

		D2	D4
ammoniated mercury	1% pet.	++	++
thimerosal	0.1% pet.	+	++
barley residues	as is	++	++
barley residues	10% pet.	++	++
malt radicle	as is	++	++
malt radicle	10% pet.	++	++
malt residues	as is	++	++
malt residues	10% pet.	++	++

10 control subjects tested with the barley and malt residues were negative. Biopsy of a positive patch test to residues of barley at D4 showed spongiosis, and perivascular lymphocytes with eosinophils in the dermis. A prick test to barley was negative. Serum IgE was 97.9 IU/ml.

Discussion

Immediate-type allergy has been reported after drinking beer, and protein components of barley malt seem to be responsible (1–3). Gutgesell & Fuchs (4) reported an occupational contact urticaria from beer in a waitress. Our patient had no problems with drinking beer, but

developed an eczema on his fingers when he handled barley malt residues. Cronin (5) reported a farm labourer with contact dermatitis from barley dust. To our knowledge, there are no other cases reported.

Acknowledgement

We thank Dr. Seara for showing us the malt processing plant, explaining the process of manufacturing barley malt, and supplying us with the residues of barley and malt.

References

1. Van Ketel W G. Immediate type allergy to malt in beer. *Contact Dermatitis* 1980; 6: 297–298.
2. Keller K, Schwanitz H J. Type I hypersensitivity to beer. *Contact Dermatitis* 1994; 30: 44–45.
3. Santucci B, Cristaudo A, Cannistraci C, Curioni A, Furegon L, Giannattasio M. Urticaria from beer in 3 patients. *Contact Dermatitis* 1996; 34: 368.
4. Gutgesell C, Fuchs T. Contact urticaria from beer. *Contact Dermatitis* 1995; 33: 436–437.
5. Cronin E. Contact dermatitis from barley dust. *Contact Dermatitis* 1979; 5: 196.

Novel causes of contact dermatitis from offshore oil-based drilling muds

ANTHONY D. ORMEROD, COLM M. DWYER AND MARK J. D. GOODFIELD¹

Dermatology Department, Aberdeen Royal Infirmary, Foresterhill, Aberdeen AB25 2ZN, UK

¹Leeds General Infirmary, UK

Key words: occupational; petroleum industry; oil-based drilling muds; allergic contact dermatitis; white spirit; abitol; irritant contact dermatitis; biodegradable synthetic olefins; alkenes. © Munksgaard, 1998.

Skin reactions are common among offshore drilling workers who suffer frequent skin contamination with oil-based 'mud' (1). The original oil-based muds used diesel oil as their base. Calcium salts in the drilling mud were associated with calcinosis cutis (2). An unusual reaction to drilling mud is the production of umbilicated papules, resembling infected chemical burns, occurring soon after caustic chemicals penetrated abraded skin, and histologically showing an acquired perforating disorder (3). In the mid 1980s, diesel was replaced by oils that were less irritating to the skin, which relied heavily on fatty acid amines homologous to ethylenediamine, diethylenetriamine (DETA) and triethylenetetramine (TETA), allergic contact dermatitis from which has been reported in several offshore oil workers (4).

Case Reports

Case no. 1

A deep-sea diver, aged 33 years, presented with acute blistering dermatitis of the dorsum of the feet, ankles, wrists, neck and genitalia. He had worked 4, 12-h shifts

over the last 4 days, during which his skin had been saturated with old drilling mud on the sea bed. He had previously worked for several years under the same conditions without any skin problem. Months later, he experienced a similar reaction. He had modified his diving gear to provide complete protection of the feet and legs, but contamination with mud had still occurred around his wrists and neck. Since then, he had not been allowed to dive. Patch testing with the European standard series, facial and plastic and glue series was positive to colophony and abitol, benzoyl peroxide, p-tert-butylphenol-formaldehyde resin, balsam of Peru and fragrance mix, but negative to ethylenediamine, diethylenetriamine and triethylenetetramine.

A sample of the mud obtained from the sea bed was analysed by Fourier transform infra-red spectroscopy (FTIR) and scanning electron microscopy/energy dispersive X-ray microanalysis (SEM/EDXA), and was found to contain aluminium, silicon from the silicates, sulfur, potassium, calcium, barium and iron. The volatile phase contained hydrocarbon very close to white spirit or low boiling point petroleum ether, while the mineral oil extracted was paraffinic or naphthenic. Further patch test-

ing showed him to be reactive to a sample of the dried mud (+++) and to white spirit (+++), these reactions persisting to 4 days. In 5 out of 6 normal controls, the mud produced a mild irritant reaction, while none reacted to the white spirit.

Case no. 2

A 32-year-old 'roughneck' developed severe blistering exudative dermatitis on the extensor aspect of his hands, fingers and forearms, sparing the area under his wrist-watch. This had developed at the end of a 12-h shift, during which his skin had been extensively contaminated with a new oil-based drilling mud, based on isomerized (double bond at position) C16/C18 α olefin, despite wearing plastic gloves, a 'slicker' protective suit and barrier cream. He had worked in similar conditions with oil-based muds for several years without any significant skin reaction.

Patch testing to a sample of mud from the well bore (as is) showed a strong reaction, but no reaction at 25% in liquid paraffin. He showed a weak positive reaction to fragrance mix and no reactions to diethylenetriamine 1%, triethylenetetramine 0.5%, European standard series and an oil and cutting fluid series (Chemotechnique). He was subsequently tested to the pure C16/C18 α olefin, with a similar strong raised oedematous, but not vesicular, reaction at 100%, but again no reaction at 25% dilution.

Case no. 3

A 38-year-old driller had worked with mineral oil-based muds for 4 years without any adverse reaction. When a synthetic oil based on (double bond at position) C14/C16 α olefin was introduced, he developed an acute dermatitis where mud tracked into his protective clothing at the wrist and on the dorsum of the hand. The dermatitis was red, hot and swollen, but without vesicles or bullae. It settled repeatedly during 2-week episodes of shore leave. Patch testing to the same series as case no. 2 was negative, apart from a moderate reaction to neomycin. Samples of mud and α olefins were negative on patch testing at concentrations of 50%, 25%, 12% and 6%. However, an open use test on the antecubital fossa, and occluded with a glove on the hand overnight at 100% to simulate work conditions, produced a severe erythematous, oedematous reaction.

3 of 16 normal controls, tested with the isomerized C16/C18 α olefin, had similar strong irritant reactions at 100%, but were negative on patch testing to a 25% dilution in liquid paraffin. Those reacting to the α olefin were not predisposed to irritant reaction, as assessed by the presence of atopy or a predisposition to irritant reactions with standard patch tests for chrome and cobalt.

Discussion

These 3 patients all had severe reactions to oil-based drilling mud and reacted to agents not previously described in this context. White spirit is not normally an ingredient of oil-based drilling muds, but is a distillate of crude oil and would have structural homology with diesel oil. It is most likely that this patient's allergic reactions were caused by diesel oil in mud that may have lain on the sea bed for many years. The allergy to abitol might also have been relevant, as tall oil (frequently used in mud) is a distillate of oleoresin from pine trees.

Biodegradable synthetic olefins have been introduced within the last 4 years. These were reported by the manufacturers data to be non-irritant (Draize tests and tests in rabbits) and non-sensitizing in the guinea pig maximization test. We concluded that in certain predisposed humans, these olefins cause a strong irritant reaction. We considered the reactions to be irritant because of the higher concentrations required to produce a reaction and the incidence of positive reactions in the control population.

References

1. Ormerod A D. Occupational dermatitis in oil rig workers. *Dermatology in Practice* 1997; 5: 16–18.
2. Wheeland R G, Roundtree J M. Calcinosis cutis resulting from percutaneous penetration and deposition of calcium. *J Am Acad Dermatol* 1985; 12: 172–175.
3. Knox J M, Knox J M, Dinehard S M et al. Acquired perforating disease in oil field workers. *J Am Acad Dermatol* 1986; 14: 605–611.
4. Ormerod A D, Wakeel R A, Mann T A N et al. Polyamine sensitization in offshore workers handling drilling muds. *Contact Dermatitis* 1989; 21: 326–329.

Occupational 'multivitamin allergy' caused by the antioxidant ethoxyquin

KRISTINA ALANKO, RIITTA JOLANKI, TUULA ESTLANDER AND LASSE KANERVA

Section of Dermatology, Finnish Institute of Occupational Health, Topeliuksenkatu 41 aA, FIN-00250 Helsinki, Finland

Key words: animal feed; fodder; antioxidants; airborne; allergic contact dermatitis; occupational; ethoxyquin; vitamin A oil; vitamin D₃ oil. © Munksgaard, 1998.

Case report

A 43-year-old man, with no previous dermatoses or atopy, had worked in an animal fodder for 17 years when

he developed a widespread eczema. This began on his hands and abdomen and became widespread. He associated the rash with adding a multivitamin mixture to mink and fox fodder. This was a fine powder and easily