

THE ETIOLOGY, PATHOLOGY, AND TREATMENT
OF RHEUMATISM, AND ITS RELATION TO
RENAL DISEASES.

CLINICAL LECTURE DELIVERED AT THE NEW YORK POST-GRADUATE MEDICAL
SCHOOL AND HOSPITAL.

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LECTURE II.

GENTLEMEN,—This patient, as you perceive, has acute articular rheumatism, and this is his fourth attack. The first one occurred when he was only eight years old. The present attack began about four months ago, taking the form of localized pain and swelling, which successively developed in the knees, ankles, and shoulders. His occupation is that of a waiter in a restaurant, and upon investigating the habits of this patient we find that he has always been a very hearty eater, and in the habit of drinking more or less freely of wine and beer. The recurrence of the rheumatic attacks is a noticeable feature in this case.

In reference to the etiology of rheumatic affections, the views here advanced will be found to differ somewhat from those that are commonly taught in connection with this disease. Not, however, that they are essentially new, but they differ in the definite relation which they hold to known physiological and chemical phenomena.

The first question to be solved is the cause of the rheumatic manifestations. Rheumatism is a separate and distinct disease, which has its origin in imperfect feeding, incomplete digestion, and a faulty oxidation and assimilation of the food-stuffs ingested, which finally results in the development of lactic acid as an incomplete or by-product of proteid oxidation. At one time in the study of this disease it seemed clear that rheumatism was the result simply of over-indulgence in the vegetable food-stuffs; because, in the majority of instances, we find that rheumatic subjects are largely vegetarians, or at least are commonly in the habit of indulging freely in vegetables and

fruits, and do not as a rule use much meat. In the vast majority of instances the vegetarian theory holds true; but, unfortunately for completeness in this view, there is found a marked minority in whom excessive meat-eating to the exclusion of the vegetable class of food-stuffs has preceded the rheumatic attack,—too large a number to form an exception to a common rule.

In endeavoring to find a logical explanation that would clearly elucidate this apparently contradictory clinical evidence, this information was obtained from an eminent chemist,—to wit, that when these CHO compounds, such as starch, sugar, and fat, began to be oxidized, the tendency was to have the process completed quickly, that they were rapidly transmuted into their final products of oxidation, carbon dioxide and water, and that they were not apt to stop short and develop into incomplete or by-products of oxidation, such as lactic acid. This information naturally interfered with the original theory that rheumatism was always the result of an incomplete oxidation of the starches and sugars. The clinical fact that many meat-eaters had rheumatism also opposed the theory of incomplete oxidation of the starches and sugars as the sole cause of rheumatism. Further investigation of the subject, and a more thorough study of the phenomena of oxidation of the starches, sugars, and fats, and also of the proteid molecules, showed that even where rheumatism is developed in vegetable feeders the lactic acid does not come from the incomplete oxidation of the starches, sugars, and fats. In all instances the lactic acid is a by-product developed from the incomplete oxidation of the proteid molecule contained in the food-stuffs introduced into the system, either as a meat albumin or as a vegetable proteid.

Rheumatism, nevertheless, occurs more frequently in those who use vegetables to excess than in the more exclusive meat-eaters. This is because the vegetable compounds are more difficult of digestion and require more oxygen and digestive energy than are required to utilize an equal equivalent of meat. When the starch, glucose, and fats are absorbed, they are more rapidly oxidized than a proteid element; therefore, when once within the system, they utilize a large amount of oxygen quickly, and consequently a deficient quantity of oxygen is left with which to accomplish the more difficult and slower task of transmuting the proteid substances into their complete and final products of oxidation,—urea, uric acid, kreatin, carbon dioxide, water, and sulphur salts. It is quite possible by eating an excessive quantity of meat to have the same incomplete metamorphosis of the proteid molecule, provided the amount ingested is greater than the oxygenating

capacity of the system. Thus we see that rheumatism can be produced from either a vegetable or a meat diet, but in both instances the exciting factor is developed out of the proteid molecules. Incomplete transformation of the proteid molecule, however, is less likely to occur when vegetables are largely excluded from the diet-list. This is because the system is more perfectly nourished when upon a meat diet and a moderate amount of vegetables.

In the patient before us to-day there does not appear to be a sharply-defined history of indulgence in any particular class of food-stuffs to the exclusion of other kinds. The history that he gives us is that of a man who has eaten to excess of all kinds of food-stuffs, together with a rather free use of alcoholic stimulants in the form of wine and beer. This patient also leads an in-door life, and takes but little exercise in the open air. The consequence has been that he has taken a much larger quantity of food-stuff than the oxygenating capacity of the system could fully utilize. As a result, every little while nature has rebelled at this imposition in the shape of increased work, until finally the nutritive vitality of the system has become unduly overtaxed, the protoplasmic tissue of the body has become impaired, and a slight exposure to cold or wet, or the excessive use of alcoholics, has excited localized congestions in and around the joint, in the intermuscular planes, and possibly in the membranes of the heart. As these cases advance, oxidation becomes still more imperfect, and the protoplasm of the tissues assumes a vicarious action, and induces at these local points the formation of lactic acid from the proteid molecule. The lactic acid so formed unites with the sodium, potassium, and calcium salts, and forms lactates of the same, and the neutral dibasic compounds, thus reducing the normal alkalinity of the system. These chemical mutations in the tissues intensify the irritation, and often excite a true inflammatory process, with all its attendant phenomena, both physiological and symptomatological; or these saline compounds may become encysted, and form the chalky deposits which are common to certain forms of rheumatism. This faulty transmutation of the proteid bodies, malnutrition, and vicarious action on the part of the protoplasmic elements of the body, together with the local formation of lactic acid and its consequent conversion into the somewhat insoluble lactates of soda, lime, and potassium, should always be kept in mind in the management of every rheumatic case.

Following these local disturbances in the physiological processes there is often a marked congestion of the part, followed by the production of new tissue without any inflammatory action, as seen in many

cases of chronic rheumatism. In other instances a truly inflammatory action is developed, with its secondary degenerations and formation of new tissue. In this way we have a full and satisfactory explanation of the pathological conditions and the symptoms developed in both the acute and the chronic forms of rheumatism of all kinds, whether the lesion be located in and around the joints, in the intermuscular planes, or implicating the heart and its membranes.

This theory also explains the recurring attacks which are so common in certain individuals. So soon as these patients recover from one attack, like the gouty subject, they at once return to their imperfect or excessive diet, which, in due time, is bound to be followed again by another of the so-called rheumatic attacks. In such subjects, at varying intervals, an excessive quantity of lactic acid is developed, precipitated often as the result of a little exposure to wet or cold, or an unusual excess in eating and drinking, until more work is imposed upon the kidneys than they are able to accomplish without damage to their protoplasmic elements, and the attack known by its symptoms as rheumatism is developed, but with an associated renal lesion. With this there are of necessity some renal symptoms, which have led some to consider rheumatism as one of the causes of nephritis. The truth, however, appears to be that the same condition that is causing the rheumatism will at the same time decrease the nutritive vitality of the renal cells and augment the excretory work of the kidneys, and in this way the renal lesion is developed in conjunction with the rheumatism. By bearing these facts in mind we can not only treat the primary rheumatic attack more successfully, but can also arrest the tendency to have such outbreaks, all of which, however, necessitates the patient's following directions to the minutest detail. Where this is done the tendency to rheumatism can be eradicated from the system and from the family.

When such a case comes before us for treatment, the first thing to be ordered is a cholagogue, preferably fifteen or twenty grains of calomel with ten grains of jalap, to be taken at bedtime, or twenty grains of blue mass in conjunction with a compound cathartic pill. Another favorite cholagogue of mine is the following tablet:

Acid. arsenic.,
Hydrarg. bichlor., āā gr. i;
Pulv. ipecac., gr. ii;
Hydrarg. chlor. mit., gr. xvi.
Misce et fiat in tabula no. xv.

Sig.—One of these may be given every three or four hours until free catharsis is established, or one can be given every night, every second night, or every third night, as the condition of the system may indicate.

The object in using any of these methods is to clear the system thoroughly of the old and deteriorated bile. This line of treatment first stimulates the hepatic cells, and then is followed by a truly cholagogue action. The final action of this combination is sedative in nature, during which period the liver-cells are enabled to rest and take on a more active nutritive condition, consequently the function of the liver, taken as a whole, is better performed, and assimilation and nutrition are improved as time progresses.

The next morning, after free catharsis, the following mixture is administered, which is a modification of what used to be known as Professor Alonzo Clark's formula :

Acid. salicylic., ℥iij ;
Sodii bicarb., ℥ii ;
Elixir. gaultheriæ, ℥ss ;
Glycerini, ℥iij ;
Aquæ, q. s. ad ℥iv.—M.

Sig.—One drachm every two hours.

This makes a freshly precipitated sodium salicylate which is far superior in its action upon the system to any of the salts usually found in the market. This formula did not originate with Professor Clark, but was taken from some German journal, and used by him first in this country, when this drug was originally brought prominently to the attention of the profession as an anti-rheumatic agent. In the original formula there was no elixir of gaultheria, but it was composed of equal parts of glycerin and water. In its original form the mixture was found to be too sweet, and apt to disturb the stomach. Even the salicylic acid, or its compounds in any form, will in certain instances disturb an ordinary reliable and so-called "strong stomach." The addition of the gaultheria and the reduction of the glycerin make the mixture more palatable and more easily retained by an irritable organ. The above-noted remedy is pushed until a decided tinnitus aurium is produced, or until the pains are under control. If the stomach rebels, the salicylate must be given in smaller doses and at longer intervals. By some observers salicylic acid and the salicylates are considered as depressing to the heart, but the evidence obtained at this clinic is to the effect that this drug can be used with impunity without fear of depressing the heart.

So far as my experience goes, there are very few cases of acute articular or muscular rheumatism in which the symptoms will not abate or be entirely dispersed in three or four days, and often in twenty-four hours, when this plan of treatment is faithfully followed ;

but without the vigorous action of the mercurial the salicylic compounds often appear to be absolutely worthless. There are a few people, however, who cannot take salicylic acid or its salts in any shape, myself being one of that number. For such oleum gaultheriæ can be substituted in the following shape :

Ole. gaultheriæ, ℥ii.

Misce et fiat in cap. no. xii.

Sig.—One capsule every one or two hours.

Successful results have generally been attained at this clinic in the management of chronic cases, also in breaking up the tendency to have recurring attacks of rheumatism upon the slightest indiscretion. To begin with, these patients are placed for a week or ten days upon an exclusive diet of skimmed milk,—eight ounces every two or three hours. This particular form of diet yields the largest amount of nutrition with the least expenditure of oxygen, but it will not furnish the requisite amount of energy to the system ; so that while on this diet the patients must not undertake to do a full day's work,—in fact, they are not inclined to attempt the undertaking. In all these cases the whole system gives abundant evidence of a general malnutrition of all the organs. You notice in this patient before you that he is not only rheumatic, but he is decidedly anæmic, and hence we see at once that one important step is first of all to improve this general nutritive state of the system. This, as I have just said, is accomplished first by a rigid plan of dieting ; secondly, and to aid the digestive apparatus, we are in the habit of administering the capsules of ox-bile, nux vomica, and quinine, the formula of which I have previously given you.

As you have already been repeatedly told, ox-bile does more to improve the condition of the digestive system than any other remedy used for this purpose with which I am familiar. The urine in similar cases, as well as in this instance, has been carefully examined from day to day while the patients have been under the influence of various drugs, and in no instance has there been such a rapid change from the abnormal and by-products to those commonly regarded as the normal ingredients of the urine as when the patients are under the influence of the ox-bile. In many cases it is absolutely impossible to effect this change so long as the bile is withheld. After a few weeks of the exclusive skimmed milk, buttermilk, or milk diet, the patient is allowed some eggs, a little lean meat, and finally some bread and butter ; all this time excluding every form of vegetables, cereals, fruits, sweets, and pastry. This form of diet will furnish the requisite amount of proteid matter to fully sustain the constructive work of the system,

and at the same time it can be utilized with the least expenditure of oxygen and the least loss of vital force. It also, when properly arranged, affords the full amount of heat and energy.

After securing immunity from the rheumatic symptoms, if the patient returns to the excessive use of the vegetable food-stuffs, and persists in eating large quantities of potatoes, or of starch, sugars, and fats, the nutrition of the system will again become so much reduced after a variable period of time that there will be another attack of acute or subacute rheumatism.

This second patient presents similar symptoms. Two days after he arrived in this city, which was about two weeks ago, he noticed that his ankles began to swell and to become painful; then the wrists became affected, and he began to suffer from headache. His appetite, however, has remained fairly good. The urine that he voids is very high-colored, hyper-acid, and contains albumin. Many writers state that rheumatism is one of the causes of nephritis. This opinion, as stated in connection with the first case, cannot be considered as correct in the light of our present knowledge; but, as already remarked, the same conditions that cause the rheumatism may in some instances impair the functional activity or even the histological integrity of the renal organs.

Instead of the four units of urine being produced, $C_{72}H_{112}N_{18}O_{22}S + 139(O) = 4(CH_4N_2O) + C_5H_4N_4O_3 + 2(C_4H_7N_3O) + 55(CO_2) + 38(H_2O) + H_2SO_4$, as from the transmutation of the proteid molecule, occurring in the normal state, only two may be formed, thus, $C_{72}H_{112}N_{18}O_{22}S + 136(O) = 2(CH_4N_2O) + 2(C_5H_4N_4O_3) + 2(C_4H_7N_3O) + 52(CO_2) + 40(H_2O) + H_2SO_4$. Out of the nitrogenous material left, which normally is converted into two more units of urea, there are formed to be eliminated some of the lower forms of proteid katabolins, such as uric acid, and also lactic acid, thus, $C_{72}H_{112}N_{18}O_{22}S + 94(O) = 2(CH_4N_2O) + 2(C_5H_4N_4O_3) + 2(C_4H_7N_3O) + 7(C_3H_6O_3) + 31(CO_2) + 19(H_2O) + H_2SO_4$. In rheumatism the latter transmutation, with the formation of lactic acid, is characteristic. The retrograde process may descend the scale of suboxidation still further until the renal cells are impaired and a form of derived albumin appears in the urine in place of the higher product, urea. This stage of the process, or albuminuria, we have perfectly illustrated in this second patient.

Rheumatism, then, does not produce nephritic lesions, but this general disturbance of the physiological metabolism which produces the rheumatism, if continued long enough, will finally cause a giving way of the protoplasmic vitality of the renal epithelium. This is first evi-

denced by the presence of albumin in the urine, and later by the presence of casts, and finally by many of the typical symptoms of a renal lesion being added to those of a rheumatic character. It may even go so far that the renal symptoms entirely displace those characteristic of rheumatism.

One of the modern theories regarding the etiology of rheumatism is that it is of bacterial origin, or a germ disease. If we accept this theory, the renal lesion is claimed to be the result of the kidneys having to eliminate from the system the germs or the substances produced by their presence. There is, however, very little, if any, good ground upon which to argue the bacterial origin of rheumatism; therefore it seems more tenable to regard rheumatism essentially as resulting from false feeding and a faulty digestion and assimilation.

This third patient is a porter by occupation, who presents symptoms of the so-called muscular rheumatism. Three weeks ago he developed a sudden pain in the lumbar region. This attack followed immediately upon an exposure to cold and wet. As you see, his tongue is soft, pale, and flabby. This condition of the tongue always indicates a poor nutritive state of the system. These cases, commonly called lumbago, or "crick in the back," are of rheumatic origin. Attacks of lumbago are more frequent in men than in women. This is due to greater muscular exertion in the former and to the construction of the clothing. Men are more likely to strain the lumbar muscles than women, and when they bend forward there is a gaping between the trousers and waistcoat which leaves this portion of the trunk poorly covered, as compared with the rest of the body, and it is, therefore, subject to the local action of cold draughts. This causes a localized congestion in the lumbar region, and in connection with this there is a state of systemic suboxidation. This engorgement of the vessels is often associated with a vicarious formation of lactic acid in the inter-muscular planes, which, together with the distended condition of the blood-vessels, causes intense pain, due to pressure upon the peripheral nerve-endings, after which every movement of the muscles of the lumbar region intensifies the distress, and causes the characteristic symptoms of this affection.

These patients need just the same line of general treatment as is employed in the more active forms of rheumatism, if the recurrence of these attacks is to be prevented. First of all, a brisk mercurial purge, then the dietetic and constitutional treatment.

For the immediate relief of the painful symptoms many things can be used. As the pain is a pressure pain, due to congestion of the

vessels and pressure upon the nerve-endings in this region, anything that will relieve the engorgement will temporarily disperse the symptom. The sudden introduction of an acupuncture or long hypodermic needle deep into the lumbar muscles will often relieve the pain instantly. The sudden mechanical injury caused by the needle-thrust into the region in which the nerves are in a hyperæsthetic condition causes a reflex impulse to be carried up to the central nervous system. This is reflected back to the heart and blood-vessels, causing an increased enervation of the heart and vascular walls, by which means the sluggish circulation in the affected parts is set in motion, the congestion overcome, and the pressure removed, and with the removal of the compression there is a disappearance of the pain, often as if by magic. Local cauterization acts reflexly in a similar manner to the needle puncture, and is an exceedingly serviceable method for treating lumbago, and, in fact, all forms of muscular rheumatism. The Paquelin cautery is the most elegant apparatus to use for this purpose; but all of you who are familiar with this instrument know how liable it is to be out of order just when it is wanted most. Therefore by taking a glass rod, from three-eighths to one-half inch in diameter, and heating it in the flame of a Bunsen burner or that of an alcohol lamp, all difficulty is obviated, and cauterization successfully accomplished. When sufficiently hot, quickly and lightly touch the hot rod to the integument directly over the seat of the pain. If the area involved is large, it is well to make the applications along the line of the nerves distributed to the muscles implicated.

One patient out of many is recalled who came to my office from time to time with these attacks, involving the muscles of both shoulders and arms. When he entered the office the pain and stiffness of the muscles were so great that he could not remove his clothing without assistance; yet after a somewhat free cauterization over the affected parts he became quite active and supple, and had no difficulty in replacing his clothing. The relief from this cauterization is not transient, but often gives immunity from pain lasting for weeks at a time. Counter-irritants in the form of liniments can be used, but my experience teaches me that to be of service they must be applied daily, which is apt to be neglected as soon as the parts become a little tender. The following liniment is a very valuable one:

R Olei tiglii, ℥ii;
 Chloroform., ℥ii;
 Aquæ ammonii fortior., ℥i;
 Olei sesami, ℥iii.—M.
 Sig.—External use daily.

The application of a fly-blister is often of great service. It must be remembered, however, that unless it is carefully dressed the vesication will be followed by a troublesome and excoriated surface. By applying the ordinary fly-blister, three or four inches square, for a few hours only, being careful to remove it before vesication has actually taken place, and then applying a flaxseed poultice to complete the vesication, quite a thick layer of integument will be raised, which is not easily broken. The blister should not be opened for a day or two, during which time a partial integumental covering will be formed underneath the contained serum. By following this plan an excoriated surface is usually avoided, and the best possible results from the blister are obtained.

Another excellent method of employing continuous counter-irritation by vesication is to use Squibb's vesicating collodion. This is especially valuable around painful and rheumatic joints. It is applied with a camel's-hair pencil in narrow strips, some distance apart, over the affected parts. After two days another series of strips are painted in between the previous applications. In this way, by repeated brushings, continuous vesication can be kept up for days or weeks at a time without producing a raw surface, and yet the counter irritant effect of a blister is steadily continued.

Still another and a very good form of counter-irritation for the chronic cases of lumbago is by means of the ordinary thapsia plaster of French manufacture, that of American makers often containing only a little croton oil and gum, and none of the thapsia resin. So soon as the croton oil evaporates from these plasters they lose their virtue, while a plaster made with the genuine thapsia gum retains its irritating properties for years. Plasters made from the genuine thapsia gum act just as effectually when ten years old as when freshly manufactured. This assertion is based upon repeated experience. In using these old plasters, and even the freshly made, it is a good plan to moisten the gummed side with spirits of camphor until it will adhere to the integument. This thapsia gum acts as a poison to the integument, exciting a surface congestion and a vesiculo-pustular eruption with intense itching. The action spreads over an area three or four times as large as the original plaster applied. This irritation will continue one or two weeks after the application, irrespective of whether the patient removes the plaster or not, provided it remains in contact with the integument long enough to make the action possible. This continued reflex disturbance alters the nutritive condition of the deeper parts and aids in effecting a cure. In using these plasters care should

be taken to thoroughly cleanse the hands after handling the plaster, otherwise some of the gum may cling to the fingers and be rubbed upon the face, as frequently happens. Where this occurs it excites a facial erythema with œdematous swelling, which has often led to the erroneous diagnosis of facial erysipelas. If understood, and a soothing application is used, it does no harm, except the temporary inconvenience and possible scare, the facial erythema usually subsiding in from twenty-four to forty-eight hours.

SCIATICA.

CLINICAL LECTURE DELIVERED AT THE UNIVERSITY OF MARYLAND.

BY I. E. ATKINSON, M.D.,

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GENTLEMEN,—The patient before you is forty years of age, German, married, and a laborer by occupation. He has suffered irregularly since 1870 from rheumatism, which he contracted during the Franco-Prussian war. Four years ago he had an attack of rheumatic fever, and was ill for seven months. At that time he had some indeterminate trouble with his heart, the character of which he is not able to tell us. I may say, in passing, that there are no traces of it left. He has frequently had rheumatism in his leg since then. The present trouble began three weeks ago, while at work. The pain came on suddenly, shooting down the posterior aspect of the right thigh and leg. The pain is present both by day and by night, but is greater when he is quiet than when he is walking. He does not think he has had any fever during this attack. He does not remember to have had scarlatina or dropsy, neither has he had syphilis. His appetite is good. His bowels are regular, and he is free from cough. He is a moderate drinker. You can see that he is a fairly well nourished man, of medium size, and decidedly pale. His tongue is moderately coated. He has no sore throat now, nor is he subject to it. He has no pulmonary or cardiac trouble. His digestive functions are fairly well performed, and were it not for the pain that he has in the right lower extremity he would be able to work. This pain keeps him in almost constant distress. There is a slight increase—not important, however—in the area of liver-dulness. His splenic area is normal. He complains of pain in the neighborhood of the sacro-sciatic foramen, a pain which is increased upon pressure. There is also pain along the course of the sciatic nerve, over the head of the tibia, in the popliteal space, and pressure over this region gives pain. He has no pain, however,