3.9) and nurses (2.2). The number of cases of CU and PCD annually by occupation has remained relatively stable (Fig. 1).

Discussion

As far as we know, only in Finland is occupational CU registered separately. During a 4-year period, 1567 cases of allergic contact dermatitis were registered and 620 cases of occupational allergic CU (18), 28% of all occupational allergic dermatoses. Unlike many other countries, NRL is 2nd to cow epithelium as a cause of occupational CU in Finland (14, 15).

In European health care workers, the prevalence of NRL allergy has ranged from 2.8% to 10.7% (2, 7–9) (Table 2). Higher such prevalences have been reported from Canada and the USA (1, 3–6) (Table 2). Not only health care workers may be at high risk (19).

NRL is the commonest cause of occupational allergic skin disease in laboratory assistants in Finland (20), the incidence rate being 1.0 per 10,000 worker years (Table 1). Although cleaners frequently use protective NRL gloves, their incidence rate per 10,000 employed worker years was not very high (0.5) (Table 1).

NRL allergy occurs in less than 1% of the general population (Table 2), being found in only 1 (0.12%) of

Table 1. 288 cases caused by NRL, and incidence rates calculated per 10,000 employed worker years; the code refers to the occupation (1-, 2- or 3-digit level)

Code	Occupation	Cases	Incidence
0	technical, scientific, humanistic	12	0.06
012	laboratory assistants	7	1.0
1	health care and social work	198	1.3
10	medical and nursing work	132	1.8
101	physicians	31	3.9
103	nurses	56	2.2
106	assistant nurses	23	1.4
12	dental care work	56	9.3
121	Dentists	16	6.0
122	dental assistants	40	11.8
2	managerial, administrative and	2	0.01
3	commercial work	1	0.01
4	agricultural, forestry and fishing	8	0.1
5	transport and communication work	1	0.01
6/7/8	manufacturing, machine operation	26	0.1
9	service work, etc.	36	0.3
942	cleaners	19	0.5
1–9	ALL OCCUPATIONS	288	0.2

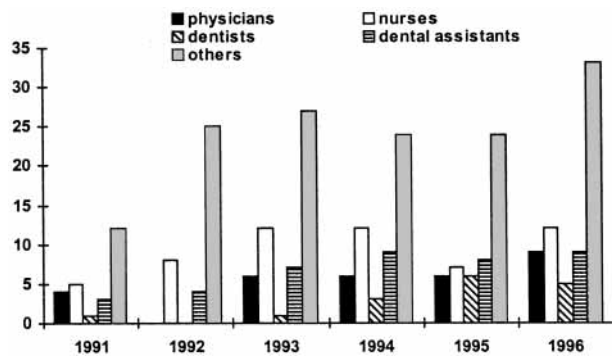


Fig. 1. Annual no. of cases of contact urticaria (including protein contact dermatitis) by occupation and year in Finland, 1991-1996

Table 2. Prevalence of NRL allergy in different populations

Populations	Prevalence (%)	Ref.
health care workers		
health care workers	12.1	(1)
operating room nurses	10.7	(2)
hospital physicians	9.9	(3)
operating room nurses	8.2	(4)
dental workers	6.2	(5)
hospital employees	5.5	(6)
hospital employees	4.7	(7)
hospital employees and dental care employees	3.5	(8)
hospital employees	2.8	(9)
general population		
atopics in an allergy clinic	3.0	(3)
atopics in an allergy clinic	0.85	(10)
non-atopics in an allergy clinic	0.4	(11)
adult surgical patients	0.12	(10)
multioperated patients		
spina bifida children	50.6	(12)
spina bifida children	32.0	(11)
spina bifida children	4.3	(13)

804 unselected adult Finns before surgery (10). A low, 0.4% prevalence rate was also found in French non-atopics attending an allergology clinic (11). Higher prevalences were found of 0.85% in 4708 Finnish patients with atopic symptoms (10) and 3% in 100 atopic patients in Canada (3). The highest prevalences are in spina bifida children (11-13) (Table 2)

Occupational allergic skin diseases are currently increasing in dental personnel (21), dentists running the highest risk (22), which is due to allergy to NRL and dental plastics. Dental assistants and dentists have now been shown to be at the highest risk of contact urticaria or protein contact dermatitis from NRL in Finland. Gloves must be selected to ensure adequate protection (23), but to carry a low risk of inducing NRL allergy (24).

References

- Liss G M, Sussman G I, Deal K, Brown S, Cividino M, Siu S, Beezhold DH, Smith G, Swanson M C, Yunginger J, Douglas A, Holness D L, Lebert P, Keith P, Wasserman S, Turjanmaa K. Latex allergy: epidemiological study of 1351 hospital workers. *Occup Environ Med* 1997; 54: 335-342.
- Lagier F, Vervloet D, Lhermet I, Poyen D, Charpin D. Prevalence of latex allergy in operating room nurses. *J Allerg Clin Immunol* 1992; 90: 319-322.
- Arellano R, Bradley J, Sussman G. Prevalence of latex sensitization among hospital physicians occupationally exposed to latex gloves. *Anesthesiology* 1992; 77: 905-908.
- Turjanmaa K, Cacioli P, Thompson R, Simlote P, Lopez M. Frequency of natural rubber latex allergy among US operating room nurses using skin prick testing. *J Allergy Clin Immunol* 1995; 95: 214.
- Hamann C P, Turjanmaa K, Rietschel R, Siew C, Owensby D, Gruninger S E, Sullivan K M. Natural rubber latex hypersensitivity: incidence and prevalence of type I allergy in the dental professional. *J Am Dent Assoc* 1998; 129: 43-54.
- Kaczmarek R, Silverman B, Gross T, Hamilton R, Kessler E, Arrowsmith-Lowe T, Moore R. Prevalence of latex-specific IgE antibodies in hospital personnel. *Ann Allergy Asthma Immunol* 1996; 76: 51-56.
- Vandenplas O, Delwiche J P, Evrard G, Aimont P, Vanderbrempt X, Jamart J, Delaunois L. Prevalence of occupational asthma due to latex among hospital personnel. *Am J Resp Critic Care Medicine* 1995; 151: 54-60.
- Wrangsjö K, Österman K, Van Hage-Hamsten M. Glove-related skin symptoms among operating theatre and dental care unit personnel (II). Clinical examination, tests and laboratory findings indicating latex allergy. *Contact Dermatitis* 1994; 30: 139-143.
- Turjanmaa K. Incidence of immediate allergy to latex gloves in hospital personnel. *Contact Dermatitis* 1987; 17: 270-275.
- Turjanmaa K, Mäkinen-Kiljunen S, Reunala T, Alenius H, Palosuo T. Natural rubber latex allergy - the European experience. In: Fink J (ed): *Latex allergy*. Philadelphia: W.B Saunders Company. *Immunology and Allergy Clinics of North America* 1995; 15: 71-88.
- Moneret-Vautrin D A, Beaudouin E, Widmer S, Mouton C, Kanny G, Prestat F, Kohler C, Feldmann L. Prospective study of risk factors in natural rubber latex hypersensitivity. *J Allergy Clin Immunol* 1993; 92: 668-677.
- Kelly K, Kurup V, Zacharisen M, Resnick A, Fink J. Skin and serologic testing in the diagnosis of latex allergy. *J Allergy Clin Immunol* 1993; 91: 1140-1145.
- Capriles-Huleit A, Sanchez-Borges M, Von-Scazoni C, Medina J. Very low frequency of latex and fruit allergy in patients with spina bifida from Venezuela: influence of socio-economic factors. *Ann Allergy Asthma Immunol* 1995; 75: 62-64.
- Kanerva L, Toikkanen J, Jolanki R, Estlander T. Statistical data on occupational contact urticaria. *Contact Dermatitis* 1996; 35: 229-233.
- Kanerva L, Jolanki R, Toikkanen J, Estlander T. Statistics on occupational contact urticaria. In: Amin S, Lahti A, Maibach H I (eds): *Contact urticaria syndrome*. Boca Raton, FL: CRC Press, 1997: 57-70.
- Central Statistical Office of Finland. Helsinki 1991-96. *Statistics on the working population in Finland*.
- Central Statistical Office of Finland. *Classification of Occupations 1987* (revised edition). Handbooks no. 14, Helsinki, 1987.
- Kanerva L, Jolanki R, Toikkanen J, Tarvainen K, Estlander T. Statistics on occupational dermatoses in Finland. In: Elsner P, Maibach H I (eds): *Irritant dermatitis: new clinical and experimental aspects*. Basel: Karger. *V Curr Probl Dermatol* 1995; 23: 28-40.
- Tarvainen K, Jolanki R, Forsman-Grönholm L, Estlander T, Pääfli P, Juntunen J, Kanerva L. Exposure, skin protec-

- tion and occupational skin diseases in the fiberglass reinforced plastics industry. *Contact Dermatitis* 1993; 29: 119–127.
20. Jolanki R, Estlander T, Kanerva L. Occupational dermatoses among laboratory assistants. *Contact Dermatitis* 1999; 40: in press.
 21. Kanerva L, Lahtinen A, Toikkanen J, Forss H, Estlander T, Susitaival P, Jolanki R. Increase in occupational skin diseases of dental personnel. *Contact Dermatitis* 1999; 40: in press.
 22. Jolanki R, Estlander T, Karjalainen A, Kanerva L. Ammatti-ihotautivaara eri ammateissa. Suomen Lääkl. (The risk of occupational skin disease in various occupations). *Finnish Med J* 1998; 53: 927–936.
 23. Mäkelä E A, Väänänen V, Alanko K, Jolanki R, Estlander T, Kanerva L. Resistance of disposable gloves to permeation by 2-hydroxyethyl methacrylate and triethylene-glycol dimethacrylate. Manuscript form, submitted for publication.
 24. Palosuo T, Turjanmaa K, Reinikka-Railo H. *Allergen content of latex gloves. A market surveillance study of medical gloves used in Finland in 1997*. Publications by the National Agency for Medicines 9/1997, Helsinki, Finland.

Allergic contact dermatitis from povidone-iodine

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Iodine tincture is still frequently used because of its efficacy, low cost, and low toxicity. An iodophor is a complex of iodine and a carrier molecule, which not only increases iodine solubility but also releases iodine slowly, prolonging its effect. The most widely used iodophor is polyvinylpyrrolidone (povidone)-iodine (PVP-I).

Case Reports

Case no. 1

A 16-year-old boy presented with post-operative dermatitis on the distal right foot, after surgery on the right big toe nail, following which he had been treated with 10% PVP-I (Freka-cid[®] cream). This treatment was

stopped and, with oral prednisolone for 1 week, the dermatitis gradually resolved.

Patch testing with Freka-cid[®] cream and all its constituents supplied by the manufacturer revealed positive reactions to Freka-cid[®] and PVP-I (Table 1). Additional patch testing with a commercial series of common antiseptics showed a positive reaction to iodine (Table 1).

Case no. 2

A 62-year-old man had been treated on the right flank with povidone-iodine (Betaisodona[®] solution, also marketed as Betadine[®] solution) prior to surgery on the left kidney. Within 24 h after the operation, he developed allergic contact dermatitis at the site where the antiseptic solution had been applied. With topical corticosteroids, the contact dermatitis gradually resolved.

Patch testing with Betaisodona[®] solution and all its constituents supplied by the manufacturer revealed positive reactions to Betaisodona[®] solution and PVP-I (Table 1). Additional patch testing with a commercial series of common antiseptics showed a positive reaction to iodine (Table 1).

Table 1. Patch test results (readings according to ICDRG recommendations)

No.	Vehicle	D2	D3	D7
<i>Case no. 1</i>				
Freka-cid [®] cream	as is	+	+	+
5% povidone-iodine	aq.	++	++	++
10% povidone-iodine	aq.	++	++	++
5% povidone-iodine	pet.	++	++	++
10% povidone-iodine	pet.	++	++	++
0.5% iodine	pet.	++	++	++
povidone	as is	–	–	–
all other constituents of Freka-cid [®] cream		–	–	–
<i>Case no. 2</i>				
Betaisodona [®] solution	as is	++	++	++
10% povidone-iodine	aq.	++	++	++
0.5% iodine	pet.	++	++	++
povidone	as is	–	–	–
all other constituents of Betaisodona [®] solution		–	–	–

Discussion

Contact dermatitis from PVP-I is rare despite its widespread use. Both our patients had a history of previous exposure to PVP-I. The 1st patient had used Frekacid[®] cream several times before his right big toe was operated on. The 2nd patient had been operated on several times before and recalled previous pre-operative applications of a "brown solution". A 10% PVP-I solution contains 1% releasable iodine, but only 0.001% free iodine, which is why PVP-I is less toxic and irritant than iodine, without being less antiseptic. PVP-I is marketed in ointments, creams, lotions, soaps, and shampoos.

Irritant skin reactions and systemic effects have occasionally been reported from PVP-I preparations (6–8).