RETURN TO NORMAL OF X-RAY CHANGES IN RHEUMATOID ARTHRITIS *

CASE REPORT

BY

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Our principal object is to present this case from the radiological aspect because of the progressive retrogression and total disappearance of the organic articular lesions. This observation we believe to be unique. We have not come across any mention of the return to normal of the radiological features, either alone or concomitantly with the clinical cure of arthritis. We know that pathological articular lesions once produced have a tendency to progress in spite of treatment or suspension of clinical evolution. The improvement in radiological changes, once obtained, is not proportional to the clinical improvement, being very much slower and showing an extinction of activity of the destructive lesions rather than a reparative process. However, with the improvement in the general condition of the patient, or his articular functions, radiological lesions develop much more slowly or even become stationary, as a consequence of the clinical inertia of the disease.

Morrison and Kuhns (1936) were the first to take up the study of the evolution of the alterations observed by x rays in 73 cases of chronic arthritis, 55 of which were rheumatoid arthritis. There was a history of some months duration in 6 cases, there were 5 cases of one year's duration, and 21 cases of over five years. Among these patients, the radiological observations covered a period of from four to ten years from the first to the last observation. In 49 cases, the radiological findings became worse; 4 cases showed no appreciable alteration; and in only 2 cases were there improvements in the radiological findings—a decrease of the bony deformity and disappearance of the destructive articular changes. Clinically, 22 cases deteriorated, 7 were stationary, and 26 improved. From these statistics one may come to the conclusion that there is no parallelism in the evolution of the radiological and clinical pictures. There was a high proportion of cases showing clinical improvement together with radiological deterioration. Morrison and Kuhns concluded that real improvement in the radiological findings is rarely seen. The case report which

follows should be considered in the light of their findings.

Case report

History.—J. C., a white girl aged 21 years, complained of articular pains for about seven months; before this she had nothing abnormal. Then she began to note a slight loss of weight, anorexia, nervousness, indisposition for her work, fatigue, weakness, and nervous irritability, which provoked frequent outbursts of crying. Together with these prodromal symptoms she observed an increase in the size of the proximal interphalangeal joints of the middle fingers, without however feeling any pain. Four months later she began to feel continuous throbbing pains in the knees, which did not increase in size but showed cutaneous hyperthermia; the pains became very intense, making it impossible for the patient to walk. At the same time the process attacked the right wrist, causing swelling, warmth, acute pain, and marked functional disability. Some days afterwards the left wrist was also involved and in less than a week the right ankle was affected similarly. On medical advice the patient tried Balneotherapy, after which the left ankle was affected and the girl began to feel pains in the fingers, especially the middle fingers which became very swollen. On taking hot sulphur baths she suffered an intense articular irritation, affecting the elbows,

FIG. 1.—Rheumatoid arthritis before treatment (January, 1942): Decalcification most marked in the epiphyses. Fusiform peri-articular swelling of the middle fingers. Narrowing of the articular space of the proximal interphalangeal joint on the left middle finger where there is a punched-out area. Complete obliteration of the proximal interphalangeal joint of the right middle finger.

* A paper read before the Section of Radiology of the *Associação Paulista de Medicina* on Aug. 22, 1944, and also at the First *Paulista Congress of Rheumatology* and the Second Medical Congress of the State of São Paulo, Brazil (Mar. 1 to 7, 1945).

FIG. 2.—Intermediate period (July, 1942): Slight recalcification with the re-appearance of the joint spaces of the proximal interphalangeal articulations of the middle fingers. Decrease of the swelling of the soft periarticular tissues.

shoulders, jaws, and some chondro-costal joints. Concomitantly there was further loss of weight of about 6 kg. Two months ago the patient had her tonsils removed and seven teeth extracted without any effect upon the arthritis.

Interrogation.—Nervousness, indisposition for work, adynamia and accentuated psychic depression. Previous weight: 66.5 kg. The patient had never suffered from rheumatic disease previously. The hereditary antecedents were negative so far as rheumatism is concerned.

General Physical Examination.—Asthenic girl in bad general state, with haggard appearance. Good skeletal

constitution, panniculus adiposus scanty, poorly developed musculature with a very diminished tonus. Cold extremities. Weight, 55 kg.; height, 1.64 m.

Special Physical Examination.—Discoloured mucosae. Teeth in bad condition and showing several extractions. Slight systolic murmur audible at the mitral area; nothing else worthy of note in the cardio-vascular system. Blood pressure, 114/80 mm. Hg.

Articular Examination.—Hands and fingers: Active flexion of the fingers had become very difficult owing to the severe pain it caused. Marked swelling at the proximal interphalangeal joints of the middle and ring fingers, especially the middle fingers which presented a characteristic fusiform aspect. Atrophy and immobility of the terminal interphalangeal joints. Lateral pressure on the joints elicited tenderness. Congenital deformity of the little fingers and pathological deformity of the right ring finger, with lesser evidence in other fingers. Skin cold and clammy.

Wrists: Diminished function, chiefly in the right where considerable swelling was noted.

Shoulders: movement causes pain.

Temporo-mandibular: Reduction of motility owing to pain and functional disability.

Sterno-clavicular and chondro-costal joints: painful at rest or on moving the arms.

Knees and ankles: Increase in size, painful at rest and the pain is aggravated by pressure or movement.

Walking: impossible, owing to pain in the weight-bearing joints. Could only walk when supported by two persons.

Laboratory Findings.—The changes in the blood count, etc., are shown in Table I.

Radiological Findings.—Decalcification of the carpal bones, metacarpals, and phalanges, most marked at the epiphyses. Narrowing of the articular space of the proximal interphalangeal joint of the left middle finger, where one observed a punched-out area in the internal margin of the proximal extremity of the middle phalanx and entire obliteration of the joint space of the same

TABLE I

EVOLUTION OF THE BLOOD PICTURE

Initial results (February, 1942)	Intermediate results (July, 1942)	Final results (December, 1942)
Red cell count 4,040,000	4,750,000	4,880,000
White cell count 5,950	5,050	5,350
Haemoglobin (8.4 gm. per 100 c.cm.) 50.6%	(14.4 gm. per 100 c.cm.) 86.4%	(15.1 gm. per 100 c.cm.) 90.6%
Colour index 0.62	0.9	0.92
Neutrophils myelocytes .. 0.0%	0.0%	0.0%
„ metamyelocytes .. 0.5%	0.0%	0.5%
„ non-filamented .. 6.5%	7.0%	4.0%
„ segmented .. 52.0%	58.0%	58.5%
Eosinophils 1.0%	8.0%	5.0%
Basophils 0.5%	0.0%	0.0%
Lymphocytes 16.0%	18.0%	21.0%
Monocytes 22.0%	6.0%	3.5%
<i>Erythrocytes:</i> Evident hypochromia; no evident alterations of the size and form; absence of immature cells of the normal or embryonic series, and also absence of nuclear remains.	No alterations worthy of note.	Slight anisocytosis.
<i>Leucocytes:</i> Numerous, with toxic granulations and nuclear pyknosis.	Absence of nucleo-cytoplasmic alterations.	Numerous neutrophils with nucleo-cytoplasmic alterations more or less intense and in particular with heavy toxic granulations.
Sedimentation rate (Westergren): 1st hour 90 mm. 2nd hour 111 mm.	1st hour 3 mm. 2nd hour 8 mm.	1st hour 7 mm. 2nd hour 22 mm.

FIG. 3.—After treatment (December, 1942) Normal: appearance. Total recalcification. Articular space with their physiological dimensions. The only remaining lesion is the punched-out area.

finger and of the same articulation of the right hand. Fusiform periarticular swelling of the middle fingers; soft tissue swelling of the wrists; widening at the joint space of radius and ulna (Figs. 1, 4, and 6).

Clinical Course

This girl began her treatment at the end of February 1942, and during the two following months there was an acceleration of the disease with aggravation of all the symptoms. In April the first improvement began to appear, characterized by an increase of appetite and consequent increase in weight, progressive diminution of joint pains, less marked psychical depression, better disposition toward domestic activities, and freer movement of the fingers and wrists. These improvements increased gradually and progressively; in July the pains in the knees and ankles had disappeared, so that it was once again possible for the patient to walk. The body weight went up to 62.8 kg. At this stage there remained only vestiges of the fusiform swelling of the fingers. The psychical condition became normal and the capacity for physical activity improved by about 60%.

During the following months the organic and articular symptoms improved and the pains in the temporo-mandibular and hand joints began to disappear little by little, so that in December of the same year articular function and stability, and normal weight had been regained. That is, there was a complete disappearance of the pain, the haematological and radiological pictures became normal, while the weight reached 66.2 kg. and increased to 66.5 kg. by the middle of January, 1943. There was a complete restoration of physical resistance

TABLE 2

JOINT MEASUREMENTS IN CENTIMETRES, BEFORE AND AFTER TREATMENT

Articulation			February, 1943	December, 1943
Right wrist	..	..	19 cm.	16 cm.
Left wrist	..	..	18 "	16 "
Right elbow	..	..	24 "	24 "
Left elbow	..	..	24 "	24 "
Right ankle	..	..	28.7 "	26.5 "
Left ankle	..	..	28.5 "	26.5 "
Right knee	..	..	39.7 "	37.5 "
Left knee	..	..	39.5 "	37.5 "

with return to a normal mode of life, the patient being discharged as clinically "cured." Table 2 shows the changes in the joints.

Radiological Course

A second radiograph taken in July, 1942, during the intermediate period of treatment, showed slight recalcification in all of the bones (Fig. 2), with the reappearance of the joint spaces of the proximal interphalangeal articulations of the middle fingers, while at the same time a decrease of the inflammatory process of the soft peri-articular tissues was noted. Films taken in December of the same year showed a normal appearance with complete recalcification. The articular spaces are seen to have regained their normal dimensions (Figs. 3, 5 and 7). The only evidence of the process which remained was the punched-out area, an atrophic lesion which we suppose to be irreversible (Fig. 7).

Discussion

The progress of the general, haematological, and articular states was parallel to that of the radiological findings, as is shown in the tables. The rarity of the return to normal of an articular space, such as took place in this case, has its explanation in the biochemistry of the cartilage. Cartilage consists of a tissue destitute of blood vessels and lymphatics, and nourished by osmosis from the synovial fluid and the subchondral vessels. Its metabolism is small and its capacity for repair and restoration insignificant, so that it is the most

FIG. 4.—Right middle finger before treatment.

FIG. 5.—Right middle finger after treatment.

FIG. 6.—Left middle finger before treatment.

FIG. 7.—Left middle finger after treatment.

vulnerable part of the articulation. As the necessity for nutrition of the cartilage is small, it is not vascularized, which is why its capacity for regeneration is nearly nil, so that small lesions in its continuity take months to repair.

In rheumatoid arthritis, the diminution of the joint space is proportional to the wear and tear of the cartilage. In the case of our patient the proximal interphalangeal joint of the middle finger of the right hand had practically disappeared, which permits us to suppose that the cartilaginous affection had been intense. However, this fact did not prevent the *restitutio ad integrum* of the articular

state. Besides this organic repair, which does not appear to have been observed before, and the recalcification which took place, an equally uncommon feature is the parallelism of the clinical and radiological improvement.

More than two years have passed since the patient was discharged and the clinical, haematological and radiological condition remains normal. Nevertheless we shall have to wait for at least another year before we may definitely regard cure as established.

REFERENCE

- Morrison, S. L., and Kuhns, J. G. (1936). *Amer. J. Roentgenol.*, 35, 645.