ON THE TREATMENT
OF
ACUTE RHEUMATISM,
CONSIDERED WITH REGARD TO THE LIABILITY TO AFFECTIONS OF
THE HEART UNDER DIFFERENT REMEDIES.¹

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THE author of the paper about to be laid before this Society has, for several years, held the office of Medical Registrar, which made it necessary for him to watch cases of disease which, although of a similar nature, have fallen under the care of different physicians, and have consequently been subjected to diverse methods of treatment. A general conviction soon arose in his mind, which was shared by others who frequented the medical wards of the hospital, that the frequency with which acute rheumatism was followed by inflammatory affections of the heart, was regulated by the treatment to which the patients were subjected. The inquiry, of which the results are here given, was undertaken with the purpose of examining, in a rigid and impartial manner, the experience which has been accumulated during a certain term of years, as to the effects of medicine in this

¹ The paper was accompanied by an elaborate tabular analysis of the cases, which the Council of the Society, however, were not able to publish.
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disorder. The cardiac complications, as they are immeasurably more important in the long run than the severity or duration of the pain, have been regarded as the first object of the investigation. The author has no theories of his own to recommend. He can claim no credit beyond that due to an impartial observer and an honest chronicler of facts brought out by the experience of others.

The tables which are given extend over the five years beginning with the 1st of January, 1857, and ending with the last of December, 1861. They include those cases of acute rheumatism, which came in during that period, in which, on admission, the sounds of the heart were natural. These have been classified according to the treatment adopted, and the condition of the heart has been noted throughout. A few only have been omitted, of which the existing notes were too imperfect to afford a trustworthy result. The author has to thank Dr. Page, Dr. Bence Jones, Dr. Pitman, and Dr. Fuller, the physicians of the institution during the period selected, for placing their own case-books at his command, without condition or limitation. The freest use has been made of the permission thus liberally accorded, beside which the author has been able to refer to his own notes of the cases, extending over about half the time. The inquiry has been followed without any prejudice in favour of one plan rather than another. As the cases have been treated purely with a desire to benefit the patients, without any view to the deduction of therapeutical principles, the classification proved a much more complicated matter than if each patient had been regarded as a subject for a definite clinical experiment.

Every case presented on admission, or on the commencement of the treatment, the well-marked symptoms of acute rheumatism. This is stated at the outset, in order that much repetition may be avoided. It is also needful to state that in every case recorded there was clear evidence by auscultation that the heart and its membranes were as yet unaffected by the disease. As it has been the main object of the investigation to ascertain the effect of remedies in pre-

venting cardiac complications, the arrangement has not been influenced by treatment adopted in consequence of their occurrence.

Venesection.

The first table gave the results of eight cases, no doubt all severe, in which bloodletting was early resorted to. In each of them other remedies were also used. In all but one calomel and opium were given at intervals, and, for the most part, saline medicines as well. In three of these cases the heart became affected with endocarditis or pericarditis, in a decided manner. In one there was incomplete evidence of cardiac derangement. The heart therefore remained uninjured in only half the number. The cases remained in the hospital for periods varying from thirteen to eighty-four days, giving an average, under treatment, of rather more than forty-one days.

It would be easy to collect from various sources cases which would show that the liability to affections of the heart is certainly not lessened by venesection. Bouillaud, who is the great advocate of this method of treatment, and trusted to it almost exclusively, expresses an opinion that such complications are the rule, and not the exception.

Mercury.

The second table gave the result of six cases where the cure of the disease was entrusted almost entirely to repeated doses of calomel and opium, while in Tables 5 and 6 were seen the effects of the same medicines, aided by saline draughts, with and without nitre. The progress of the disease appears under each plan to be much the same. The three tables, giving together twenty-four cases subjected to mercurial treatment, afforded six examples of inflammation of the heart or its membranes, two of which proved speedily fatal. The patients who left the hospital alive remained under treatment, on an average, for thirty-seven days.

Remedies supposed to exert a specific action in acute rheumatism, excluding alkalies and their salts, with the vegetable acids.

The third table included fourteen cases which resemble each other more as regards the absence of the more ordinary methods of treatment than by the uniformity of the remedies used. Nitrate of potash was given in half the number, with results which will be shortly considered. Dover's powder, opium, belladonna, quinine, iodide of potassium and guaiacum were used in the remaining seven. The general result of these latter remedies may be stated as peculiarly unsatisfactory. The heart became involved in four of the number, and the duration of the treatment gave a mean of rather more than forty-six days.

These numbers are worthless as regards the merits of any individual remedy, but they may have their weight as compared with the results of the medicines which are here excluded.

As to the frequency of endocarditis after the treatment of opium, which is here only represented by one case, important information has been given by Dr. Sibson, in some tables published in the 'Association Medical Journal.' Twenty-one cases are here recorded, in which, when the treatment was commenced, the sounds of the heart were natural. Opium was administered in frequent doses, sometimes as much as a grain every hour, conjoined with other remedies reputed to have an effect in rheumatism. No less than fourteen of these cases—exactly two thirds—manifested while under treatment the symptoms of valvular or pericardial inflammation.

Independently of any direct evidence, it surely might have been inferred that opium would prove highly injurious in this disorder. It is known to impede the action of the great excreting organs within the abdomen—the bowels, the liver, and the kidneys. Much of the rheumatic virus which would ordinarily escape by these channels must therefore be retained in the system, at the risk of the structures most amenable to its influence.

Nitre.

The seven cases treated with nitre, without salines, alkalies, or mercury, give only one example of cardiac complication, and afford the unusually low average of twenty-seven days for the duration of the treatment. These few cases, then, speak well on both grounds for the action of the remedy. The same deduction may be drawn by comparing the cases treated with nitre in conjunction with saline remedies with those which had salines alone, or salines with so-called specific medicines, excluding nitre. The addition of the nitrate of potass thus appears to occasion better results, both as regards the duration of the disorder and the immunity of the heart, than follow the draughts from which nitre has been excluded.

Dr. Basham, in a paper printed in the 'Transactions of the Medical and Chirurgical Society,' has given the results of the treatment by large doses of nitre, assisted, however, by other remedies. His table gives sixty-seven cases where, on the commencement of the treatment, the heart was unaffected. In only six of these, a proportion of about one in eleven, did that organ become involved during the progress of the disease. The duration of the disease was not very different from what was observed in the cases here given.

Salines.

The difficulties which attend any classification which is founded upon the treatment adopted by different persons, in any disorder, make it necessary to limit the meaning of the terms used.

The term "saline" has been necessarily applied in a somewhat arbitrary sense. It has been used, however, with a precise and definite signification, which may be held to excuse the perversion of the word.

It appears that the salts which potass and soda form with the vegetable acids undergo such changes in the system as to become equivalent to the same, or nearly the same, quantities of the alkalies in combination with carbonic acid. Thus,

whether a certain quantity of potass is administered as citrate, tartrate, acetate or carbonate, much the same effect is produced upon the urine, and, it may be presumed, upon the system generally.

This axiom has been made the basis of the arrangement. All those patients who were treated with an aggregate quantity of such salts (potass and soda with carbonic and the vegetable acids) not reaching three drachms in the twenty-four hours have been considered as under *Saline treatment*. In this sense only has the term been used.

Those cases which were treated with these salts in quantities together amounting to three drachms, but falling short of half an ounce in the same period, have been characterised as under *Partial alkaline treatment*.

The table headed "Full alkaline treatment" was made to include patients taking in the twenty-four hours from half an ounce to an ounce and a half of the same medicines.

Sixty-two cases were subjected to the so-termed saline treatment. In by far the greater number of these other remedies were given in conjunction, and the tribe was broken up into families according to the particular medicines thus interposed.

The whole number gave seventeen instances of cardiac complication; a proportion of 1 in 3.6.

The general conclusion appears to be that saline remedies are ineffectual, either for the shortening of the disease or the protection of the organ chiefly endangered.

In the cases where the method has been used single-handed, the results are about intermediate between the successful and the unfortunate—seven cases afforded two examples of the inflammation of the heart, and remained under treatment, on an average, thirty-three days.

Saline medicines with nitre give somewhat better results in both particulars, but are not so successful on either ground as where nitre has been used alone.

Salines with repeated doses of calomel give a longer duration to the disease than follows the use of mercury alone, although as regards the liability to affections of the

heart the additions of the salts appears to work no alteration.

Salines with reputed specific remedies partake of the ill success which follow the latter medicines when used by themselves. Of six cases where Dover's powder was thus resorted to, the heart became involved in four. This closely corresponds with the disastrous results already shown to attend the use of opium.

It thus appears that the saline treatment has by itself little influence upon the course of the disorder. When it has been used in conjunction with more potent measures, the result has corresponded with the observed effect of the additional remedies when used independently.

Partial alkaline treatment.

When the doses of alkaline and decomposable salts have been increased to between three and four drachms a day, and these given without other remedies, though they do not lessen the frequency of the heart symptoms, yet they appear to lead the disorder to a more speedy termination. No such advantage, however, appears when the treatment is complicated by the addition of colchicum and other medicines.

In the total of seventeen cases the heart became affected in six, which is a rather larger proportion than appeared with the smaller doses of salts.

Full alkaline treatment.

The treatment thus described consisted in the daily administration of salts, such as have been already specified, in quantities which varied from half an ounce to an ounce and a half. Half a drachm of the acetate, with a drachm or a drachm and a half of bicarbonate of potass, dissolved in the *Haustus Ammoniae Acetatis* of the hospital pharmacopœia,¹ furnished a very ordinary form of prescription.

¹ This consisted of half an ounce of the *Liq. Amm. Acetatis* with an ounce of water.

This was given every four or six hours. Sometimes the medicine was made to effervesce by the addition of a little citric acid.

Salts of soda, the bicarbonate and potassio-tartrate, were resorted to in some of the cases.

Twenty-two cases thus treated yield a better result, as regards the duration of the disorder, than belongs to any other method. The number of days in the hospital is reduced to an average of twenty-five.

When the simplicity of the method has been departed from, the superiority as regards the shortening of the rheumatism becomes less striking. Twenty-six cases where the alkalies were given, with the addition, mostly, of colchicum, give an average duration to the disease exceeding by five days that obtained by the more simple plan.

It may be remarked, too, that where colchicum was used in aid of the partial alkaline treatment, the patients remained longer in the hospital than where the same system had been pursued without any such addition. It may, therefore, be concluded that, although this remedy appears to exert no especial influence upon the heart, yet it rather hinders than accelerates the cure of the rheumatism.

The great fact, however, which may be deduced from this investigation is unaffected by this incidental remark.

The total of forty-eight patients subjected to large doses of alkaline salts passed through the dangers of the disease with only a single instance of any cardiac affection. In this one exceptional case the sounds of the heart were noted as free from murmur on the day of admission. The stethoscope was not again applied until twenty-four hours afterwards, when a valvular murmur was heard. This was followed by a feeble friction sound. Ten days later, however, the sounds were again normal, and they so remained until the patient left the hospital.

A certain time must, of course, elapse before remedies taken into the stomach can affect the system generally. The occurrence, therefore, of this case cannot be held to weaken the conclusion which must be drawn from the forty-

seven other cases, in which the protection extended to the heart was complete.

The importance of this fact is such that it can scarcely be overrated.

Dr. Garrod, in a paper printed in the 'Transactions' of this Society for 1855, has recorded the results of the treatment of the disorder by bicarbonate of potass, as observed at University College Hospital.

This was given in frequent doses, amounting generally to an ounce daily. Twenty-four cases, in which, on the commencement of the treatment, the heart was unaffected, afforded three instances of rheumatic inflammation of the organ. This came on, in each case, before the medicine had been taken for forty-eight hours.

This result is not quite so satisfactory as has been obtained at St. George's, which is, perhaps, owing to the exclusive use of the alkaline carbonate. Nevertheless it must be regarded as a great success when compared with any different method of treating the disease.

The conclusion, then, must remain unshaken, that the carbonates of potass and soda, with those of their other salts which in the body must be presumed to be converted into the carbonates, exert an especial curative power over rheumatic fever, and if given in time, will completely protect the heart from the dangers by which it is surrounded. It is worth remarking, in connection with this subject, that, contrary to what would have been expected, no part of the protection which is afforded by full doses of alkali or of decomposable salts appears to be afforded by quantities which fall short of a certain definite amount. As far as the heart is concerned, "partial alkaline treatment" is useless.

Possibly the salts of ammonia may exert a similar influence to those of potass and soda, but as yet there is not sufficient evidence to lead to any conclusion.

Taking the proportion of heart affection under the alkaline system, 1 in 48, or including those treated with ammonia, 1 in 53, and, with this as a standard, reviewing the other plans of treatment, the result is sufficiently striking.

113 cases where other remedies were used give 35 instances of cardiac mischief, or a proportion of 1 in 3·2.

Nitre, next to the alkalies, is the most successful. It appears not only to shorten the disease, but to extend a limited protection to the heart. It reduces the frequency of cardiac inflammation to about one case in ten. On reviewing the action of the other remedies which have been credited with the cure of acute rheumatism, it simply becomes a question which is useless and which is injurious.

Mercury allows a proportion of cardiac inflammation of one case in four; saline medicines give in this particular a rather worse result. With bleeding, one half of the cases become thus complicated. Under opium the mischievous influence of the disease appears to attain its maximum. Two thirds of the cases, as it appears, manifest the symptoms of endo- or peri-carditis.

Excepting nitre and alkalies, it is scarcely possible to avoid the conclusion that the more active the treatment, and the more potent the remedies, the more untoward is the progress of the disease.

Saline medicines alone are better in effect than when mercury, colchicum, or Dover's powder, have been used as auxiliaries. When alkalies have been given, although in small quantities, a comparatively good result is manifest, which disappears when other remedies are conjoined. In the same way, full doses of alkali are robbed of some of their efficacy by the addition of vinum colchici.

It may be deduced from the mass of experience which the tables represent that acute rheumatism would be treated best by giving, at short intervals, a solution containing nitrate, acetate, and bicarbonate of potass, in such quantities that the two latter salts would together amount to, at least, an ounce in the twenty-four hours. Half a drachm of the acetate, with a drachm of the bicarbonate and ten grains of nitre, given in solution, every four hours, would fulfil all indications. At the outset of the treatment, so long as the urine remains acid, the medicine should be given in larger quantities or at shorter intervals. It must, of course, be need-

ful at the same time to pay regard to any symptoms peculiar to the individual case, especially such as show a loaded state of the bowels or defective secretion by the abdominal viscera.

It seems remarkable, with such indications as exist of a supernaturally acid state of system, that alkaline remedies were not resorted to by the older pathologists in cases of acute rheumatism. Perhaps this may be accounted for by the vague state of their chemical knowledge. Mascagni, in 1804, having observed how easily coagulable lymph could be dissolved even in a weak solution of the alkaline carbonates, was led to propose the use of those remedies in acute inflammatory diseases and in complaints of a more chronic nature, which he supposed were characterised by the effusion of the same material. The late Dr. Samuel Wright, of Birmingham, in a lecture on rheumatic fever, which was published in 1847, dwells upon the importance of correcting the acid state of the system and its secretions, stating that "the acidity is greatest where the inflammation is highest; that an increase of acidification is often a precursor of an increase of the febrile and inflammatory action; and that the correction of the former is often followed by a complete cessation of the latter." He then commends what he terms *the alkaline treatment of rheumatism*, expressly stating it to be "no novelty of practice," although he was not aware by whom first it had been recommended. The author of this paper has not been more successful in finding the earliest suggestions which preceded this important discovery. Dr. Wright states that he had, for many years, been in the habit of trusting to alkalies in this disorder, and contrasts the results obtained under their use with the inefficacy of methods more generally adopted. He was in the habit of ordering the bicarbonate of soda in comparatively small quantities from two to four drachms daily, and using in addition alkaline baths. He makes no mention of the immunity of the heart under this system. Dr. Fuller has worked out the discovery which Dr. Wright left thus imperfect, and in his work, published in 1852, claims for the alka-

line treatment, which in his hands was more boldly applied, the invaluable peculiarity which it possesses. The method thus advocated was further tested by Dr. Garrod, and the results brought forward in 1855 in the paper of which mention has already been made.

When it is considered how large a proportion of the multitudes who die every year from valvular disease of the heart, owe their fate to the progressive mischief initiated by rheumatic fever, we may appreciate the importance to humanity of any discovery by which this fatal alliance is forbidden.

Abstract of Tables, including 164 Cases.

Number of table.	Treatment.	Number of cases so treated.	Cases in which heart became affected.	Average number of days in hospital.	Cases which ended fatally.
1	Venesection, with other remedies	8	4	41	0
2	Mercury	6	2	29	0
3	Nitre	7	1	27	0
—	Repeated specifics (including guaiacum, Dover's powder, opium, iodide of potassium, and quinine)	7	4	46	0
4	Salines (less than $\mathfrak{z}$ ij of salts daily)	7	2	33	0
5	Salines with nitre	28	6	32	0
6	Salines with nitre and mercury	7	1	36	1
7	Salines with mercury	11	3	43	1
8	Salines with specifics	9	5	35	0
9	Partial alkaline (less than $\mathfrak{z}$ iv of salts daily)	8	3	28	0
10	Partial alkaline, with other medicines	9	3	40	0
11	Full alkaline (more than $\mathfrak{z}$ iv daily)	22	1	25	0
12	Full alkaline, with other medicines	26	0	30	0
13	Salts of ammonia	3	0	22	0
14	Incapable of classification	6	1	65	0