FRACTURES IN CHRONIC ARTHRITIS*

By GEORGE J. BAER†

THE incidence of fractures in chronic arthritis, the rate of healing, and the complications following fractures have not been recorded in modern medical literature. A review of the literature from 1900 to 1940 makes no mention of this subject. The 1,625 case records of arthritis at the Robert Breck Brigham Hospital were reviewed to determine the frequency of fractures, the rate of healing, the ætiology, and the effect upon the systemic and local disease processes. The case records examined included the different types of disease in all accepted classifications.

Fractures are among the less common complications of arthritis. They occurred 21 times, or in 1.2 per cent. of the cases examined. Dislocations, on the other hand, are common.

It is frequently difficult to differentiate a fracture from "disintegration" at the bone ends due to atrophy and cystic degeneration. In the roentgenogram one frequently can see a fracture line at the bone ends where disintegration has taken place. Should such disintegrations be considered as fractures, the incidence of fractures in chronic arthritis would be increased statistically. Such "infractions," as they have been described by Knaggs,¹ have not been classified as fractures in this survey. A fracture to be so classified had to satisfy the criteria commonly accepted by all surgical textbooks.

From a theoretical point of view one would expect fractures to be common in patients with rheumatoid arthritis. The marked bone atrophy with loss of lime salts, cystic degeneration of bone, and loss of muscle tone would lead one to such a conclusion. However, these patients, because of the loss of joint function, pain, and muscular weakness, lead a rather guarded existence, so that the forces necessary to produce a fracture are infrequently encountered. In rheumatoid arthritis the simplest type of trauma is sufficient to produce a fracture. Weight-bearing alone was the only force necessary in one instance, and muscular effort in another. In no case was major trauma the cause of a fracture except during manipulation of a joint under

* Received for publication November 30, 1941.

† Read at the Eighth Annual Meeting of the American Rheumatism Association, Cleveland, Ohio, June 2, 1941.

THE RHEUMATIC DISEASES

anæsthesia. The recognised pathology of bone in osteo-arthritis would lead one to conclude that the incidence of fractures would be within the limits of statistical expectancy following major trauma in normal bone. More violent trauma accounted for the fractures in this latter group.

In 21 cases of fractures, 14 of them occurred in rheumatoid arthritis. There were 8 females and 6 males (Table I). The majority of the patients were in middle life. The youngest was 13 years and the oldest 72 years. The average duration of the disease before a fracture was sustained was 11·4 years. The femur was involved 9 times (neck of femur once); humerus 3 times; tibia twice; vertebra, fibula, radius, and ulnar styloid each once. A simple shaft fracture was most frequent, occurring 9 times; comminuted fractures of the shaft twice; impacted fractures at the bone ends and of the vertebra 3 times; and greenstick fracture once.

TABLE I.—RHEUMATOID ARTHRITIS

<i>Case.</i>	<i>Sex.</i>	<i>Age.</i>	<i>Duration of Disease.</i>	<i>Bone Involved.</i>	<i>Type of Fracture.</i>	<i>Union.</i>
332 ..	F.	21	18 years	Left femur, shaft	Comminuted	Yes.
5,642 ..	F.	57	15 months	Left humerus, shaft	Simple	Yes.
1,492 ..	M.	31	10 years	Vertebra	Impacted	Yes.
594 ..	M.	43	11 years	Right femur, shaft	Simple	Yes, delayed.
1,538 ..	M.	35	11 years	Left femur, shaft	Simple	Yes.
596 ..	F.	13	10 years	Left femur, left tibia	Simple	Yes.
1,298 ..	M.	56	14 years	Left femur	Impacted	Yes.
571 ..	M.	52	4 years	Left humerus	Simple	Yes.
2,839 ..	F.	72	1 year (?)	Radius and ulnar styloid	Simple	Yes.
4,960 ..	F.	59	24 years	Tibia and fibula	Simple	Yes.
1,137 ..	M.	22	8 years	Right femur	Simple	Yes.
393 ..	F.	38	5 years	Both femora	Simple	Yes.
2,326 ..	F.	56	26 years	Neck femur	Simple	Yes.
65 ..	F.	49	18 years	Humerus	Simple	Yes.

Surgical manipulation of a joint under anæsthesia was responsible for 5 fractures. The remainder were the result of simple trauma.

In each instance there was atrophy of the fractured bone. The bone atrophy was minimal in 4 cases and marked in 10 cases.

The degree of bone atrophy did not correspond to the duration of the disease, since some of the early cases had more marked atrophy than those of long duration. Following the healing of a fracture the bone atrophy persisted in all parts of the bone except about the fracture site, where the newly calcified callus was conspicuous by its density. Union took place in all cases, and proceeded normally except in one case—a fracture of the mid-shaft of the femur—where union was delayed.

In the case of a fracture in a limb where a joint or joints had been involved by rheumatoid arthritis, immobilisation of the limb in a plaster cast did not promote ankylosis or permanently decrease the range of joint motion. After the cast was removed some limitation of motion in the affected joints was noted, but with physical therapeutic measures the range of motion that was present before the fracture occurred was soon regained.

In 8 cases the sedimentation rate was elevated at the time the fractures were sustained. The arthritis was considered active in these cases. The fact that a fracture occurred did not alter the course of the active arthritis, nor was there a generalised or localised exacerbation in the quiescent cases.

One fracture was found in a patient with gonococcal arthritis. The disease had been present six weeks and was subsiding when a Colles fracture resulted from a fall upon the outstretched arm with the wrist dorsiflexed. The wrist joint had been involved in the generalised gonococcal arthritis. There was slight bone atrophy. Healing took place in six weeks.

TABLE II.—OSTEO-ARTHRITIS

<i>Case.</i>	<i>Sex.</i>	<i>Age.</i>	<i>Bone Involved.</i>	<i>Type of Fracture.</i>	<i>Union.</i>
1,982 ..	M.	65	Ribs	Simple	Yes.
1,738 ..	M.	66	Ribs, vertebra	Simple	Yes.
5,639 ..	F.	75	Neck of femur	Compression	Yes.
536 ..	F.	57 (?)	Phalanx of toe	Simple	Yes.
1,220 ..	F.	64	Vertebra-rib	Compression	Yes.
3,730 ..	F.	56	Both radii, left ulna, vertebra	Simple	Yes.

The 6 cases of osteo-arthritis included 4 females and 2 males (Table II). These patients were in or past the sixth decade of life. The youngest was 56 years and the oldest 75. The vertebrae were involved 3 times; the ribs 3 times; radius twice; neck of

femur, phalanx of toe, and ulna each once. A simple fracture of the shaft occurred in all the long bones except for the neck fracture of the femur. The vertebral fractures were of the compression type. Major trauma accounted for 5 fractures and muscular effort (ribs) for 1. Firm union took place in all cases in normal time. Atrophy of the fractured bones was not noted in 4 cases and was minimal in 2.

The sedimentation rate was elevated in 2 cases and was not determined in the others. Fractures did not alter the arthritic process.

All the fractures in this survey were reduced and treated by well-recognised and accepted methods.

Since this material has been compiled three fractures in patients with rheumatoid arthritis have been observed within one month. All of them are now under treatment, and the fractures are healing normally as revealed by roentgenograms. Simple trauma produced these fractures in atrophic bones.

It must be emphasised that when a fracture occurs in a limb with involved joints, immobilisation in a plaster cast is justified only long enough to allow sufficient callus to form to hold the fragments in good alignment. The cast must then be removed and the limb immobilised in a splint so arranged that passive motion of the affected joint can be easily accomplished to prevent ankylosis or marked limitation of motion.

It is obvious that fractures in osteo-arthritis are more common than this survey indicates. Only those patients with osteo-arthritis whose disease was symptomatic gained admission to the hospital. In a large series of fractures the incidence of fracture in patients with concomitant osteo-arthritis would be much higher than among a group of symptomatic osteo-arthritic patients. It is likely that fractures in rheumatoid arthritis are more common than the figures here presented would indicate. Once the possibility is recognised and a more careful search made for fractures, future surveys should reveal a higher percentage of cases.

SUMMARY

From this survey one may conclude that fractures are among the less frequent complications of chronic arthritis. Healing takes place normally and a firm union can be expected. A fracture has no bearing on the active disease process *per se*, nor will it

promote an exacerbation of a quiescent arthritis. Simple trauma is sufficient to fracture the atrophied bones of the rheumatoid patient. Limitation of motion or ankylosis of joints need not occur if proper precautions are used. In osteo-arthritis fractures are usually produced by major trauma that would be sufficient to produce a fracture in normal bone.

BIBLIOGRAPHY

KNAGGS, R. L.: *The Inflammatory and Toxic Diseases of Bone* (Wm. Wood and Co., New York, 1926).

GOUT AND MALE PSEUDOHERMAPHRODISM: REPORT OF A CASE*

EDWARD F. ROSENBERG

*First Assistant in the Division of Medicine, Mayo Foundation, Rochester,
Minnesota*

THE curious fact that gout occurs predominantly among men was known to Hippocrates, and records indicate that throughout the twenty-four centuries that have elapsed since his time, women have for the most part continued to escape this painful malady. In the twenty-ninth aphorism of Hippocrates, according to Adams, it was stated that "a woman does not take the gout unless her menses be stopped," and in 1851 Gairdner wrote in a textbook on gout that "... women, though not wholly exempted from attacks of gout, do, notwithstanding, enjoy a greater comparative immunity." Similar observations have been made by many others since Gairdner's time. Practically every modern American authority on gout has observed that there is a predominance of the disease among men, although the exact ratio has varied in different reports. In a series of thirty-six cases reported by Fitcher in 1902, all the patients were men, and Hench^{6,7,8} has repeatedly stated that 98 per cent. of patients who have gout are men. Other American series in which a predominance of the disease among men is noted include those of Williamson (116 cases, one female), Schnitker and Richter (fifty-five cases, four females), Kinell and Haden (135 cases, five women) and Cohen (forty-seven cases, three women). In England, France

* Submitted for publication August 28, 1941.