Thesis

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On Valvular Disease of the Heart

There is no subject in medicine more deserving of careful study than valvular disease of the Heart. Our knowledge of this deadly malady, though very considerable to what it was within recent years, is still far short to what the least sanguine amongst us should like it to be, especially with regard to treatment. So far as the power of making an accurate diagnosis is concerned, I do not think there is any disease in which the profession has made such energetic and

laudable strides. This is to be considered all the more valuable, as in all cases an accurate diagnosis, or in other words the discovery not only of the name of a complaint, but of everything of a morbid nature under which your patient is suffering, is the greatest help and the truest guide to successful treatment, the chief aim of all study in medicine. In most cases increased knowledge as to cause of disease, gives increased ability in the treatment of that disease. There are however, amongst the maladies to which human flesh is heir to, affections in which a profounder knowledge as to their character, cause &c, has not enabled us to be proportionately successful in their treatment. Cancer & heart diseases may be cited as examples.

The number of patients, who in spite

of our utmost efforts are smitten down with these complaints; so, or ought to be sufficient to stimulate us to renewed exertion, even though our success has hitherto been anything but satisfactory. We ought not to give up in despair, but on the contrary take every opportunity to ventilate the subject well, in the hope that we may eventually be able to give more lasting relief, and if possible prolong life. Conscious of my own inability to throw any new light upon the therapeutics of this grave disease, I yet desire to raise the question, in order that we may see what it is we do know, and endeavour to lay out the course of treatment that ought to be adopted consistent with that knowledge

The subject of Valvular disease of the heart is too extensive to be considered in detail. I shall confine myself to its Causation, Clinical history, and treatment. Its anatomical & pathological characters, prognosis & diagnosis, shall only be referred to as it may be found necessary to elucidate other points

Causation

Diseases of the heart are supposed by many to be more common now than in former years. I do not, however, think that this is so, nor can I see why it should be so. It is not unlikely, some say, that the greater degree of excitement to which the people of our age are subject to in connection with a more active and stirring life, may in some degree account for its greater frequency.

An investigation into this point will throw doubts on the truth of it. I believe that the increased means now in our power of making a diagnosis in this complaint, have enabled us to recognise what in former years we could not appreciate. So far as I am aware, heart disease has not become more common since we have been able fully to recognise its existence, nor does it appear to be more common among those who pass their lives in the midst of the greatest excitement of body & mind, viz. our active business men.
My own experience though limited leads me to believe that it is as common, if not more so, among the labouring class, who undergo less of the worry & anxiety of life than the former. I rather think that the main

cause of heart disease is to be looked for internally & not externally, that there is a diathesis that tends to produce it. Though not a common complaint in early years, cases of acute disease have been met with in children of two years old. The bustle & excitement of an active life could not have produced it in those cases. It is a disease that is very apt to prevail among different members of the same family. We know that Rheumatism is in nine-tenths of the cases the fore-runner of heart disease, and all authorities acknowledge a Rheumatic diathesis. This diathesis may be congenital or acquired, but in the larger proportion of cases I believe it to be congenital. As Already said the endocarditis resulting from acute Articular Rheumatism, is the origin of most cases of heart disease. On the other hand, though the cases

are relatively few, valvular disease may arise from atheromatous or calcareous degenerations, and from atrophy, irrespective of endocarditis. I am inclined, however, to think that such degenerations are in most cases the after effects of a previous inflammation. It is also possible that endocarditis may have existed apart from acute articular rheumatism. It is perfectly within the limits of reason to suppose that a constitutional state which is not sufficient to produce acute articular rheumatism in its entirety, & therefore overlooked as a case of such, may have been sufficient to produce its usual concomitant endocarditis. On this point it is difficult to obtain reliable information, as uncomplicated endocarditis may exist without

being appreciable to the patient, & therefore without medical advice being sought for. In most of the cases of acute articular rheumatism that I have attended, when endocarditis was present, the patients themselves might probably complain of a little pain in the region of the heart, but so much less than that which they experienced in the joints that they counted it as nothing; and in many cases no cardiac pain was complained of whatever. It is only upon the statement of a medical practitioner that we can believe simple endocarditis to have existed; whereas the statement of a patient may be credited as to his having had Rheumatic fever, and from that we may infer that ~~the~~ endocarditis was likely to accompany it.

Endocarditis it would seem, whether rheumatic or simple? is the chief

cause of that departure from the normal integrity of the valves, which in the course of years ends in their permanent disease, and it has been seen that this destructive inflammation is in nearly all cases secondary to acute articular rheumatism. We cannot help therefore being driven to the conclusion that the cause of articular rheumatism, is in most cases the ultimate cause of valvular disease of the heart. What then is the condition that gives rise to Acute articular Rheumatism. Some suppose it to be an excess of one clothes of lactic acid in the blood. The latter opinion has by far the most supporters. From the comparatively more frequent occurrence of endocarditis upon left than upon the right side of the heart, it is probable that

the morbid material is generated during the passage of the blood through the lungs, and that it becomes eliminated or decomposed during the systemic circulation, before reaching the right side of the heart. This supposition has been verified by experiment. Lactic acid has been injected into the peritoneal cavity, and endocarditis produced on the right side of the heart while the left remained free. This also renders it highly probable that the morbific agent is lactic acid. Going back to the fountain head in this way, I cannot help thinking that there is a common cause in the production of Acute Articular Rheumatism and Valvular disease of the heart, viz an excess of lactic acid in the blood. It is like the different steps of a ladder; at the bottom you have the lactic acid in the blood, a step

or two further up you have acute
Articular rheumatism with coex-
isting endocarditis, and valvular
lesions discoverable by physical
signs only, and at the top you
have valvular disease established
so as to embarrass the patients
actions & threaten life.
In thus far considering the
Causation of cardiac disease,
I have been drawn into its
Pathology. Looking at it in
the light that I have rep-
resented it, the original de-
parture from the normal con-
dition which ends in the de-
velopment of the disease, seems
to be an excess of lactic acid
in the blood. It is therefore
originally a blood disease,
and its pathology consists
of an excess of that acid in the
blood. Though this point is
not yet demonstrated by absolute

proof it is accepted by most writers. But adopting it to be true, what is that morbid condition that leads to the production of that acid in the blood. So far as I know we are unable to answer that question. It is undoubtedly due to changes within the system itself, and not to any outward cause. From what I have already said it is probably due to some change in the blood constituents during their passage through the lungs. It has been supposed that lactic acid is formed by the destruction of sugar in the lungs, and it may be that that power of destruction goes on too energetically, or that after lactic acid is formed, some other substance that ought to neutralize it does not exist in sufficient quantity, or not at all. This is a mere theory assumed

to account for it, still I believe it to be the path in which the truth lies at present hid from our knowledge. I hope, and do not doubt, that future researches with regard to the chemical actions that take place during the passage of the blood through the pulmonary organs, will remove all uncertainty on the point, and render it not a mere theory but a theory that has been demonstrated by proof.

Clinical History

The clinical history of valvular disease of the heart varies greatly in different cases, according to the valve which is primarily affected. There are certain points common to all cases, but the order of the symptoms and the

number of them differs greatly in different cases. The clinical history will here be considered to that extent only that will enable us the more readily to understand what is rationally indicated in the treatment.

The symptoms of heart diseases are very insidious at their origin, and they do not as a rule give much embarassment till they have excited a considerable time. The murmurs themselves, pure & simple, do not at first give rise to much uneasiness. It is only after the lapse of time when, by their presence, they have gradually changed the organ as regards internal capacity, thickness of walls, external size, that the graver symptoms are developed. The first of the changes that are produced in a heart with diseased valves are conservative, & it is not until dilatation is pro-

duced that the danger to life becomes great. Medical men are rarely consulted till symptoms which endanger life, & ultimately prove fatal manifest themselves. Hypertrophy & dilatation are results that diseased valves never fail to give rise to. Hypertrophy is a condition that is gradually developed, and the patient becomes gradually accustomed to it, and although with such a condition present he may feel the heats action rather strong, he does not usually seek advice until it has attained to a great degree. Dilatation never exists without compelling the patient to seek relief, and occasioning great danger. The former is conservative and is attended with uneasiness, the latter is destructive and

is attended with great distress. In most cases of heart disease Hypertrophy & dilatation are combined There appears to be a limit to the growth of all muscular fibre, and it is when Hypertrophy ceases and dilatation goes on that the really grave symptoms commence At the very origin Hypertrophy takes precedence of Dilatation, but from the increased and increasing inward pressure of blood the latter condition is rarely long in accompanying it. The duty which the heart has to perform is to carry on the circulation, and if that organ be changed in itself, a change in the circulation must necessarily accompany it. Every symptom developed in the course of this disease, is clearly traceable to the abnormal distribution of the blood by the diseased organ. The functions of all the organs of the body become

embarrassed through the heart,
though they may be at the outset perfectly healthy in themselves

I will consider in the first place disease of the mitral valve as it is most common, and trace the changes in the system and the symptoms that result from those changes. In this form of the disease the burden falls primarily upon the lungs. In mitral regurgitation there is a reflux of blood through the valve during the contraction of the ventricle into the left auricle, causing over-repletion & distention of it. No valves are attached to the pulmonary veins, and the blood in consequence becomes stemmed along them. They are also in a full and distended state. The evils which arise thus far are not so great

as those which succeed. Embarrassment to the pulmonary circulation is the next result, and this leads to difficient oxydation of the blood, and dyspnoea. According to the amount of embarrassment in the circulation, so will be the amount of the dyspnoea. As a rule Orthopnoea becomes finally established. Haemoptisis, pulmonary apoplexy, Hydrothorax are also results of this embarrassment from congestion, and when present increase the danger. The want of sleep & rest is in these cases very distressing. Night after night is spent in restless anxiety. In some cases rest can only be obtained by sitting up & leaning forward with the elbows upon the knees. These symptoms arise from the fact that a certain amount of blood which ought to leave the ventricle by means of the aorta, goes backward in an abnormal

direction. In a correspondingly backward direction does disease become stamped. If life be further prolonged and it very often is. the right side of the heart becomes affected. The pulmonary artery and right ventricle are distended. They cannot get quit of their blood, seeing that the road which it ought to go easily, has been obstructed & become only partially passable. The ventricle exerts itself unusually to overcome this onward impediment to the circulation, becomes hypertrophied & finally dilated. The tricuspid valves become now insufficient, and a new set of symptoms arise from embarassment to the venous circulation. Chief among which is general dropsy. This dropsy is purely mechanical, and is caused by the increased hy-

draulic pressure within the veins. The lower limbs & scrotum attain in many cases to an enormous size. Fissures & ulcerations may occur allowing an abundant drainage, and giving for the time great relief.

Another characteristic symptom occurring at this time is pulsation of the superficial veins of the neck, more especially on the right side. This is no doubt due to overfilling of the right auricle and upper vena cava, and upon the contraction of the ventricle the pulsation is sent through the valve, auricle, & vena cava, and thence into the superficial veins of the neck. This pulsation is also sent into the deep veins, but owing to their depth it is not manifest.

I have hitherto traced the changes from mitral disease in a backward direction, and will now look to what effect is produced in the onward

circulation and what symptoms
are connected with it.
Less blood is sent into the aorta
than should be by that amount
which is sent back into the left
auricle. The pulse is in these
cases intermittent, and the beats
are irregular as to force. The
Sphygmograph gives results
which would indicate quick-
ness of the ventricular systole,
deficient arterial tension from an
inadequate quantity of blood being
sent into it, but more from its being
unable to retain that which it
does get; and irregularity, from
irregular blood supply by
the ventricle.
In the consideration of Mitral
& tricuspid disease I have only
referred to regurgitation. An
obstruction of these valves though
distinct and easily diagnosed
by the A.S. murmur, the symptoms

& results are much the same. I do not therefore consider it necessary to enter further into that point in giving the clinical history.

Two valves yet remain to be considered, those that chiefly enter into, or are totally concerned in the production of the second sound of the heart viz the aortic & pulmonic valves. Disease of the former is by far the more common & presents special characters, that of the latter is extremely uncommon, and has no features needing here a special consideration.

Disease of the aortic valve whether obstructive or regurgitant leads in the first place to hypertrophy of the left ventricle. The patient experiences a feeling of inconvenience & uneasiness from the increased power of the heart action. This hypertrophy is truly conservative in many ways. It enables the heart to carry on the

circulation better than it could a were its action weaker; it prevents the speedy dilatation of the ventricle which would soon follow were its walls not thickened & strengthened against the constantly increasing pressure; it preserves so long as it continues the integrity of the mitral valves; it retards the dilatation that ultimately follows, and postpones the symptoms that arise from the backward progress of the disease to the lungs, which in most of those cases is a sure sign of approaching death. In cases that begin with aortic disease alone, life is rarely prolonged till the right side of the heart is affected. The symptoms arising from pulmonary congestion are not so common in this form of the disease, as in mitral lesions.

Pain is much more marked in
Acute than in mitral lesions, &
the former is much oftener accom-
panied by those distressing paroxysms
known as Angina Pectoris.
It is exceedingly probable, that
partial paralysis of the heart
arises from accumulation of
blood within the ventricles, is
the cause of these paroxysms. The
radiating pain which attends
them may be caused by the com-
pression of the numerous ganglia
of the heart between two powers,
one active and the other passive,
viz the active contracting ventricles
and the passive mass of blood
which opposes it. There two powers
exist to a less degree normally
but it is the intensity of the ~~[illegible]~~ resistance of the blood
& the outward contraction of the
ventricle that is supposed may
cause the actual pain.

These attacks become progressively more & more frequent. In a patient that I attended they commenced by occuring once a day, and before death they took place every half hour or so. The symptoms attending them are most distressing. I happened to be present during several of those attacks, and the following is a description of what occured. Feeling the approach of one the patient suddenly threw both of his legs over the edge of the bed, and grasped the bed-clothes with both his hands. The pulse before the occurrence of the paroxysm was 96, & during it, it fell to 35. Aproxer was marked, he gasped suddenly as if choking, though there was no difficulty in drawing air into the lungs. His urine was passed involuntarily.

I kept my hand on the pulse during the attacks, and as soon as it began to quicken under my finger he began to get relief. The attack lasted only about a minute.

From these facts I am inclined to think that the dropping of the pulse from 96 to 35 suddenly, shows a partial paralysis of the heart; that this paralysis is caused by an accumulation of blood within the ventricles & overpowering them; that the difficulty of breathing is the result of the nearly paralyzed circulation through the lungs; and that the patient recovering simultaneously with the quickening of the pulse, shows that the attack is clearly traceable to the causes, that gave rise to its sudden lowering.

The pulse & aortic regurgitation is very characteristic and distinctive. The artery strikes against the finger

placed over it with quickness, and melts away under it almost as quickly. It has not got the bounding elasticity of the normal pulse. This is due to the fact that the force of the arterial tension derived through the quadrupeds of blood propelled into it by the ventricle, is lost back through the regurgitant valve by the way in which it came. The valve ought to act as a barrier to prevent the elastic tension of the artery sending any of its force back into the ventricle. In its diseased state it does not do so. The arterial tension derived from the ventricle is the power, but it has lost its footing. All the power ought to be exerted in an onward direction, but the greater part of it goes backward. The arterial tension is diminished by exactly

the force of the regurgitant current. In this way it is taken last; and the force that ought to give you a long and sustained pulse, not only does not do that, but even meets the original force coming again from the ventricle, and to some degree counteracts it. The gradual fall of the artery under the finger in health, is the result of the gradual sustained arterial tension.

The function of the other organs of the body suffer more or less from the congestion that is apt to become universal.

Albumen may be found in the urine though this is by no means common, and the quantity of urine passed is somewhat scanty.

Haemorrhages are predisposed to occur from mucous surfaces.

The Stomach ultimately participates in the general derangement.

The appetite & digestion become impaired. Nutrition is, however, for a long time well kept up and emaciation is not by any means a marked symptom in this disease. It contrasts in this respect strongly with Phthisis. The gravity of the Complaint & the appearance of the patient rarely coincide

Treatment.

In few diseases are we attended with less success, than in our treatment of valvular affections of the heart. In considering the means to be adopted for a beneficial end, we require to ascertain the condition of the heart with regard to the lesions that may at the time of treatment exist, and also con-

sides what symptoms are present, and demand attention. In all thoroughly established cases we are unable to do more than relieve & palliate; and even that in many cases we fail to do to any extent. In the valvular affection that accompanies Acute Articular Rheumatism, there are no subjective symptoms that call for treatment. There is, however, a most objective one, in the murmur which the Physician discovers. Ought we to treat that latter symptom. The value of that question according to some cannot be overestimated. Can we by appropriate means prevent that further development of the disease, which ends in laying the patient low under the most grave of subjective symptoms, or can we in these cases prevent entirely the occurrence of that

endocarditis which occasions the murmurs, and which is the origin of so many cases of heart disease? According to some we can, and if we can it is only in this stage that treatment may be said to be curative. If we can prevent its occurrence that is a cure & the highest of cures. Prevention is better than cure and ought always to go before it, especially in the cases now under consideration. The cure of valvular disease is impossible, and this enhances its prevention, if prevention can be enhanced.

Dr Fuller claims for the alkaline treatment fully carried out, complete prevention of endocarditis in cases of Acute Articular Rheumatism. The importance of this statement, if true, cannot be too strongly impressed on the

Profession considering the number of cases of valvular disease of the heart that originates in this affection.
My own experience on that point is too limited to give an opinion. So far as it goes, however, it has strengthened my belief in its truth. Such a mode of treatment is rationally indicated in view of what is looked upon as the pathology of the disease, viz. an excess of lactic acid in the blood. It is not unreasonable to suppose that if endocarditis be due to the above condition of the blood, which renders the valves of the heart predisposed to that inflammatory attack; the establishing a condition antagonistic to it will neutralize that predisposition. & by doing so remove the cause & prevent the disease. The alkaline treatment in these cases is that which is most popular at the present time, and I believe that it deser-

vidly occupies the first place. It becomes therefore a matter of great importance to commence early, & carry out efficiently the alkaline treatment in cases of Rheumatic endocarditis. Large doses of an alkali should be given at the commencement, and after the condition required has been produced a much less quantity is sufficient to maintain it. The urine ought to be rendered alkaline in 12 or at the furthest 24 hours and that condition faithfully kept up. In too many cases this mode of treatment is carelessly followed out; it is commenced too late & and given up too soon. I have very little doubt in saying that were the alkaline treatment more efficiently carried out in cases of acute Articular Rheumatism, we would have fewer of these

cases of disease values which march their patients steadily to an untimely end.

I will now pass on to the consideration of the more advanced stages of valvular disease, & the symptoms associated with it.

Different cases differ remarkably as as regards the gravity of the symptoms. The distress of the patient is not always proportionate to the fatality of these symptoms. The patient may be going about his ordinary work feeling very little put about, though a murmur is very apparent, & may have been so for a considerable time. On the other hand the disease may be of recent date, and yet symptoms exist that threaten life. Death may take place equally sudden in either case. There seems to be great differences in different systems for withstanding the progress of the disease after it has

commenced. The Dyspnœa and other pulmonary symptoms are among the first to arise and claim remedial agents. What is sought to be obtained in these cases? It is the relief of the dyspnœa by the removal of the congestion & œdema that gives rise to it. The dyspnœa is not due to the difficulty of taking air into the lungs, but to the difficulty of getting the blood to take up its proper amount of O. and pass on as soon as it has done so. The defect is in the circulation. Active exercise is to be interdicted, as by quickening the heart action it adds to the embarrassment in the circulation, & increases the dyspnœa.

The remedial agent that I have found most successful in these cases is the exhibition of a diuretic. Digitalis has long been considered a cardiac diuretic, and the recent

opinion y to being a cardiac tonic further recommends its use. Combined with the Salts y Potash I have found it to act admirably. I will relate one case in which such a course was followed with marked benefit J. M. 58 years y age. stout and healthy in appearance, had been unable for any exercise for a considerable number of years. He suffered from disease y the mitral valve. The dyspnoea was very great, amounting almost to orthopnoea. I laterally he had been constantly confined to bed. He was under the impression that he was suffering from disease y the lungs alone, as he was constantly spitting up blood, and accordingly consulted me with a view to that point. He experienced a good deal y thirst from the saline taste imparted to the mouth from the blood, and drank largely y water to quench it.

I ordered the pig of water from which he was constantly supplying himself to be removed, and put him upon the medicine referred to. Before a week was over great improvement was effected. The breathing was relieved and the spitting of blood ceased By the end of a fortnight he was much better than he had been since the commencement of his complaint. He was now able to lie down in bed. to procure refreshing sleep, and to get up and take exercise in the open air. He could do neither before this treatment was commenced. Such a case as this is very instructive. It establishes theory by practice. Theoretically such a mode of treatment is indicated; & practically the accuracy of the theory is borne out. The load which the heart has to bear is the circulation. In such

a case as I have related it was too great for it. By reducing the mass of blood we reduce the load, and lighten the work the heart has to do. It manages to circulate through the lungs more freely that amount left after the action of the diuretic, than it could the former large quantity.

Dyspnoea arises from a deficient supply of Oxygen, and it is through the lungs we procure this gas. By establishing the pulmonary circulation, we are enabled to have a much larger supply of it carried into the circulation. It is without doubt true that in these cases along with a deficient supply of Oxygen we have an excess of Carbonic acid gas in the blood. It is not an easy matter to say to what extent the excess the one or the deficiency of the other contributes to the production of the

Pathological condition. We know that Animal life cannot be maintained in an atmosphere y Carbonic acid gas, and we are equally aware that life cannot exist without a sufficient supply y oxygen. While admitting that both these conditions contribute their share, I am inclined to think that the dyspnoea is chiefly due to a deficiency y the latter gas. So far as the treatment is concerned this question is immaterial, as y placing the system in a condition in which it can receive more oxygen, we also facilitate the means of getting quit y Carbonic acid, seeing that the one is thrown off proportionately as the other is absorbed.

While we reduce the blood as regards quantity we ought to

maintain its integrity as regards quality. The diet ought to be nutritious, and as dry as is compatable with with the comfort of the patient. It is perfectly essential to insist upon the latter point as all your efforts by diuretics will be useless, if fluid be taken to any great extent. By such a method we gain two points; the heart is supported & strengthened, & the work that again has to perform is considerably lightened.

General dropsy is a symptom that frequently if not always calls for treatment. When it is remembered that this dropsy is mechanical, & results from too great pressure within the veins, by obstruction to the venous circulation, it will be readily understood that the same indication for diuretics exists. It is quite a different kind of dropsy from that which attends Bright's disease

In the latter the blood is abnormally aqueous, the blood serum is deminished in density, and dropsies take place without any increase of pressure within the veins. Deuretics in heart dropsies by lessening the mass of blood deminish the pressure which is the cause, and a diminution of the dropsy itself must necessarily follow. They also act beneficially by relieving the congestion of the kidneys, & thus enabling those organs to respond more effectually to their action.

If we cannot depend on diuretics and often we cannot from the state of the kidneys, we must have recourse to other means. Of these the most effectual are hydragogue cathartics. They can always be relied upon to reduce in some measure

dropsical swellings; but we are unable to continue them ~~from~~ for any length of time, as they lower too much the patients strength and cause great depression. When the one class of remedies wont act we must try the other, but diuretics should always have the first trial, as when they do act, they do so more effectually and cause a less waste of strength.

It may sometimes be advisable to make small punctures with a needle in greatly distended limbs and scrotum, especially in cases when diuretics wont act, and when the patient is too weak to stand the action of cathartics. It gives marked relief for a time, and where we see that life is merely a question of a few days I think it is a course of treatment that ought to be adopted. I do not, however, approve of punctures

early in the disease, a before other means have been tried, as they are apt to produce a low form of inflammation & possibly gangrene. The minor symptoms such as cough, must be treated upon general principles. Another symptom that calls urgently for relief is the distress that attends the want of sleep and rest. If the previous treatment has been adopted an amount of relief will be given in this respect in most cases. Where such a course is ineffectual I have given most grateful refreshing nights by the subcutaneous injection of Morphia. One injection will often be followed by two or three good nights. It is, however, a remedy to be used sparingly, and not resorted to unless the distress be very great.

I am perfectly well aware that there is danger in connection with it, but there is also great danger without it, and seeing that that is so, we are entitled to use all the means in our power to relieve the patients suffering.

George Caldenwood

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