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Skin Lesions as a Sign of Subacute Pentachlorophenol Intoxication

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Pentachlorophenol (PCP) and its sodium salt are frequently used in wood preservatives. Little is known about the effects on man when being chronically exposed. Only vague skin symptoms, such as rashes, acne and cutaneous infections were described. We present two cases of pemphigus vulgaris with a known non-occupational chronic PCP exposure. The clinical course and the titer of pemphigus antibodies roughly correlate with the PCP levels in serum. In one case of chronic urticaria the exacerbations also run parallel to the PCP serum levels and increased anti-skin antibodies, without any manifestation of pemphigus vulgaris. The role of PCP as one of the causes provoking pemphigus vulgaris and chronic urticaria with raised anti-skin antibodies is discussed. *Key words: Pemphigus vulgaris; Urticaria; Wood preservatives.* (Received September 3, 1985.)

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Pentachlorophenol (PCP) is a commonly used wood preservative. Its dose dependent acute toxic effects on the phosphorylating process were investigated in animals and the symptoms of acute poisoning in man after massive exposure were described (1, 2). Less is known about minor health problems in people chronically exposed to smaller doses.

Besides conjunctivitis, chronic sinusitis, upper respiratory complaints, recurring headache and neurological complaints, several skin lesions, such as vaguely defined skin irritations and rashes, a possible chloracne and a tendency for cutaneous infections were reported (3, 4).

We report two cases of pemphigus vulgaris and one of chronic urticaria where PCP is a contributing factor.

CASE REPORT

Case 1

A 41-year-old Caucasian man bought a PCP treated bookcase in the summer of 1983, during which he was also highly exposed to the sun. Shortly after, bullae with a diameter of 1 to 3 cm appeared on the

face, the scalp and the arms and larger bullae up to 6 cm in diameter on the trunk. The disease was clinically diagnosed as pemphigus vulgaris. The biopsy revealed a deep seated acantholysis in the epidermis, forming a cleft between the malpighian and the basal layer. The immunofluorescence techniques showed deposits of mainly IgG with less IgM and IgA in the intercellular spaces of the epidermis and a strong positive reaction to C_3. Anti-skin antibodies of the pemphigus vulgaris type were present in the serum at a titer of 1/1200.

Responding rapidly to a treatment with oral methylprednisolone (Medrol® 48 mg/day) and azathioprine (Imuran® 100 mg/day), the patient could soon leave the hospital. During the follow-up the decrease of the treatment doses were several times followed by relapsing skin lesions. At these occasions the serum PCP levels were measured following the analytical procedure described earlier (5) with the highest dose (15.0 μg/l) accepted as normal being the mean of the PCP levels in a population without any exposure (6). It was 47.0 μg/l in October 1983, 40.5 μg/l in February 1984 and 28.0 μg/l in January 1985. Each time the titers of the anti-skin antibodies had significantly increased. In between those relapses, during periods of healing with disappearance of the anti-skin antibodies, the PCP levels were 29.0 μg/l in December 1983, 10.7 μg/l in March 1984, 24.8 μg/l in July 1984, and 15.5 μg/l in October 1984.

Case 2

A 28-year-old Caucasian woman was seen in March 1983 for painful erosive lesions on the oral mucosa and the vocal cords and circumscribed bullae on the face, the shoulders, the upper arms and the décolleté. These were followed by confluent crusty erosions. The clinical diagnosis of pemphigus vulgaris was confirmed by the biopsy demonstrating intra-epidermal blisters between the lowest part of the malpighian layer and the basal layer. The immunofluorescence techniques showed deposits of IgM, complement and fibrine in the intercellular spaces of the epidermis near the blister. Anti-skin antibodies of the pemphigus vulgaris type only reached a titer of 1/20. A treatment was started with oral methylprednisolone (Medrol® 32 mg/day) and azathioprine (Imuran® 100 mg/day). The corticosteroids were reduced progressively.

In the late summer of 1983, after serious exposure to the Mediterranean sun, new vegetating and crusty lesions developed on the face, in the décolleté and on the back. The diagnosis of pemphigus vulgaris was confirmed histologically. The titer of the anti-skin antibodies of the pemphigus vulgaris type was 1/120.

The patient was treated with triamcinolone (starting dosis of 80 mg/day intramuscularly) and azathioprine (Imuran® 100 mg/day). Soon the corticosteroids could be administered orally and were reduced step by step. A new thorough anamnesis revealed an exposure to PCP. Some months before the first lesions appeared, several rafters in the living room had been treated with PCP containing wood preservatives.

New relapses of the disease occurred in March 1984, July 1984. September 1984 through January 1985, and in March 1985, with serum PCP levels of respectively 25.0 μg/l, 48.7 μg/l, 114 μg/l and 24.2 μg/l. Each time the titer of anti-skin antibodies reached 1/120. During the periods of clinical improvement and low titers of anti-skin antibodies, the PCP levels dropped to 12.9 μg/l in January 1984, 12.2 μg/l in February 1984, 10.8 μg/l in February 1985.

Case 3

A 35-year-old Caucasian man had suffered from urticaria for four months with large wheals spread over the trunk and the limbs. No obvious causes were noted. The dietary provocation tests were positive for salicylates and negative for penicillin, yeast extract, tartrazine and benzoates.

The treatment consisted of a salicylate free diet and different antihistaminics: terfenadine (Triludan®), hydroxyzine (Atarax®) and astemizole (Hismanal®). The urticaria worsened however: two exacerbations with high fever, general malaise and arthralgia were observed. A new thorough anamnesis revealed a possible PCP exposure when the patient was treating a lot of wooden framework shortly before the start of the urticaria and again just before the exacerbations. The PCP level was 85.7 μg/l in the serum and 144 μg/l in the urine. The CRP was high: 9.9 mg/dl (normally <1.2 mg/dl). The R.A. test was 57.4 I.U./ml (normally <50 I.U./ml) and the Rose-Waaler test was 1/32. The IgE circulatory immune complexes became positive with 3.03 T.U./l (normally <2.74 T.U./l).

Control investigations after 3 weeks revealed a still high PCP level of 143 μg/l in the serum and of 20.9 μg/l in the urine. The titer for the antinuclear factor was 1/40 with a mottled aspect and 1/120 up to 1/1200 for the anti-skin antibodies of the pemphigus vulgaris type. Because of the lack of any significant improvement, the patient moved temporarily to an other house in early September 1984. After two weeks the urticaria had decreased significantly. The serum PCP level became 50.9 μg/l with no more anti-skin antibodies observed. A month later it lowered to 41.6 μg/l, but increased to 96 μg/l

(with an urine level of 25 µg/l) when the patient returned home in January 1985. In the mean time all possible sources of PCP emanations has been removed. Since then he has been free of urticaria. The last control of the serum PCP level was 46 µg/l.

DISCUSSION

PCP and its sodium salt are frequently used both industrially and privately as fungicides, insecticides, bactericides, herbicides and molluscicides in wood preservatives, paints and desinfectants. Their acute toxic effects on the phosphorylating process were investigated in laboratory animals (1) and the symptoms in man after accidental massive exposure were described (2).

Less is known about the chronic exposure which can be either occupational or non-occupational. Minor problems such as conjunctivitis, chronic sinusitis, upper respiratory complaints, recurring headache and neurological pains were noted. As cutaneous symptoms vaguely defined skin irritations and rashes, a possible chloracne and a susceptibility to skin infections were mentioned (3, 4).

In our cases it was only a thorough and repeated anamnesis that revealed the possible link between the skin pathology of the first case and the chronic exposure to PCP. Alert ever since, we detected the next cases earlier. By presenting these cases, two of pemphigus vulgaris and one of chronic urticaria, all of them showing a striking parallelism between their course and the PCP serum-levels, we would like to draw the attention to possible new hazardous effects of PCP.

We do realize that it is too early to draw conclusions concerning the role of PCP in the pathogenesis of these cases. One can only suggest some possible mechanisms. First a direct toxic effect of the PCP on the phosphorylating process in the tissue cells. Secondly a possible photodynamic activity of the PCP could contribute to the pemphigus vulgaris cases, knowing that long exposure to high sun can play a role in provoking the disease. Moreover we can also assume that skin contact with PCP, brought to the exposed surfaces via the ambiant air, via contaminated clothing or via the blood circulation after ingestion or inhalation, changes the normal epidermal nature sufficiently to be recognized as strange by the immune tolerance. This could enhance a so-called auto-immune disease expressed by the significantly elevated titer of anti-skin antibodies of the pemphigus vulgaris type.

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