THE SIGNIFICANCE OF SUBCUTANEOUS NODULES IN RHEUMATOID ARTHRITIS*

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The presence of subcutaneous nodules in rheumatic fever is of serious prognostic significance because, as they are pathologically similar to the Aschoff bodies found in the heart, they generally indicate severe cardiac damage and active infection. As a rule nodules appear after the onset of the rheumatic heart lesion. There is, therefore, practically always cardiac involvement in cases where nodules are found, and they may be regarded as presumptive evidence of carditis. Nodules develop occasionally, however, in cases in which no clinically demonstrable cardiac lesions exist. In 1889 Cheadle affirmed that the appearance of nodules was really the equivalent of a death sentence. While the prognosis is bad, it is not quite so serious as this suggests. Hayes and Gibson (1942), in a study of 167 patients with nodules, found that 163 had cardiac lesions. Fifty-two (31%) died during the attack, and the later mortality was double that of cases without nodules.

The Present Investigation

In contrast with this knowledge of the importance of subcutaneous nodules in acute rheumatism, little is known of the significance of their development in rheumatoid arthritis. We have, therefore, studied 55 patients with rheumatoid arthritis who had subcutaneous nodules; 38 of these suffered from rheumatoid arthritis only, while the remaining 17 cases had rheumatoid spondylitis as well. These 55 cases were found among a series of 290 cases of rheumatoid arthritis. Thirty-eight patients were female and 17 male.

The 55 patients had amongst them a total of 289 nodules, with the following distribution :

Head	..	..	..	..	3 (1.1%)
Trunk	..	..	..	..	51 (17.6%)
Limbs	{upper	..	..	..	204 (70.5%)
	{lower	..	..	..	31 (10.7%)

* Abridged from a paper read at the Annual Meeting of the American Rheumatism Association, held in New York City on May 24 and 25, 1946, and before the First Inter-American Congress of Medicine, Rio de Janeiro, Sept. 7 to 15, 1946.

In order to interpret the true significance of the subcutaneous nodules in rheumatoid arthritis, our cases were considered from four different aspects: (1) the patient's heart; (2) his joint involvement; (3) therapeutic results; and (4) the clinical features of the nodules.

THE PATIENT'S HEART

In assessing the prognosis for rheumatoid arthritis patients with subcutaneous nodules we must take into consideration the condition of the heart in such patients, just as we should do in cases of rheumatic fever, where the duration of life is governed by the extent of the heart damage. For some years we have observed that clinical examination of the heart in patients suffering from rheumatoid arthritis, accompanied or not by subcutaneous nodules, reveals no functional or morphologic abnormality notwithstanding the long duration of the arthritis or of the nodules. In view of the constantly normal findings, and for the sake of research, we decided to amplify our examination by systematic electrocardiographic and radiographic records of each case, and thus to obtain as accurate data as possible about the cardiac condition of these patients. The complete examination was carried out in only 19 patients with subcutaneous nodules. Thirty-six were subjected to clinical examination only, owing to the fact that we lost contact with the others before we had a chance to submit them to electrocardiographic and radiological examination.

It is significant that none of our 55 patients with rheumatoid arthritis subcutaneous nodules showed clinical signs of heart disease as a direct, indirect, or remote consequence of the arthritis, although 36 had suffered from arthritis for more than four years. The long duration of the illness in 8 cases (respectively of 13, 14, 15, 16, 17, 23, 30, and 50 years) is suggestive.

ELECTROCARDIOGRAPHIC FINDINGS.—In studying the tracings we took as a basis the recommendations of the New York Heart Association adopted by the American Heart Association and the Cardiac Society of Great Britain and Ireland. The three standard leads and praecordial leads CF_1 and CF_5 were selected.

Rhythm.—In none of the cases did we observe disturbances of rhythm, except for sinus tachycardia in some.

P Waves and P-R Interval.—These were normal in all tracings.

QRS Complexes.—In 3 patients there was left axis deviation due to hypertension.

Thickenings and notchings considered abnormal were observed in only 1 patient, whose radiograph showed moderate left ventricular hypertrophy, and whose blood pressure was 150/100 mm. Hg.

In one case there was bundle branch block. This patient was 64 years old, and the clinical examination showed striking aortic and pulmonary second sounds (chiefly the former) and a blood pressure of 200/100 mm. Hg. A moderately enlarged left ventricle was also found, and confirmed by radiograph. This patient being aged and having no history of previous rheumatic fever, the bundle branch block was attributed to coronary arteriosclerosis.

T Wave.—We observed a T-wave abnormality in a patient 66 years old with hypertension; this consisted in a flattening of T_1 that measured less than 1 mm. (myocardial sclerosis).

Fifteen patients showed normal electrocardiograms.

RADIOGRAPHS OF THE CHEST.—Eleven patients showed no changes in the size of the heart. The remaining 8 showed left ventricular hypertrophy due to hypertension.

From the analysis of these findings we may infer that there is no specific cardiac lesion in rheumatoid arthritis, no matter in what stage the disease may be or how long its duration. As a matter of fact we made a clinical, electrocardiographic, and radiographic survey of 50 patients suffering from rheumatoid arthritis and 12 from rheumatoid spondylitis in different phases of the disease, the duration of which varied from a few months to 41 years. In 72% of the cases of rheumatoid arthritis the results were entirely normal, while the remaining 28% showed abnormalities which were attributed to hypertension or myocardial sclerosis. The findings were normal in all patients suffering from rheumatoid spondylitis.

We may affirm that involvement of the heart is not found in rheumatoid arthritis, whether or not the latter is accompanied by subcutaneous nodules. In fact we know that rheumatoid arthritis, even when occurring at a young age, does not damage the heart. This we verified in 2 patients whose disease began at four and nine years old respectively.

When a patient suffering from rheumatoid arthritis shows signs of a cardiac lesion, either it suggests that another disease is accompanying the arthritis, or else it is the result of previous rheumatic fever. This is so true that, whenever it is difficult to differentiate between rheumatoid arthritis and rheumatic fever, the absence of signs denoting involvement of the myocardium will be a factor suggesting rheumatoid arthritis.

PATIENTS' JOINT INVOLVEMENT

Excluding the hypothesis of heart involvement in the cases of rheumatoid arthritis exhibiting subcutaneous nodules, we analysed the articular findings in our cases in order to judge whether there might be a more intense or graver form of arthritis in these patients. They were observed with special regard to their walking capacity, the direct and immediate consequence of the joint involvement.

We think it necessary to draw special attention to 3 patients with arthritis of 23, 30, and 50 years' duration, the last of whom began suffering at the early age of four years. All these patients were in good health, with slight joint involvement which allowed them to get about quite well in spite of existent ankylosis.

THERAPEUTIC RESULTS

In analysing the results of treatment we divided our patients into two distinct groups, the first of which included 40 in the advanced (37 patients) or moderately advanced (3 patients) stages, and the second composed of 15 patients in the terminal stage. Among the patients of the first group, 19 received treatment—thus enabling us to analyse its results—and 21 were untreated.

Among those who received treatment, 6 were much improved (marked objective and subjective changes with a considerable drop in the erythrocyte sedimentation rate), 9 were moderately improved (objective and subjective changes, together with a drop in the erythrocyte sedimentation rate), 3 showed no improvement (no objective, subjective, or erythrocyte sedimentation rate modifications) and 1 became worse (intensification of symptoms and increase of erythrocyte sedimentation rate).

Six out of 15 patients in the terminal stage received treatment. One was markedly improved (with 8 years of arthritis), 3 were moderately improved (cases of 9, 11, and 50 years of arthritis), and 2 showed no improvement (cases of 7 and 15 years of arthritis). These were considered good therapeutic results in view of the stage of the arthritis.

Thus, twenty-five patients exhibiting subcutaneous nodules (19 in the advanced or moderately advanced stages, and 6 in the terminal stage) received treatment, and favourable results were obtained in 19 (15 in the advanced or moderately advanced stages and 4 in the terminal stage). Six patients showed unfavourable results (4 in the moderately advanced stage and 2 in the terminal stage).

In commenting on the therapeutic results of these cases we should like to point out that in rheumatoid arthritis the results of treatment are much more favourable the earlier it is administered. Nearly all our patients were unfavourable from the point of view of treatment, in view of the duration of the arthritis. Nevertheless, the treatment results were satisfactory and in no manner inferior to those which we achieved with patients suffering from rheumatoid arthritis without subcutaneous nodules.

CLINICAL FEATURES OF THE NODULES

The clinical features of the nodules (the time of their appearance in relation to the duration of the arthritis and to the activity or stage of the arthritis, and their response to treatment) were as follows.

Time of Appearance.—The appearance of the nodules in one patient occurred 11 years after the beginning of the arthritis, that is, at its terminal stage and with a normal erythrocyte sedimentation rate (7 mm. fall at the end of the first hour—Westergren). This goes to prove that, in contradistinction to the findings in rheumatic fever, the appearance of subcutaneous nodules in rheumatoid arthritis does not indicate activity or exacerbation of the arthritis.

In another patient the nodules had existed 20 days before we were notified of their presence, by which time the erythrocyte sedimentation rate was 9 mm. at the end of the first hour, and the patient himself showed an increase in body weight of 14.5 kg. since the beginning of treatment 15 months previously, the result of which had been marked improvement. This patient was discharged in excellent general condition and with practically normal joints.

In another case nodules appeared in the forty-ninth year of the arthritis—and, therefore, at the terminal stage—without being accompanied by any objective or subjective manifestations or any deterioration of either the general condition or that of the joints. (Figs. 1 and 2, p. 218.)

The appearance of the nodules in some cases goes to prove that they in themselves do not indicate graver types of arthritis, since 7 of these patients were markedly improved by treatment notwithstanding the long duration of the disease. (See Figs. 3 and 4, p. 218.)

As a result of the treatment there was total disappearance of the nodules in 2 patients, and a decrease in the size of the nodules in 6 others. The involution of nodules took place spontaneously in 2 cases. Of the 25 patients exhibiting subcutaneous nodules who received treatment, and who were, therefore, under observation for a long time, the nodules were affected by treatment in 8 (32%).

Comments

Taking as a basis our observations concerning subcutaneous nodules in this group of 55 patients, we are inclined to disagree with the view given by Dawson in 1933, because we have noted that the presence of such nodules has no influence on the prognosis in rheumatoid arthritis. We cannot understand the reasons which induced Dawson, and many others after him, to consider the presence of subcutaneous nodules in rheumatoid arthritis as indicating a poor prognosis. This is the present-day view, and so far the facts upon which it is based have neither been explained nor contested. On the basis of the data reported in this paper, we came to the conclusion that subcutaneous nodules in rheumatoid arthritis are valueless from a prognostic standpoint because they do not signify any cardiac involvement or any more serious type or longer duration of arthritis or its activity, nor do they constitute an obstacle to treatment. *They are, therefore, a somewhat insignificant finding.*

Summary and Conclusion

We hold that the presence of subcutaneous nodules in rheumatic fever denotes a grave prognosis because such nodules indicate carditis and active diseases. This study of subcutaneous nodules in rheumatoid arthritis, however, shows that they do not indicate an unfavourable outlook, any involvement of the heart, or any enhanced activity, intensity, or severity of the arthritis, and that they do not constitute any obstacle to treatment.

These differences in the features of the subcutaneous nodules in the two types of rheumatism constitute just one more factor to prove that rheumatoid arthritis and rheumatic fever are diseases distinct from one another.

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