# THE PROGNOSIS OF RHEMATOID ARTHRITIS

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Rheumatoid arthritis presents a difficult and often a discouraging problem. Because the etiologic factors are unknown, the prognosis is questionable, and in viewof the complexity of the problem and often the slow response to therapy, the attitude generally is pessimistic and no definite attempt is made to help these unfortunate individuals. Every gradation of involvement is observed, and each patient presents an individual problem of prognosis. In the earliest stages of migrating pains without any objective signs of rheumatoid arthritis, the course of the disease is questionable. In other cases with severe deformities or complete ankylosis, the prognosis is poor.

The problem is how to obtain information from these patients which might be used as a guide in making a reasonable prognosis. The first prerequisite is a detailed history, including information regarding the onset and course of the disease, previous infections, the home and occupational environment, mental attitude of the patient, and heredity factors. Other factors which often precede the onset of rheumatoid arthritis are chronic exhaustion, exposure to cold, psychic trauma, pregnancy, psoriasis, hyperthyroidism, coronary thrombosis, and major operations.

Second in importance is a thorough physical examination, including examination of the involved joints and of the general stature and body mechanics. A thorough search should be made for foci of infection, the most common sources of which are the teeth, tonsils, sinuses, prostate pelvis and gallbladder. Roentgenographic study of a typically involved joint indicates the cartilaginous and bony involvement.

Certain laboratory studies give essential information about the patient's general condition. The routine blood examination determines the degree of secondary anemia which is often present. Estimation of the sedimentation rate gives a fair index of the amount of activity in the joints or body. The glucose tolerance test often presents information worthwhile to warrant its use, as we have observed that many patients have poor utilization of sugar. The blood uric acid determination is done routinely to exclude the possibility of gout in questionable cases. As a lowered metabolic rate is observed in a very large number of cases, the basal metabolism should be checked. Anacidity and hypo-acidity also are not uncommon findings. A questionable involvement of the sinuses should be studied roentgenographically. Roentgenograms of the teeth also should be made to eliminate the possibility of apical infection. If gastrointestinal disturbances, particularly gallbladder symptoms, are present, complete roentgenographic studies should be undertaken.

From these examinations information may be obtained to use in making a prognosis, which should be based not only upon the physical examination and laboratory studies, but also upon the patient's general condition. If the patient has the will and determination to get well, some of the treatment has been accomplished.

Another very vital factor in the prognosis is whether or not the treatment can be adequate. The best results are usually obtained from complete bed rest in the hospital. Unfortunately, this is not possible in many instances, and consequently the patient often receives inefficient or ineffective therapy.

We are all aware of the fact that there are many methods for treating rheumatoid arthritis. Complete bed rest for both mental and physical relaxation is one of the first essentials. Many patients suffer from fatigue and exhaustion, and worry about deformities from progression of the disease. If the patient can be hospitalized and daily active treatment instituted, the patient's outlook often is improved. Environmental change is another beneficial measure. Muscular relaxation should be obtained. While the patient is in bed, he should have joint use to prevent stiffening and contracture by carrying each joint through complete range of motion one or more times each day.

The secondary anemia so characteristic of this disease usually does not respond satisfactorily to iron therapy alone. To restore the blood to a normal level, blood transfusions should be given in adequate numbers to obtain a normal blood picture. If a severe anemia is present, four or five transfusions may be necessary. In addition to restoring a normal blood picture, a nonspecific reaction is frequently obtained which is most beneficial.

Dietary treatment is a disputed question. However, we know there is a metabolic disturbance from the study of glucose tolerance curves. The blood sugar at the first and second hours very often is higher than normal, but usually reaches normal, however, at the end of the fourth hour. Because of this poor utilization, the low carbohydrate diet is used unless the patient is markedly underweight and emaciated. Often these patients have been on a poorly balanced diet. The low carbohydrate diet contains adequate protective foods and proteins with sufficient calories, as follows:

HIGH VITAMIN—LOW CARBOHYDRATE DIET

1. A liberal portion each day of any fresh fish, meat or fowl.
2. One or two eggs each day.
3. Fresh vegetables, both raw and cooked, as follows:

(a) Two fresh raw vegetables from the following: (May be taken in salad form)

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| Cabbage | Swiss Chard | Pepper |
| Lettuce | Cucumber | Carrot |
| Tomato | Radish | Onion |
| Endive | Celery | Water Cress |

(b) At least two fresh cooked vegetables from the following:

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| Asparagus | Brussel's Sprouts | Beets |
| Egg plant | Mushrooms | Kale |
| String beans | Tomato | Spinach |
| Cabbage | Peas | Cauliflower |
| Onion | Broccoli | Parsnips |
| Turnips | Kohlrabi | |
| Celery | Squash | |
| Rhubarb | Carrots | |

4. Fruit, especially fresh fruit in season, liberally each day. It is best to eat fruits in place of made desserts and pastries; oranges, grapefruit, pears, pineapple, melon, berries, and apples are especially good. Use just sufficient sugar to make the fruit palatable.
5. Two glassfuls of milk or buttermilk each day. Other beverages with a minimum of sweetening may be added.
6. No cereal nor bread, except two slices of whole wheat bread daily.
7. Butter, cream and salad dressing as desired.
8. Nuts as desired.
9. Add vitamins as follows (unless otherwise directed):
   (a) Wheat germ for Vitamin B. Take two tablespoonfuls each day
   (b) Fresh yeast for Vitamin B. Two cakes each day.
   (c) Cod liver oil for Vitamins A and D, two tablespoonfuls, twice a day or an adequate amount of one of the newer fish oils.
10. Avoid the following:

    All vegetables not on list

    All bread and bread substitutes, except the allowed whole wheat bread

    All cereals

    All desserts such as puddings, cookies, pies, cake, pastry and ice cream

    All very sweet fresh fruits and all dried fruits such as figs, dates, raisins and prunes, unless taken only occasionally in small amounts

All spaghetti, noodles, macaroni, rice, candy, honey, syrups, jellies

All sugars except such as are necesssry to make food and drink palatable.

When the atypical blood sugar curve is obtained, ten units of protamine-zinc insulin are given daily, usually for a period of from four to six weeks.

Nutritional deficiency often plays a part in the etiology, and adequate vitamins should be added to the diet. This deficiency certainly is not the cause of the disease, but may be an important influencing factor. Cod liver oil given in ounce doses twice a day is most valuable. Wheat germ and yeast are excellent sources for vitamin B. If these vitamins are not well tolerated by the patient, the concentrated forms may be substituted in adequate dosage.

The removal of infected foci probably will not cure arthritis, but very often will improve the general health. It is unwise to remove teeth which are only suspected, as this often leaves the patient without adequate masticating surface and prevents proper nutrition. Focal infection is probably an influencing factor and should be removed as soon as possible. Focal infection probably is more important early in the course of the disease than later. If the patient is markedly debilitated or is having an acute exacerbation, operative procedures should be used with caution as they often increase joint involvement and cause exacerbation of symptoms.

The value of many drugs recommended in the treatment of this disease has been questioned and in many instances only serve to relieve pain. As many of these patients have achlorhydria or hypochlorhydria, dilute hydrochloric acid should be given. If the metabolism is low, thyroid extract should be added. Iron in the form of Blaud's mass often is of value even if the anemia has been corrected with blood transfusions.

Arsenic in some form often is beneficial and can readily be administered in the form of neoarsphenamine in doses of 0.3 gm. twice weekly for six to eight injections.

An important adjunct to the treatment of these patients is the use of nonspecific vaccine, such as the stock typhoid-paratyphoid vaccine. For the first treatment 25 million bacteria are injected intravenously. Each succeeding injection is given after 24 hours of normal temperature. The amount injected each time is twice the number of bacteria given at the preceding dose. The temperature reaction following the first injection usually lasts longer than 48 hours, so 72 hours should elapse between the first and second dose. As the succeeding injections are less prolonged, the third and succeeding doses usually can be given at 48-hour intervals. Nonspecific protein therapy should not be given

to seriously ill patients, but should be reserved for use as an aid when the patient is improving and on the upgrade. Three to six injections are given.

Another important adjunct is physical therapy. The patient with arthritis usually requires treatment over a long period of time and simple physical methods of treatment should be employed. Short wave diathermy is not a necessity, but if it is available, it should be used especially for treating the larger joints such as the shoulder, back, hips, and knees. The local application of heat increases circulation and tissue metabolism in the involved part, and a sedative effect also is obtained. In an acute rheumatic joint, the first application of short wave diathermy should be at low intensity and for a period of time shorter than the usual treatment. When there is congestion in a joint, added excess heat may increase the congestion and intensify the symptoms. Treatments can be given every day if the patient is in the hospital, and every other day if the patient is an out-patient. In addition to local heat, the systemic application of heat is of value in increasing circulation and metabolism. This is especially true when many joints are involved and they cannot all be treated locally. If at home, the patient can apply heat daily from an infra-red generator or the paraffin bath which is especially suitable for the hands.

The electrically controlled paraffin bath gives an excellent form of heat, especially for the hands and feet. The application of daily treatment for the hands can be easily done by the patient at home. The following are directions for use:

Fill the top part of a large double boiler (6 quart) with paraffin (6 to 8 pounds) and the lower part with hot water. Heat until almost all the paraffin is melted, but be sure an unmelted piece remains. This is important if burns are to be avoided. Remove from the fire, leaving the water in the bottom of boiler.

Dip the hand quickly into the paraffin, keeping the fingers separated and being careful not to touch the sides or bottom of the boiler. Remove the hand from the boiler until the paraffin hardens on the hand, then dip and quickly remove again. Repeat this procedure until a thick "glove" is formed, after which the hand is kept immersed in the paraffin for ten minutes to half an hour. Peel off the glove and put the paraffin back into the boiler.

Massage must be given at frequent intervals, and should follow the application of heat. This also can be done at home by some interested member of the family who has received instruction in the procedure. Heavy massage over an arthritic joint may cause a marked local reaction. Therefore, the prescription for this should be made specific by the physician.

During the acute phase, rest in proper supports is important. Passive manipulation should be avoided because it may increase swelling and interfere with the circulation which already is poor. Sunbaths from the natural source should be taken whenever possible, and the ultra-violet lamp should be used in the winter.

Patients with rheumatoid arthritis improve in a hot dry climate if a prolonged stay is possible. Climate alone, however, is of little benefit as it is only an aid in treatment and not a substitute for other therapy. Often a patient sent to the southwest without supervision obtains no results because climate alone may not be depended upon for improvement.

Every patient with rheumatoid arthritis should be under orthopedic supervision from the beginning of treatment in order to prevent contractures. With proper splinting and proper care, contractures usually can be avoided. If a contracture develops after the disease has run its acute course, it can often be corrected by orthopedic care and the joint returned to usefulness.

The following case report illustrates some of the points discussed above.

*Case 1:* A 47 year old executive was first seen in August, 1939. He gave a history of swollen and painful joints since February, 1939, following an attack of influenza. First the hands and later the knees, ankles, toes and shoulders had been involved. Fatigue had developed along with weakness, and he had lost twenty pounds in weight. He was bed-ridden.

Physical examination revealed the weight to be 130 pounds, the temperature 100° F. and the blood pressure 130 mm. systolic and 85 mm. diastolic. The general stature was of the hyposthenic type, and the patient was quite pale. Transillumination revealed the sinuses to be clear. The tonsils were present, and purulent material could be expressed from the left tonsil. Roentgen examination of the teeth revealed one questionable tooth with some evidence of periapical involvement. A devitalized tooth had been removed four months before admission and had caused severe exacerbation of symptoms. Examination of the lungs, heart, and abdomen revealed no abnormal findings. The prostate gland was normal. Examination of the joints showed marked involvement in the fingers, wrists, elbows, shoulders, knees and ankles with limitation of movement and considerable inflammation and swelling.

General laboratory studies revealed a normal urinalysis. Examination of the blood showed 4,080,000 red cells with 70 per cent hemoglobin, and there were 6,200 white cells. The sedimentation rate was 1.9 mm. per minute (the high normal of the O'Rourke-Ernstene method used at the Clinic is 0.45 mm.). The uric acid was 2.2 mg. per 100 cc. Wassermann and Kahn tests of the blood gave negative reactions. The basal metabolic rate was plus 1 per cent. The Ewald test meal showed a free acid of 20 and a total acid of 40 degrees. The glucose tolerance curve showed the fasting blood sugar to be 84 mg. per 100 cc.; in one hour it was 219 mg. (high normal 200). In two hours the blood sugar was 222 mg. per 100 cc. (high normal 150 mg.). The third hour blood sugar level was 170 mg. per 100 cc. (normal 120 mg.). At the fourth hour the level was within normal limits. The chest roentgenograms were normal. Roentgenograms of the intestinal tract showed a normally functioning gallbladder without calculi, and the stomach, duodenum and colon were normal. Roentgenograms of the kidneys, ureters, and bladder showed no suspicious urinary tract shadows. A roentgenogram of the right hand revealed marked demineralization of the bones of the hand and wrist. There were no changes in the joint cartilages.

This patient presented the typical picture of very active rheumatoid arthritis involving many joints, and running a rapid course. He received two blood transfusions of 500 cc. each. Neoarsphenamine, 0.3 gm., was given intravenously twice weekly. A low carbohydrate, high vitamin diet was given. One ounce of cod liver oil twice daily, a cake of fresh yeast with each meal, and two Brewer's yeast tablets three times daily were taken. Protamine-zinc insulin, 10 units daily, was given. Physical therapy was applied in the form of diathermy and massage to the knees, and quadriceps exercises. The hands were treated in the hand paraffin bath, followed by massage. The infra-red baker was applied to the knees and feet for one hour three times daily.

The patient had definite reactions to the neoarsphenamine with generalized aching and some fever. After the fourth injection he had a marked reaction with a chill, and the temperature rose to 104°F. Following this episode the temperature fluctuation was less and there was only a slight daily rise. Five days later one injection of neoarsphenamine, 0.15 gm., was given.

After twenty-four days in the hospital on the above mentioned treatment the patient had less pain with some general improvement. It was then felt advisable to give a course of nonspecific vaccine therapy, in the form of typhoid vaccine. Following this he was discharged from the hospital, generally improved. Considerably less activity was present in the joints, with little pain. The patient could walk with assistance. He continued with the diet, vitamins and iron. He also received physical therapy three times weekly to the affected joints.

Three weeks after discharge from the hospital the hemoglobin dropped to 71 per cent and he was given two blood transfusions of 500 cc. each. He then went to Florida for the winter, continuing with the medication and local therapy. In May, 1940 the devitalized tooth was removed. He continued to improve and was able to replace his crutches by a cane. With the use of exercise apparatus such as a stationary bicycle, muscle tone in the legs increased and the ankles became stronger. Examination of the blood in November, 1940 showed 4,910,000 red cells with 89 per cent hemoglobin. He again went to Florida for the winter and plans to resume his former occupation upon his return.

This patient was able to have adequate treatment, and cooperated to the fullest extent. If this patient had not had active treatment nor the will to get well, he probably would have been an invalid. Of course, such an excellent result cannot be obtained in every patient. Some are not benefited by any treatment and a milder case may recover without any treatment. However, every patient should have the benefit of active treatment.

The following case illustrates the findings and the treatment in early rheumatoid arthritis.

*Case 2:* This patient was a 24 year old nurse who had a complete physical examination in September 1940, at which time there were no abnormal findings. In April 1940, soreness developed in the feet and hips, followed by pain and swelling in various joints of the body, especially in the knees, wrists, elbows and sternoclavicular joint.

The only important laboratory finding was a blood count of 4,230,000 red cells with 61 per cent hemoglobin. Three blood transfusions of 500 cc. each were given. She was placed on a low carbohydrate, high vitamin diet, Blaud's mass, grains 20, three times daily; and neoarsphenamine, 0.3 grains, twice weekly for six injections. Local therapy consisted chiefly of the use of the hand paraffin bath, and massage of the feet and hands; infra-red baking was applied to the knees. She was kept at rest and in May, six weeks later, the joint involvement had subsided completely. She rested for the remainder of the month, during which time she took sun baths. She now has returned to her occupation.

This patient received early active treatment which was followed by a rapid response. There, of course, is always the possibility of a recurrence; nevertheless, the active treatment brought the symptoms under control.

## CONCLUSIONS

After a complete study, information is available to help in making a prognosis in rheumatoid arthritis. In some instances, however, the prognosis will be a difficult problem.

Results depend upon the severity and stage of the disease and the extent of joint damage at the time treatment is begun.

With adequate treatment many of the early cases will recover; later, the disease may be arrested and most patients restored to a comfortable and useful life.