

ROENTGEN THERAPY OF "VIRUS" PNEUMONIA

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 THE atypical pneumonia which has come to be designated as virus pneumonia² seems to be refractory to medical treatment. According to inquiries made at numerous institutions, roentgen therapy has not been used so far in the treatment of this disease. Hence the results of roentgen irradiation in a fairly large group of cases should be recorded.

As during previous epidemics of influenza pneumonia—to which virus pneumonia is at least very closely related—the disease varies somewhat with the locality and with its own epidemic course. For instance, at a time when numerous cases with massive consolidations were observed in the Boston district, only small peribronchial foci were found in the patients examined some seventy miles to the north, in New Hampshire. Pleurisy, which has been a fairly common complication in other parts of the country, has not yet been noted in the cases in northern New England. The severity and duration of the clinical manifestations seem to increase as the present epidemic extends. Moreover, at a given time, the symptoms differ from case to case and are sometimes stormy, sometimes rather slight. Apart from these variations, physicians are generally agreed on the distinctive features of virus pneumonia: fever and infiltration of the lungs lasting several weeks; persistent cough; no response to the sulfonamide drugs; and slow convalescence.

Two main types have been observed in New Hampshire: (1) a massive consolidation usually not confined to one lobe, but involving adjacent parts of contiguous lobes, mainly in the perihilar areas, casting ill-defined globular shadows; this is often bilateral, with one side much more extensively affected than the other; (2) a more diffuse patchy infiltration of both lungs along the bronchi, with definite enlargement of the hila, sometimes with small foci resembling

miliary tuberculosis; this corresponds to the peribronchitis and pneumonitis of previous epidemics. A more detailed analysis of the roentgen findings has been published very recently.⁶ The roentgenologic differences, however, are not associated with clear-cut clinical differences. The course, duration, and severity of the illness are not characteristic of the one or the other type in the instances observed in this district. During November and December, 1942, the leukocyte counts were low in the pneumonitis group (3,000 to 5,000), and high in the presence of massive infiltration (over 12,000); but this difference has not been noted in recent months. Since most of the patients had received sulfonamides before admission, these counts are not very significant.

After the febrile stage, which lasted anywhere between five days and six weeks, most of the patients continued coughing, chiefly at night. The cough did not respond to drugs, inhalation, steaming, and the like, and kept the patients awake for hours at a time. The impression was given that the resulting lack of sleep was one of the factors which delayed recovery. The cough could be controlled by roentgen therapy. This encouraged us to use roentgen therapy during the acute stages as well.

Although the results of roentgen therapy of lobar pneumonia are well known,⁵ there is little information available on roentgen treatment of atypical pneumonias.^{4,5} During the past ten years, I have treated non-neoplastic lesions, including bronchopneumonia, with roentgen doses corresponding to about one-third to one-fifth of those commonly advocated in the treatment of inflammations. These small doses approximate closely the doses recommended by Chamberlain¹ in a paper which does not seem to be sufficiently known. For the treatment of virus pneumonia, the follow-

ing factors were used in this series: 130 to 150 kv., according to the size of the chest and the thickness of skin and muscles; 30 ma.; 0.5 mm. Cu plus 1 mm. Al filtration; 50 cm. anode-skin distance; an average dose of 50 r (measured in air) through portals covering the involved parts of the lungs usually 20 by 20 cm. This technique was

of any kind were observed with this treatment. In the presence of leukopenia, roentgen therapy did not induce a further drop in the leukocyte counts.

The results obtained in 56 cases of virus pneumonia and pneumonitis are given in Table I. None of the cases had previously responded to medical treatment; and the

TABLE I
SYNOPSIS OF CASES

Number of Cases	Duration of Illness before Roentgen Therapy	Duration of Symptoms after Roentgen Therapy	Cured*	Not Cured†
18	2-5 days	1-2 days	14	
		3-5 days	4	
22	6-14 days	1-2 days	4	
		3-5 days	15	3
16	Over 14 days	1-3 days	2	
		4-7 days	6	8
Total: 56			45	11

* "Cured" means disappearance of fever and symptoms, but not necessarily of the pulmonary infiltrations, within the period of days mentioned (see the text).

† "Not cured" means that the symptoms did not completely subside within the period of days mentioned, although subjective improvement was sometimes noted.

adopted after treatment with 100 r or more at early stages had induced severe systemic reactions with chills, convulsions, and cold sweats in 3 instances. These reactions are known to occur after roentgen therapy of other infections,⁵ but do not seem to be necessary for achieving the desired therapeutic result in our experience.

According to the observations of Fried and Heidenhain,³ the amount of radiation applied should increase with the duration of the inflammation: the more recent the lesion, the smaller should be the dose administered. Accordingly, about 35 to 45 r was given to children, and 50 to 60 r to adults, during the first two or three days after the onset of symptoms; but 50 to 70 r and 70 to 90 r respectively when the symptoms had persisted for about one week previous to treatment. No untoward reactions

failure to respond to sulfonamide therapy was considered a diagnostic sign.

The therapeutic effect of roentgen treatment varied to some extent with the duration of the disease prior to irradiation. As a general rule, a single treatment was sufficient to bring about a return of temperature to normal within sixteen hours, as well as a considerable diminution of the cough and distress, in patients treated within a few days after the onset of symptoms. About twenty-four hours after the treatment, expectoration usually increased moderately in these cases, and most of them were discharged from the hospital after another day or two. The annoying cough which troubles the convalescence of untreated patients did not occur at all in the cases treated early. When, previous to irradiation, the disease had lasted for over a

week, one treatment usually resulted in a drop of temperature to slightly above normal, but the coughing spells tended to persist, and the temperature often rose again after an interval of three or four days. In the cases of this group, a second treatment, sometimes followed by a third one after forty-eight hours, was necessary to obtain relief and drop of the temperature to normal. In 2 patients treated sixteen and twenty-three days after the onset of symptoms, several irradiations with increasing doses (up to 300 r) failed to effect any therapeutic results. These observations suggest that roentgen therapy of virus pneumonia is useful mainly during the early stages of the disease.

The clinical improvement did not coincide with a regression of the pulmonary infiltrations. The course of the resolution was checked on roentgenograms in all the patients. In general, clinical improvement or cure preceded the disappearance of the infiltrations by about four days, but a decrease in density and size of the corresponding shadows was often noticeable as early as thirty-six hours after the treatment. Residual infiltrations were not observed to persist in the patients treated.

Five patients were referred for roentgen therapy several weeks after termination of the febrile stage because of persistent cough at night, associated with fatigue and inability to resume normal occupation. These patients were treated with doses of 90 r three to four times in the course of about two weeks. They were free of symptoms after this time and regained normal health rapidly.

In the patients treated during the febrile stages, the disappearance of fever and distress was entirely undramatic. There was no evidence of a crisis. With surprising uniformity fever and symptoms subsided gradually in the course of about sixteen hours, during which period most of the patients spent their first comfortable night after days of discomfort and dyspnea. The rate of pulse and respiration returned to normal gradually at the same time. In view of the

severe reactions observed after treatment with larger doses, as above mentioned, one may perhaps attribute this uneventful and gradual recovery to the small r doses administered in this series.

Clearly the results of any mode of treatment are very difficult to ascertain accurately and impartially, especially as regards acute infections. It certainly cannot be proved that the 56 patients of this series would not have recovered as rapidly without roentgen therapy. Control series are not easy to evaluate since, in clinical medicine, no two cases are exactly alike. In two pairs of treated and untreated patients the findings were similar enough to be comparable. *comparable* Two males of about the same general build, aged fifty-six and sixty-three, showed an infiltration 11 cm. in diameter in the central part of the left lung, and a smaller one, about 4 cm. in diameter, in the right base. Both were severely ill, with rapid pulse and respiration, temperatures about 103° F., and moderate cyanosis. One of them was treated on the third day of his illness with 50 r; sixteen hours later the temperature had dropped from 103 to 98.3° F., pulse from 160 to 84, and respiration from 60 to 24. The infiltration was found definitely diminished forty-eight hours after the treatment, and the lung fields were found free of abnormal shadows five days after the treatment. There was a slight recurrence of the cough on the fourth day, but the patient remained free of symptoms from the fifth day on. The other patient was not treated during the first sixteen days of his illness, and the infiltration was found to have increased during this time.

The second pair consisted of two girls aged six, with bilateral diffuse pneumonitis. In the treated child, symptoms and lesions disappeared seventy-two hours after irradiation; in the untreated, they persisted for twenty-five days.

These two pairs of cases seem to bear out the experience of many physicians in various parts of the country in regard to the course of virus pneumonia in patients not submitted to roentgen therapy. If we may

use these many hundreds of untreated cases in lieu of a control series, it would seem to be evident that roentgen therapy helps to shorten the duration of the disease materially.*

SUMMARY

1. Roentgen therapy with small doses of between 35 and 90 r resulted in clinical cure within a few days in 45 out of 56 cases of virus pneumonia.

2. The pulmonary consolidations disappeared within three to five days after roentgen treatment.

3. The results of roentgen therapy were best at early stages of virus pneumonia, but limited when irradiation was used later than two weeks after the onset of the disease.

4. Roentgen therapy was the most effective mode of treatment for the control of the persistent cough which delayed complete recovery during convalescence in pa-

*No distinction was made between "virus" pneumonia of adults and the so-called interstitial pneumonia (peribronchitis and peribronchiolitis) of childhood, since the two diseases are identical epidemiologically and virtually indistinguishable in their clinical course. Children seem to respond to roentgen therapy more uniformly and within shorter periods than adults.

tients who had not received irradiation during the febrile stage.

5. At early stages, the r doses applied should be small. Treatment with doses exceeding 100 r during the early stages resulted in alarming systemic reactions. No untoward reactions whatever were observed with the use of smaller doses.

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