

Fibreglass dermatitis: a report of 2 cases

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Fibreglass is used widely due to its properties of thermal, acoustic and electrical insulation properties (1). Transversely, is also used to reinforce other materials such as plastics.

Fibreglass fibres are amorphous in structure. Transversally, they break very easily, producing numerous fragments of the same diameter but different length. Skin problems caused by fibreglass result from cutaneous penetration of these fragments. Fibreglass dermatitis, which was originally described by Sulzberger and Baer in 1942 (2), is one of the most common work-associated dermatoses. The problem might be suspected in fibreglass industry workers presenting with symptoms of dermatitis, but arriving at such a diagnosis is harder when the patient is not normally exposed to such fibres – as in the case of the two patients described here.

Case Report 1

A 22-year-old non-atopic man who had been working in a scrap yard

for 2 months presented with intensely pruritic skin lesions. These lesions had started on the top of his hands and feet and over the next 15 days had spread over the entire body except the face, palms, and soles. Examination showed a polymorphous skin eruption composed of multiple erythematous papules with fine flaking on the trunk, neck, and extremities and was prominent on the joints of the arms and legs (Fig. 1). Screening haematology, biochemistry, and immunological studies were normal. A biopsy of one of the lesions showed epidermal spongiosis and a predominantly perivascular lymphocytic inflammatory infiltrate. Patch tests [baseline Spanish Research Group in Contact Dermatitis and Cutaneous Allergy (GEIDAC) series] were negative.

The patient explained that symptoms had begun when he had been removing some heating pipes. A possible relationship with fibreglass was then suspected. When the biopsy was reviewed in detail, a fragment was detected in the cornified layer that showed birefringence when viewed microscopically under polarized light – typical of fibreglass

(Fig. 2). No contact allergy to resins or additives used in the manufacture of fibreglass products was detected. Symptomatic treatment with topical corticosteroids and antihistamines was initiated, and the patient advised on the precautions he should take to avoid further problems.

Case Report 2

A 48-year-old non-atopic man, the head of a construction company, presented with generalized pruritus (especially intense on the arms) that had developed over a period of 2 months. Examination showed marked cutaneous xerosis on the trunk and small, papular, scabby, and excoriated lesions. Screening haematology, biochemistry, and immunological studies and thyroid function were normal. Histopathological examination of a skin biopsy showed a spongiotic pattern. Patch tests (GEIDAC) were negative.

A diagnosis of irritant contact dermatitis (ICD) caused by contact with fibreglass was suspected after a detailed history the patient showed that he had visited a building site when fibreglass roof insulation was being installed. The diagnosis was confirmed

when microscopy showed fibreglass fragments in the cornified layer of skin stripped from the arm with adhesive tape. The patient was treated and given advice similar to case 1.

Discussion

Fibreglass is inert from a chemical point of view, but contact or occupational exposure can cause fibres to penetrate and remain in the cornified layer of the skin, leading to ICD. Less commonly, allergic dermatitis can develop through sensitivity to the additives and resins used in the manufacture of fibreglass products (3–5). Dermatitis can also be caused by the carriage of the fibres in ventilation systems (6). ICD caused by fibreglass is most commonly seen in occupational medicine (7); it was reported in 20.3% of workers directly exposed and in 1.1% of those not directly exposed (8, 9). Minamoto et al. (10, 11) reported skin problems in 58% of workers who handled fibreglass in a plastic reinforcement plant. In the construction industry, its prevalence can be as high as 60% (12).

The basic pathogenic mechanism of this dermatitis involves the penetration through the stratum corneum of fine fragments of fibreglass, which cause mechanical irritation. The degree of irritation is proportional to the diameter of these fragments and inversely proportional to their length.

In some cases, exposure to fibreglass is not occupational but accidental, as in patient 2. This can make diagnosis difficult, and a number of such cases have been reported (13–17). This type of dermatitis is usually seen in people who are exposed to fibreglass for only a short period; longer exposure commonly leads to tolerance. Clinically, the earliest and most prominent symptom is intense pruritus in the skin folds (where the clothes rub the skin), followed by a micropapular rash, folliculitis with linear excoriation caused by scratching (18), and paronychia (19). On rare occasions, fibreglass has been reported as causing purpuric, urticarial, granuloma annulare, and erythema multiforme-like lesions (20).

A diagnosis of fibreglass dermatitis is usually reached after a history suggests exposure, followed by the observation of fragments after skin stripping, and examination requires polarized light microscopy. Histopathology is



Fig. 1. Patient 1: erythematous flaking lesions in the antecubital fossae.

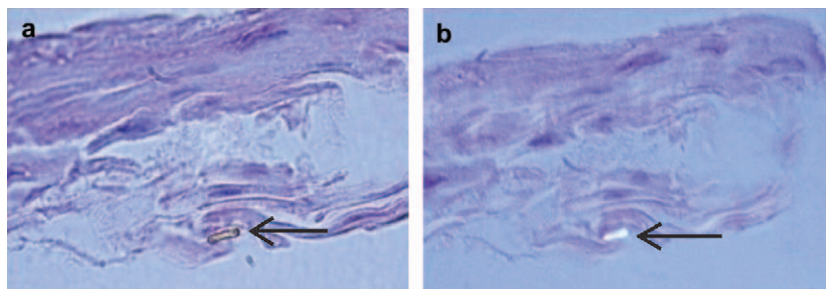


Fig. 2. Histopathological study: a fibreglass fragment in the cornified layer (left) and birefringence under polarized light (right).

not diagnostic unless birefringent fibreglass fragments are observed (Fig. 2).

In fibreglass industry workers or those who handle fibreglass, the possibility of dermatitis induced by this product is evident – but diagnosing this condition is much harder in people who are not habitually exposed to it. In the present patients, the clinical suspicion of the condition backed by detailed histories was key in arriving at the correct diagnosis.

References

1. Renzi P M, Mantha J, Matar N, Renzi G D. Pathogenicity of artificial mineral fibers: are they as dangerous as asbestos? *Union Med Can* 1990; 119: 54–60.
2. Sulzberger M B, Baer R L. The effects of fiber glass on animal and human skin. *Ind Med Surg* 1942; 11: 482–484.
3. Conde-Salazar L, Guimaraens D, Romero V L, Harto A, González M. Occupational dermatitis from glass fiber. *Contact Dermatitis* 1985; 13: 195–196.
4. Minamoto K, Nagano M, Inaoka T, Futatsuka M. Allergic contact dermatitis due to methyl ethyl ketone peroxide, cobalt naphthenate and acrylates in the manufacture of fibreglass-reinforced plastics. *Contact Dermatitis* 2002; 46: 58–59.
5. Camarasa J G, Moreno A. Fiberglass dermatitis. *Contact Dermatitis* 1984; 10: 43.
6. Verbeck S J, Bruise-van Unnik E M, Malten K E. Itching in office workers from glass fibers. *Contact Dermatitis* 1981; 7: 354.
7. Chang C H, Wang C M, Ho C K, Su W B, Yu H S. Fiberglass dermatitis: a case report. *Kaohsiung J Med Sci* 1996; 12: 491–494.
8. Tarvainen K, Kanerva L, Jolanki R, Estlander T. Occupational dermatoses from the manufacture of plastic composite products. *Am J Contact Dermatitis* 1995; 6: 95.
9. Sertoli A, Giorgini S, Farli M. Fiberglass dermatitis. *Clin Dermatol* 1992; 10: 167–174.
10. Minamoto K, Nagano M, Inaoka T, Futatsuka M. Occupational dermatoses among fibreglass-reinforced plastics factory workers. *Contact Dermatitis* 2002; 46: 339–347.
11. Minamoto K, Nagano M, Inaoka T, Kitano T, Ushijima K, Fukuda Y, Futatsuka M. Skin problems among fiber-glass reinforced plastics factory workers in Japan. *Ind Health* 2002; 40: 42–50.
12. Björnberg A. Glass fiber dermatitis. *Am J Ind Med* 1985; 8: 395–400.
13. Eby C S, Jetton R L. School desk dermatitis. *Arch Dermatol* 1972; 105: 890–891.
14. García-Patos V, Pujol R M. Generalized pruritus with flexural micropapules in a 16-month-old girl. *Arch Dermatol* 1994; 130: 785–788.
15. Abel R R. Washing machine and fiberglass. *Arch Dermatol* 1966; 93: 78.
16. Lucas J B. Common industrial dermatoses. *Cutis* 1974; 13: 33.
17. Cusano F, Mariano M. Fiberglass dermatitis microepidemic in a primary school. *Contact Dermatitis* 2007; 57: 351–352.
18. Chen J Y, Phillips R, Lewis A T, Quan L T, Hsu S. Irritant contact dermatitis secondary to fiberglass: an unusual presentation. *Int J Dermatol* 2000; 39: 372–374.
19. Heisel E B, Hunt F E. Further studies in cutaneous reactions to glass fibers. *Arch Environ Health* 1968; 17: 705.
20. Sertoli A, Francalanci S, Giorgini S. Fiberglass dermatitis. In: *Handbook of Occupational Dermatology*, 1st edition, Kanerva L, Elsner P, Wahlberg J E, Maibach H I (eds): Berlin, Springer-Verlag, 2000: 122–134.

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