

are essential in following treatment in cases such as these. Sometime ago Dr. Cournand pointed out that such studies were essential when therapy was undertaken which might alter respiratory gas exchange or the pulmonary circulation.¹ With cortisone or ACTH, with which a sense of well-being, and even euphoria, is commonly noted, such studies are doubly important if we are to separate the pulmonary effects of these drugs from their psychic effects.

I shall summarize our findings in these six cases and tell you about two of them in some detail.

The woman who had generalized scleroderma had no measurable change in pulmonary function during three weeks of cortisone therapy. There was some gross change in the appearance of the skin, and a frank sense of well-being developed.

The patient with Boeck's sarcoid, after two and a half weeks of treatment with cortisone, has shown no definite and clearcut effect of therapy.

The patient whose disease of the lung remained undiagnosed, but which is suspected of having been of granulomatous nature, gave perhaps the most dramatic response to therapy. In this woman dyspnea developed and in less than a year became disabling. A diffuse pulmonary lesion was found by roentgenogram, and a severe defect in transport of the oxygen from the alveolus to the arterial blood was demonstrated, so severe, in fact, that her oxyhemoglobin saturation at rest was only 70 per cent even when she breathed 30 per cent oxygen. She was given ACTH. Within two weeks she was nearly symptom-free; she could leave her bed and her oxygen tent; her resting saturation when she was breathing room air was 94 per cent. She has left the hospital and is being maintained with small injections of cortisone given three times a week in the outpatient department.

One of the patients with granulomas containing foreign body giant cells and birefractive crystals has had no measurable effect from more than three weeks of cortisone therapy.

The other patient with a histologically similar granulomatous lesion is a 17 year old boy who noted, during the two years preceding admission, increasing shortness of breath on exertion and clubbing of his fingers. We have questioned him and his family carefully and have not been able to find that he was exposed to any toxic substances. He was found to have abundant rales in both sides of the chest, lymphadenopathy in the supraclavicular and axillary lymph nodes and on one occasion a palpable spleen.

Early in 1950 a roentgenogram showed a fine diffuse process involving both lungs, as well as enlarged hilar and mediastinal lymph nodes. Before treatment with cortisone was started, biopsies were made of an axillary lymph node and the anterior-inferior edge of the middle lobe of the right lung. The lesions in these two areas were histologically similar. The alveolar-capillary septums were seen to be thickened and involved by a granuloma which contained epithelioid cells, many foreign body giant cells and birefractive crystals.

With cortisone therapy, his symptoms improved, and a roentgenogram showed definite but incomplete clearing of the diffuse infiltrations. Near the end of his course of cortisone therapy, a biopsy was made of the medial edge of the middle lobe of the right lung. A definite and marked change seemed to have taken place in the granulomatous process. The epithelioid cells were no longer present. The foreign body giant cells were still present and in about the same number, and the crystalline material was still present. A hyalin-like stroma was now apparent throughout the lesion.

The cardiopulmonary studies were repeated late in the course of cortisone therapy. There was no significant change in the lung volumes. There was a slight improvement in the maximum breathing capacity. The ventilation at rest and after exercise decreased somewhat, and the oxygen saturation of the arterial blood after exercise rose from 89 per cent to 92 per cent. The alveolar-arterial gradients were determined at rest, at two levels of inspired

1. Cournand, A.; Riley, R. L.; Austrian, R.; Donald, K. W., and Himmelstein, A.: Studies of Pulmonary Circulation and Gas Exchange in Three Cases Following the Resolution of Various Diffuse Miliary Infiltrations of the Lungs, *Tr. A. Am. Physicians* 62:134, 1949.