SMOKE-BOMB PNEUMONITIS: DESCRIPTION OF A CASE

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The reaction between hexachlorethane and zinc oxide, with the liberation of particles of zinc chloride, is widely used for the production of smoke-screens by the armed forces. Although no ill effects have been reported in the concentrations usually found, when the smoke is liberated in an enclosed space it may act as a lung irritant. The only case which we have found reported in the literature was when the smoke-screen was laid down by a ship at sea (Whitaker, 1945). A zinc chloride cloud is very caustic when in contact with moist areas of the body, and it is presumed that this is the active agent, although, according to Ardran (1950), other products of combustion of the cannister cannot be excluded as a contributory factor.

DESCRIPTION OF CASE

E.H., 18 years, admitted to hospital 5th July, 1952. Past history showed that he was quite well until six days before, having had no previous chest trouble or other illnesses he could remember. He had no cough or sputum, no hemoptysis, he was not short of breath, and his weight was steady and energy good.

Six days before admission he was on an army exercise and was on the top floor of a house when a smoke cannister was set off on the stairs. He could not get out of the house and had no respirator. He was exposed to the smoke for about ten minutes before the cannister and smoke were cleared. As a result of the smoke he coughed a lot, but without producing sputum; his mouth felt very dry and he could not eat. He vomited half an hour later. He was short of breath and felt rather sleepy, so that he slept in the Land Rover which took him to the Medical Reception Station. At the M.R.S. he was given some tablets and slept all night. The following day he was transferred back to his unit, where he was put on light duties.

On the second day he had a free epistaxis lasting a quarter of an hour, and was still short of breath. He was admitted to the Medical Reception Station, where it was noted that his temperature was raised to 99-100°F. Two days later it was noted that he had a pain in his side, and the following day that he had some difficulty in breathing, which later that night became more pronounced. At this time the medical officer first noted adventitious sounds at the base of the
right lung. The patient’s temperature was still 99-100° F. He was put on Aq. penicillin, and the following day transferred to hospital.

When admitted he did not look ill. There was no cyanosis or distressed respiration. Temperature was 100° F. and respiration rate 24 per minute. The most pronounced feature on examination was the very poor expansion of his chest, both sides of which, however, moved equally. The mediastinum was central and there was no clubbing of the fingers. There were moist crepitations over all areas of both lungs, and at both bases there was markedly diminished air entry associated with impairment of the percussion note.

In spite of the moist sounds in his chest, which became almost “coarse,” he produced no sputum, and great difficulty was found in getting a little clear mucoid sputum for bacteriology by postural drainage.

X-ray of Chest.—Patchy consolidation of all areas of both lungs, most pronounced in the mid-zones.

Blood Count.—Hb. 106%. (15.8 g./100 ml.)
W.B.C. 7,400. P. 66%, L. 29%. M. 3%, E. 2%.

Sputum.—Direct smear showed scanty Gram-positive cocci and Gram-negative cocci. Culture yielded a light growth, mainly Proteus and pneumococci.

Urine.—Nil abnormal in routine examination, deposit or culture.

The penicillin which had been started prior to admission was continued and, in addition, the patient was put on breathing exercises. His chest expansion improved remarkably, and at the same time air entry increased at the lung bases and loud coarse crepitations could be heard. His temperature, which was irregular in type, rising to a maximum of 100.6° F., gradually fell to normal by the fourth day in hospital.

Throughout this period the patient had no abnormal physical signs apart from those in his chest.

21st July, 1952, X-ray of Chest.—There was no evidence of consolidation remaining, only a diffuse fine mottling of all areas of both lungs evenly and symmetrically distributed and almost “miliary” in appearance.

Further Investigations
Mantoux 1/1,000: Negative. X-ray of hands: Nil abnormal.
Mantoux 1/100: Negative.
Plasma Proteins: Albumin 3.7%, globulin 3.1%. Total 6.8%.
Six gastric lavages: Negative for T.B. by direct smear and on culture.

By 1st August he was taking walks in the grounds. His chest had completely cleared clinically, but X-ray still showed a diffuse fine mottling. This, however, had completely cleared by 18th August, when he was discharged from hospital.

Follow-up ten months later showed no change in clinical or radiological picture, which were both normal.

DISCUSSION

We were lucky in seeing our patient earlier than in Whitaker’s case, and were able to confirm Ardran’s (1950) finding in dogs that the general condition
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is good despite the gross radiological findings. In contrast to phosgene poisoning, where the radiological signs clear in less than a fortnight (Steel, 1942; Sage, 1944), the mottling persists much longer (Whitaker, 1945; Ardran, 1950), and in our case it was still present four weeks after asphyxiation. Other workers' findings indicate that the initial pulmonary pathology may be due to intense initial broncho-constriction and some œdema. The œdema is not progressive and rapidly resolves, but leaves multiple fine areas of atelectasis with surrounding areas of emphysema, which produce the radiological appearance of mottling. (Schatzki, 1943; Durlacher and Bunting, 1947; Tobias et al., 1949).

REFERENCES


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