TWO SEVERE REACTIONS FOLLOWING A PULMONARY SCAN IN A PATIENT WITH IDIOPATHIC PULMONARY HAEMOSIDEROSIS

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Pulmonary scanning with ^{131}I- or ^{99m}Tc-labeled macroaggregates of human serum albumin is considered to be a safe, simple and reliable procedure in the diagnosis of pulmonary disease (*1*). Complications arising from this procedure, however, have been substantially documented only twice (*2,3*). In both cases severe occlusive disease of the pulmonary vascular bed was present; one was due to widespread tumor emboli to the lungs and the other to intimal fibrosis of the pulmonary arteries. The dose of tagged albumin in each case was very large and probably contributed significantly to pulmonary vascular occlusion (*1,9*). The following case report is that of a patient with idiopathic pulmonary haemosiderosis who, after an ^{131}I-macroaggregate scan, demonstrated two reactions which differed from those in the previously documented cases and which were probably due to a different mechanism.

CASE HISTORY

KC, a 59-year-old white female was admitted for investigation of periodic hemoptysis. Her past history included recurrent attacks of "pneumonia" for 15 years and blood in the sputum off and on for 9 years. For 10 years she had been treated intermittently with systemic steroids for neurodermatitis, and for the last year had been taking 2.5 mg of deltacortisone b.i.d. Progressive dyspnea was noted in the last year and a half, and a lung biopsy had demonstrated the findings of idiopathic pulmonary haemosiderosis (Fig. 1). The patient was allergic to penicillin, animals, and many foods, but there was no history of sensitivity to iodine, and a bronchogram performed 1½ years previously with aqueous propyliodone was uneventful. Pulmonary function tests before the lung scan showed a minor restrictive defect with a low diffusion capacity and above normal flow rates. A lung scan was performed

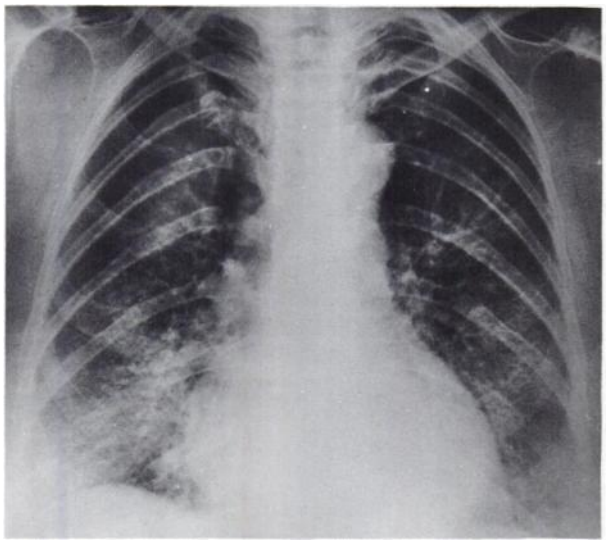

FIG. 1. PA view of chest 2 years before present admission has general coarse reticular pattern, most pronounced within both lower lobes.

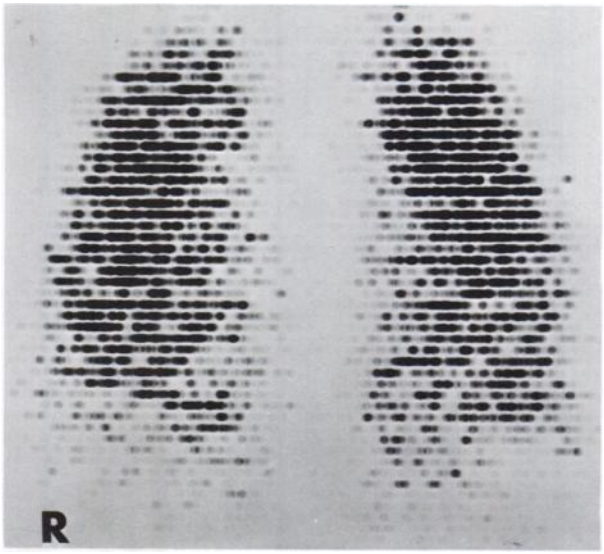

FIG. 2. AP rectilinear scan with moderate decrease in perfusion present in lower lobes.

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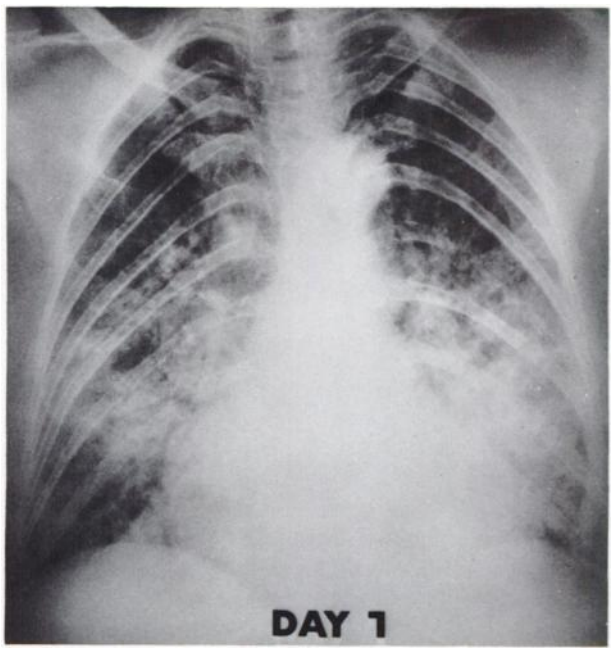

FIG. 3. AP supine view of chest less than 24 hr after lung scan.

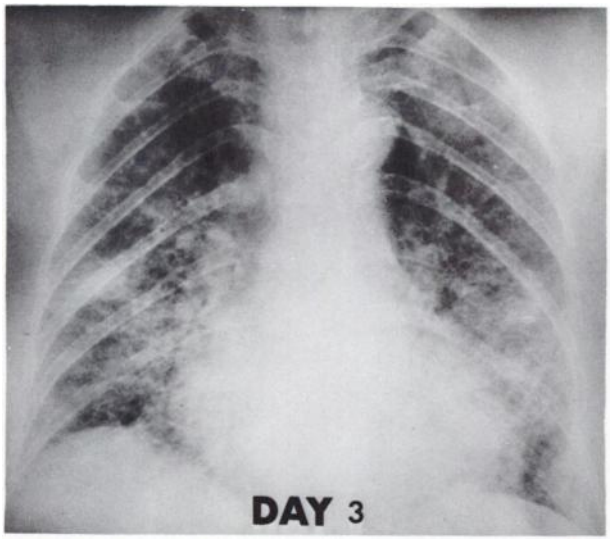

FIG. 4. AP supine view of chest 3 days after lung scan. Slight clearing of lower lobe densities has occurred but upper lobes are now more involved.

(Fig. 2) after injection of 250 μCi of ^{131}I-macroaggregates in 1.6 ml (total albumin 0.65 mg). Fifteen drops of Lugol's solution in water were given orally after the lung scan. Immediately after the ingestion of the Lugol's iodine, the patient noticed the onset of an almost continuous unproductive cough accompanied by a clear nasal discharge. These symptoms became distressing after her return to the ward, but there was no clinical evidence of bronchospasm. Her blood pressure fell 7 hr later to 80/50 with a pulse rate of 100/min and a rise of temperature to 101.4°F (38.5°C). The chest radiograph (Fig. 3) showed the formation of a bilateral, ill-defined consolidation superimposed upon severe interstitial disease. Her pO_2 fell to 32 mmHg, she required continuous oxygen and received 400 mg of hydrocortisone sodium succinate during the first 24 hr. The urinary output on the day of the scan was nil; 1 day later it was only 325 ml, and it returned to normal on the third day. However, the BUN rose to 39 mg% on the first day and became normal 18 days after the lung scan. Microscopic hematuria and blood-tinged sputum was present on the second day, and both urine and sputum were grossly bloody on the fifth day. On the third day she developed large nodular skin eruptions, 0.5–2 cm in diam, scattered over the extremities. The lesions became hemorrhagic and appeared to be localized at multiple previous injection sites. In addition, similar lesions appeared on the tongue and buccal mucosa. A biopsy of one such lesion indicated an allergic vasculitis with superficial necrosis of the skin. On the fourth day after the scan the eosinophil count was 19% and 3 days later, 9%. A chest radiograph on the third day (Fig. 4) showed slight clearing of the bilateral densities of the lower lobes, and clearing was complete on the day before discharge (Fig. 5).

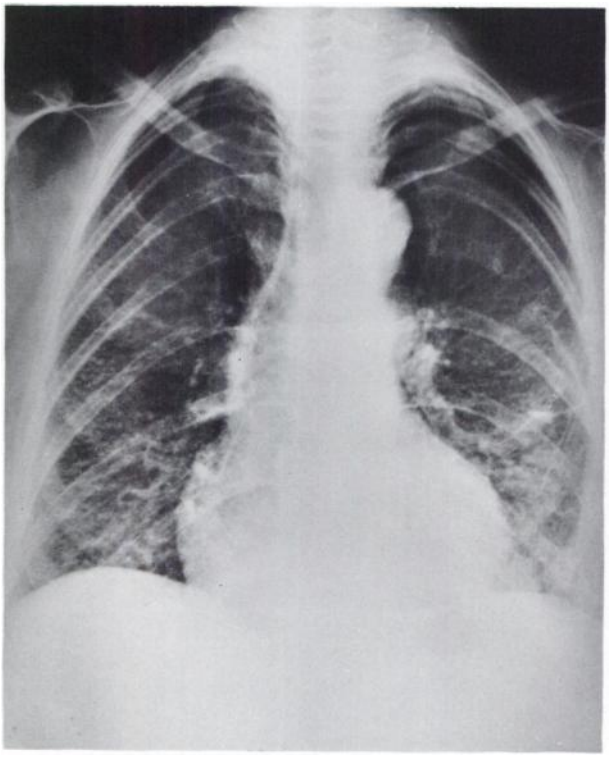

FIG. 5. PA upright view of chest before discharge shows return to state seen in Fig. 1.

DISCUSSION

In this patient two different reactions were observed; an immediate anaphylactic response with shock and pulmonary consolidation, and a delayed reaction with mucocutaneous lesions.

The immediate reaction occurred 30 min after the injection of the macroaggregates and within minutes of the ingestion of Lugol's iodine. The chest x-ray within the first 24 hr after the lung scan showed a bilateral pulmonary consolidation, but without evidence of venous distension or cardiomegaly. It is interesting to speculate that this immediate reaction caused an exacerbation of the idiopathic pulmonary haemosiderosis (*5*), but the possibility of pulmonary edema as a drug reaction (*6,7*) cannot be ruled out.

Using the calculations of Tow (*4*), 1 mg of protein-producing macroaggregates 7.5 microns or larger would contain 250,000 of these structures. The patient received 0.65 mg of albumin, and thus received 165,000 macroaggregates which would not occlude more than 0.003% of the total pulmonary vascular bed. This dose of macroaggregates is well below the safe levels of albumin and certainly is far below the dose given to the previous patients documented in the literature having reactions after lung scanning. An additional fact in the exclusion of hemodynamic causes for the initial reaction was the finding that clinical and radiographic evidence did not demonstrate significant pulmonary hypertension before or after the scan was performed.

The iodine in the macroaggregates administered to the patient is tagged and not free iodine. The amount ranged from 1 to 3 μg, which in comparison with the iodine pool of 75 mg and daily intake of up to 150 μg (*8*), can be excluded as the cause of the immediate reaction.

However, 15 drops of Lugol's iodine containing 5–8 mg/drop was administered and therefore, the patient received between 75 and 120 mg of inorganic iodine. The evidence appears to indicate that the Lugol's iodine caused both the immediate and delayed reactions. The immediate response can be explained on the basis of drug sensitivity, and the delayed reaction is identical to the mucocutaneous lesions described by Sheldon (*9*) as a reaction to iodine.

SUMMARY

Adverse reactions following the infusion of ^{131}I-human serum albumin macroaggregates are rare, and few have been reported. A 59-year-old woman with idiopathic pulmonary haemosiderosis demonstrated two different types of reactions following a lung scan which are believed to be due to the associated administration of Lugol's solution.

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