ON THE TREATMENT OF RHEUMATIC GOUT BY THE AID OF THE CONSTANT GALVANIC CURRENT.*

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I DO not intend on the present occasion to bring forward a systematic essay on the pathology of rheumatic gout, or to add one more to the many speculations which have from time to time been proposed concerning the nature of this distressing and painful malady. The symptoms of the complaint have been so well described by different authors, amongst whom I will only mention Adams, Todd, and Fuller, that little, if anything, new could be added to their observations: indeed, these symptoms are so patent to the eye, that rheumatic gout may be pronounced one of the few diseases which you can diagnose by merely looking at the patient, without asking him a single question, or entering into any minute physical examination. For, although difficulties in the diagnosis may arise in a few cases, where the larger joints, such as the hip and the knee, or the sterno-clavicular articulation, are affected to the exclusion of the smaller ones, yet the common form of the distemper in which chiefly the interphalangeal joints of the hands and feet are deformed, is so peculiar and characteristic that the nature of the disease may be recognised at a glance.

I will not here discuss the question whether rheumatic gout owes its origin to a special poison which is generated in the system. No proofs have been brought forward for the assertion that it is so, which has perhaps been somewhat too rashly and confidently made; pathologists relying for this view more upon the analogy of the disorder, with gout on the one, and rheumatism on the other, hand, than upon any very precise data at their disposal with regard to rheumatic gout itself. Taking all the special features of this distemper into consideration, it seems to me more rational to look upon it as a nutritive disturbance of the joints peculiar to old age, or premature old age. By far the largest number of cases of this disease are observed after the age of 45; and although instances do occur in which rheumatic gout occurs in much younger persons, yet we invariably find, when such is the case, that emotions, anxiety, privations, voluntary or involuntary offences against the laws of hygiene, and other debilitating influences, have produced a sort of premature *senile decay* in the persons thus affected. The morbid process which under these circumstances takes place in the joints, is indeed very analogous to the atheromatous process which occurs in the internal tunic of the arteries at the same period of life, and which nobody thinks of putting down to a special poison generated in the system. It constitutes one of those highly *insidious and chronic inflammatory conditions which are characteristic of the period of involution and senile decay*.

This peculiar kind of inflammation, which, if it occur in the synovial membrane and the articular cartilages, we call rheumatic gout, or rheumatoid arthritis, or arthritis deformans, and which, if observed in the intima tunic of the arteries, we call endo-arteritis deformans, or the atheromatous process, never seems to lead to suppuration, as it is not intense enough for that. The first thing that occurs in the joints is hyperplastic proliferation of all the parts involving the same. The synovial membrane throws out, partly, somewhat large pediculated polypi, consisting of fat and connective tissue, and partly a finer kind of tufts and fringes, causing a peculiar roughness of the surface, which Volckmann has appropriately likened to a sheep's-skin. The cartilages likewise become proliferated, at first in their superficial and external layers, and subsequently in their deeper parts. In the healthy cartilage, *pairs of cells*, which look like the two halves of a ball cut through in its middle, are seen to be regularly imbedded in the hyaline basement substance; and the proliferation of these cells occurs in strict proportion to a simultaneous growth of that basement substance, so that always a proper distance is kept between the several cells. Now, recent microscopical researches have shown that in rheumatic gout, on the contrary, *groups of from ten to twenty large cartilaginous cells* are formed, which are lying close to one another, to the detriment of the basement substance, which becomes more fluid, absorbed, and finally altogether wasted. The natural consequence of this tissue-change is, that the joints are no longer able to stand the wear and tear, either of motion or of pressure, which is put upon them. The structure, therefore, gradually perishes, and proliferation continues only at the edges of the articular cartilages. There is, however, no uniform swelling there, but numberless small nodes are formed, which are as many ecchon-

droses, and which gradually coalesce to form a sort of wreath round the joint. The surface of the bone thus becomes gradually denuded. This, however, does not cause caries, but osteitis, terminating in sclerosis; and the bone becomes covered with a smooth, shining, white, and firm osseous plate, on which traces of the mechanical injuries to which it has been exposed during life may often be discovered. This brittle osseous tissue cannot, in the nature of things, resist in the long run the constant friction and grinding to which it is exposed, however quiet the patients may keep, in order to avoid the pain which is caused by every motion. If two pieces of pumice-stone were constantly rubbed against one another, only little would be left after a time; and in a similar manner the surface of the bone gradually wastes away. Whole epiphyses may thus perish; the neck of the femur will disappear; and the affected joints will altogether be so deformed that only little, if anything, is left of the original structure.

Looking, then, upon rheumatic gout as a disease of malnutrition peculiar to the period of involution and senile decay, we must not be led away by the term "inflammation" into antiphlogistic measures, which only make matters worse; but the great aim of our treatment should be to support and stimulate the failing powers. The remedies upon which chief reliance is placed by the best observers are, therefore, bark, mineral acids, strychnia, iron, cod-liver oil, and arsenic. There can be no doubt, from the positive statements of reliable practitioners, that in a considerable proportion of cases these remedies do a great deal of good: yet how frequently do we see patients who have for months and years been under the care of the most eminent physicians, familiar with all the ordinary resources of the art; who have had everything done for them which money can procure; who have not only taken gallons of physic, but paid one visit after another to Buxton, Bath, Wiesbaden, and Wildbad, and who yet find the distressing symptoms of their complaint gradually becoming intensified, the pain more severe, the deformity greater, the helplessness more embarrassing. Surely under such circumstances we cannot look with any degree of satisfaction upon our present treatment of rheumatic gout; and any means which promises, from general considerations, to be really effective in such cases, should have a fair trial given to it.

Holding these views, I have for the last six years sought and found many opportunities to use in this distressing distemper that most active stimulant of nutrition the continuous galvanic current; and, although I am far from considering it a specific or a panacea for all cases of rheumatic gout, yet I have seen enough of its effects to convince me that in cases where the most approved lines of medicinal and hydro-therapeutic treatment, intelligently and perseveringly followed, have, after months and years of trial, left the patient no better but rather worse than before, the constant current, judiciously administered, may do great good in a variety of ways. I do not mean to say that we can by its aid really cure rheumatic gout. The current cannot reproduce wasted cartilages, nor restore its normal structure to a sclerosed bone; it cannot prevent the patients from advancing in age, nor arrest altogether the process of involution and senile decay to which the system must in the end succumb; yet it can do much good. Instead of relating cases which might prove monotonous, I will shortly summarise the results of my experience about the therapeutical capabilities of the current in the disease now under consideration.

1. It acts as a general tonic to the system, and more especially to the nervous system. Although in some cases of rheumatic gout the appetite is tolerably good, the food taken is pretty well digested, and the action of the liver, the alvine evacuations, and the urinary secretions, are not very materially interfered with; yet we find that the large majority of patients suffer from some form of dyspepsia, and impaired action of the liver, bowels, and kidneys. In the cases to which I now allude, there is no actual disease of these organs, which sometimes becomes developed towards the end; but there is functional debility, owing to an insufficient supply of nervous force to the parts mentioned. Thus an insufficient quantity of food is taken; that which is taken is imperfectly digested; the elimination of effete matters from the system is slackened; and the consequence of all this is a degree of debility which is more alarming to the experienced observer than the discomfort and pain attending the local manifestations of the disease in the joints. Patients of this class have often considerable difficulty in taking medicinal tonics, which are apt to heat the system, while alteratives often lower it still more. Under such circumstances the constant current is often remarkably effective in rousing nervous energy and improving all the most important functions of the body. The best mode of application for this purpose is to direct the positive pole, armed with a conductor of large surface, to the cervical spine, while the negative pole, similarly armed, is placed on the pit of the stomach. A gentle current, which even patients of exquisite sensibility can well bear, is thus allowed to flow for from three to five

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minutes in the direction just described. By this application, the base of the brain, the spinal cord, and the coeliac plexus of nerves, are simultaneously brought under the influence of the current.

2. *Want of sleep* is one of the chief complaints of patients suffering from rheumatic gout. This arises partly from want of exercise in the open air, and partly from the circumstance that the pain is apt to get worse at night. The patient keeps tossing about in bed from being unable to find a really comfortable position. "Nature's sweet restorer" thus flees the pillow of the sufferer, who generally dreads the night as his worst time. Opium and morphia are rarely applicable in these cases, as they generally excite rather than soothe, and impair the action of the stomach and the liver still more. Hydrate of chloral often steps in as the right thing in the right place; but I believe you will agree with me when I say that the more ample our experience of that remedy becomes, the more frequently do we find cases in which the system does not tolerate it, either in small or large doses. Where morphia and chloral fail to procure sleep, few other drugs will succeed in doing so; and it must, therefore, be looked upon as a considerable advantage connected with the use of the constant current, that under its influence sleep soon becomes prolonged and refreshing. No special application is necessary for attaining this end, the one I have just mentioned being quite sufficient.

3. *Pain* is another invariable symptom of rheumatic gout, and one which frequently resists the administration of sedatives and counter-irritants. Even subcutaneous injections of morphia and atropia have only a temporary effect, which rarely extends beyond twelve or twenty-four hours. The pain is generally most severe in the deformed joints, but is likewise felt in many other parts of the body. For the alleviation of the pain, the constant current is the most useful remedy with which I am acquainted. It must in this instance be applied to the suffering parts, so that the positive pole, armed with a small electrode, is made to touch the sore points; while the negative, connected with a large electrode, is placed in the neighbourhood. The current used may in this instance be somewhat more powerful than where it is employed for general tonic effects; and if a short application, say of one or two minutes, be not successful, this may be extended to four or five minutes. The effect is, in many instances, almost magical, inasmuch as pain, which has been fixed in some particular spot for months and years, is, as it were, charmed away by one or two applications.

4. The *deformities* which rheumatic gout produces, more especially in the interphalangeal joints of the hands and feet, resist the use of the current more obstinately than the other symptoms which have been mentioned; and it requires much patience and perseverance on the part of the practitioner and the patient to reduce them to any extent. Provided, however, that the galvanic treatment is followed up for a sufficient length of time, even extensive deformities may be improved, which is a matter of considerable importance, as most patients belong to the female sex. No one who has not seen it can have any idea of the beneficial effects which the current will produce in the long run on these deformities, even where they are extensive, and where the patients are not very old. It seems as if the action of the vasomotor nerves were gradually directed back into its proper channel. Unfortunately, many patients want to be cured in a week of a disease which is essentially chronic in its progress; and some practitioners are inclined to discontinue a special treatment too soon, unless immediate effects are produced by it. In this as in many other complaints the ultimate success of a particular plan of therapeutics depends not alone on the remedies which are used, but also very materially upon the more or less systematic use made by the practitioner of his remedies; and last, not least, upon the intelligent co-operation of the patient. In order to reduce deformities, galvanisation of the cervical sympathetic nerve must be had recourse to.

By what I have said I do not by any means wish to imply that the use of internal remedies should be altogether eschewed in the treatment of rheumatic gout. If we were, for some reason or another, to abstain completely from their use, we should only deprive ourselves of many chances to do good to our patients. Although in the system of therapeutics which I have pursued for rheumatic gout, I have given the first place to the constant current, I have frequently prescribed medicines which I thought would prove beneficial for removing certain complications which were present. Thus where there was an excess of acidity in the system, as evidenced by a highly acid condition of the mucous membrane of the tongue, the perspiration, and the urine, I have given alkalies or bismuth; for constipation, I have ordered Marienbad or Frederickshall mineral water; where the blood appeared to be very much impoverished, the *ferrum redactum* of the *L'harmpocoeia*, or Spa water, was prescribed. All these and some other remedies I have used were, however, only auxiliaries of the galvanic treatment,

and could not of themselves have exerted any decided influence upon the progress of the disease.

In conclusion, let me impress upon you once more the necessity of persevering with the use of the galvanic current, if it is to be used at all. The circumstance that most of our patients will be above 45, and not a few above 60 years of age, in connection with the obstinate character of the malady itself, must prepare us for slow results, more especially as far as the improvement of the deformities is concerned. Pain, indeed, is often relieved at once, but it is very apt to return: the patient often becomes rapidly stronger, but at times the old debility will again be felt, more especially if he undertake to do more, either in business or pleasure, than he is able to do; and a sleepless night may again occur after many good nights in succession. It is therefore necessary to tell the patient at once that a rapid cure is quite out of the question. The current should be used, either daily or three or four times a week, for at least a month or six weeks; and if the patient continue to improve, we may go on with it much longer than that. If, however, after that time he does not seem to make any further decided progress, it is better to discontinue the treatment for a month or longer, and then to recommence it. Those who will not shirk the sometimes rather tedious labour involved in carrying out such a treatment perseveringly, will ultimately be amply rewarded for their trouble by an amount of success which, in some forms of the disease, could not have been obtained by any other line of treatment.

ON THE INFLUENCE OF LIME AND MAGNESIA IN DRINKING-WATER IN THE PRODUCTION OF DISEASE.*

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THE subject of my paper is of great importance to every one who, like ourselves, resides in a magnesian limestone district. It therefore well deserves to occupy a portion of our time, especially in this progressive age, when preventative medicine is engrossing so much attention. What I am about to advance is founded upon a few cases only; not, however, in consequence of a paucity of such cases, but rather the difficulty of fully testing the indicated plan of treatment, from inability hitherto of obtaining soft water in a town and region where every sample of drinking-water is saturated with lime and magnesia.

Last March, I read, in *The Urine and its Derangements*, by Dr. George Harley, that "oxalate of lime and phosphatic calculi are the two most common forms of stone met with in districts where the water is impregnated with large quantities of lime;" and that "the lime must be got rid of from the drinking-water; for, should it by any chance contain an excess of lime, its habitual employment will completely frustrate our best efforts at treatment." On perusing this, a previously dim and uncertain light became to me fixed and clear; not as yet, however, to attain the brilliancy of the lime or magnesian light, but perhaps sufficient by which to indicate other cases in which soft water, or water freed from lime and magnesia, would be of service in the prevention or cure of disease.

On referring to older works on urinary pathology, I find that in 1844 Dr. Golding Bird was the first to bring under notice the frequent presence of oxalate of lime in the urine of inhabitants of towns. In 1849, Dr. James Begbie pointed out the connection between oxaluria and imperfect digestion with sequent mental despondency. In 1850, Dr. Bence Jones said distilled water instead of spring water will lessen the quantity of lime passing through the body, and hence oxalate of lime in the urine. He also states that lime-water will cause phosphatic deposit. Sir Thomas Watson points out the risk from drinking water containing lime in oxaluria; and Dr. Atkin recommends, when oxalates appear in the urine, to avoid water containing lime. Dr. Harley, in the second volume of the *Medical Times and Gazette* for 1864, is, I believe, the first to show the imminent danger of lime in drinking-water in what was wont to be termed the phosphatic diathesis. My experience in the action of solvent remedies in gravel and calculi has not been so satisfactory as I could have wished; but, following the light shed by Dr. Harley, and acting by it whenever practicable, I am enabled to support the doctor's statements.

One patient, *e.g.*, with ammoniaco-magnesian phosphate and carbonate of lime sediment in his urine, has since been relieved by mineral acids and the use of soft water from Hamburgh, he fortunately being a sailor. Two others, by the same treatment and distilled water, are now passing acid urine, the physical signs of renal calculi are less urgent,

* Read before the Northern Branch.