Section of Dermatology

President H R Vickers FRCP

Meeting December 16 1971

Cases

Chloracne: Three Cases

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(for I B Sneddon FRCP
and A E Walker MD MRCPEd)
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Case 1 Mr M H, aged 24
February 1971: Onset of acute erythema of the face, followed by creamy coloured cystic lesions and later comedones of chloracne; facial lesions were chiefly on malar regions but ears, nose and neck were also involved. Elsewhere, folliculitis and comedones on trunk and proximal limbs. The patient is otherwise well with no pruritus and no previous history of acne. His condition is unchanged after 11 months. Biopsy from the face showed marked keratotic follicular plugging and scanty sebaceous glands.

Case 2 Mr R S, aged 41
March 1971: Onset of symptoms similar to those of Case 1. This patient is also otherwise in good health with no pruritus; he has no previous history of acne. After 11 months he shows some improvement.

Case 3 S S, son of R S, aged 4
June 1971: Developed comedones on the cheeks and ears (Fig 1), similar in type and distribution to his father's. He has no previous history of acne, no pruritus, and is otherwise in good health.

History
April 1968: An explosion took place at a factory producing 2,4,5-trichlorophenol, killing the operator. Initially, special protective clothing was worn and no trouble occurred, but over the next few months around 70 maintenance workers at the site developed chloracne. Clearly a toxic substance had been produced and widely dispersed. To eliminate the compound, all parts of the damaged plant were buried underground except some large tanks which were repeatedly cleaned by high-pressure steam jets. No further cases of acne were seen among people working in the area of the explosion.

January 1971: Cases 1 and 2 were temporarily employed as pipe-fitters for the same firm. Case 1 had never been in the works before; Case 2 had, but had not been involved in the explosion or its aftermath. They were to set up a new installation away from the site of the explosion, refitting one

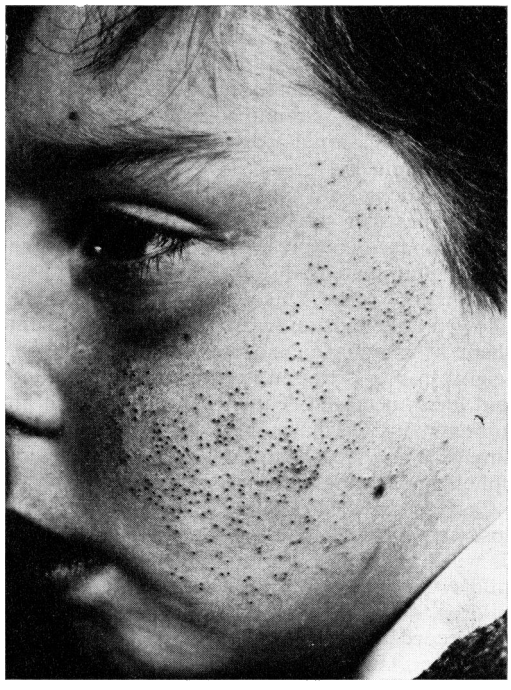

Fig 1 *Chloracne in a child of 4*

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of the cleaned tanks. Within four weeks both had developed severe chloracne.

Comment

2,4,5-trichlorophenol is used as an insecticide and herbicide and is prepared by the alkaline hydrolysis of tetrachlorobenzene, when one chlorine atom is replaced by a hydroxyl group; it does not produce chloracne even when painted on a rabbit's ear in 10% concentration (Kimmig & Schulz 1957). If the reaction is not carefully controlled, endogenous heat leads to the formation of more complex byproducts and also the risk of explosion.

When over 70 workers at this plant developed chloracne following the explosion, extreme efforts were made to prevent further contamination, and analysis of residues at the site revealed the presence of the extremely potent acne inducer tetrachlorodibenzodioxane. This chlorinated dibenzyl cyclic ether has been responsible for similar outbreaks of acne in association with explosions (Crowe 1970). Even a 0.001% solution has produced acneiform changes in a rabbit's ear and it is also hepatotoxic in animals.

The original cases remained severe for 1–1½ years after the explosion, many still showing signs over three years later. More worrying was the occurrence of our cases after an interval of nearly three years. They probably chanced upon a pocket of contamination, tetrachlorodibenzodioxane being almost indestructible and very persistent. No regular employees, even at the explosion site, developed trouble later and the little equipment salvaged was considered harmless after steam cleaning. Rabbits maintained inside these vessels did not develop skin damage. These two men have been very unlucky.

Our patients did not show abnormal liver function tests or serum lipid levels as described in the Japanese outbreak of biphenyl poisoning from contaminated rice oil (Katsuki 1969). In a report from France (Dugois *et al.* 1968) chloracne followed an explosion in a trichlorophenol plant where, after a single exposure, malaise, anorexia, weight loss and raised serum cholesterol and lipid levels occurred. Patients investigated in an outbreak in Germany had evidence of liver damage. Systemic absorption, as in the cases of biphenyl poisoning, cannot therefore be excluded.

Case 3, the son of Case 2, was regularly in close contact with his father whilst still wearing his working clothes, the presumed source of the child's contamination. Cases of wives and children developing chloracne have previously been recorded (Good & Pensky 1943).

Addendum: Eleven months after the time of exposure, the wife of Case 1 has developed facial comedones.

REFERENCES
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Good C K & Pensky N (1943) *Archives of Dermatology* 48, 251
Katsuki S *ed* (1969) *Fukuoka Acta Medica.* Report of study groups for 'YUSHO' (chlorbiphenyls poisoning). Special issue, June
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Dr H R Vickers: The first cases of chloracne I saw occurred during World War II in young women fixing heavy electric cables round ships to neutralize their magnetic fields so as to protect them from mines. The insulating material in the cable caused the trouble. Since then cases have cropped up from time to time, chiefly in the electroplating industry. This new outbreak demonstrates well how chloracne can be produced by minute amounts of the responsible substances.

Dr K D Crow: I think it likely that, despite thorough cleaning of the pressure vessel, so potent a substance as tetrachlorodibenzodioxane may still have remained in threads, pipe flanges or similar crevices in sufficient quantity to cause severe chloracne.

Dr G May (*Bolsover, near Chesterfield, Derbyshire*): In connexion with the original incident referred to by Dr Jensen, almost all the 79 cases of chloracne recorded in 1968 resolved within months. Where infection was present it was controlled with oxytetracycline; mild cases of chloracne were treated with lotio pot. sulphurat.; resistant cases were given steam baths and then subjected to irradiation with ultraviolet light.

In reply to the suggestion that flanges on the particular vessel under suspicion may have been the source of contamination in Dr Jensen's cases, this could not be so as these flanges had been replaced by other workers. Samples of deposits from within the vessel were subjected to gas-liquid chromatography in the search for tetrachlorodibenzodioxane, without success (negative to 1 part in 10^{10}). Further samples were therefore submitted for biological assay, but with completely negative results.

Porphyria Cutanea Tarda, Carcinoma of Bronchus, Rheumatoid Arthritis, Right Hydronephrosis

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Mr P K, aged 49

History: Admitted June 1971 because of outbreak of vesicles and blisters on backs of hands and neck of two months' duration (Figs 1 and 2). Resultant superficial ulcers healed slowly, leaving thin depigmented scars. Skin of hands easily trauma-