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MITRAL INSUFFICIENCY.

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A Clinical lecture by Chas. W. Hickman, M. D., Lecturer on Diseases of The Eye, Ear and Throat, in the Medical department of The University of Georgia, Augusta, Ga.

Delivered at the Clinic of the Medical College.

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GENTLEMEN—We have before us to-day, a case of great interest, and one demanding our closest study and attention; namely that of a valvular lesion, an insufficient action of one of the heart valves, upon which our life is so dependent.

In order to appreciate fully what is before us, it is necessary first of all, to hold constantly in view, the construction and workings of the important organ with which we wish to deal.

The heart is a muscular aparatus, or more properly speaking, a series of muscular chambers combined in one, while its action may be compared to that of a force-pump, its object being to distribute blood throughout the entire body. It consists of two smaller receptacles on either side, the right and left auricles, and joined to them two larger ones, the right and left ventricles, into which, the blood pours and the forcible contraction of which, gives to the organ its well known force pump, or driving engine properties.

The superior and inferior *Vena Cava* pour the dark Venous blood into the right auricle, from thence it passes through an *auriculo-ventriculo*, opening into the right ventricle, by the contraction of this it is thrown through the pulmonary artery at its top to the lungs, there to be vitalized by receiving oxygen from the air. Teeming now with life-giving properties, it returns by means ofthe pulmonary veins to the heart, emptying into the left receptacle or auricle, and from thence passing into the left ventricle, the contraction of which latter, sending

it through the *aorta* at its top, the first great artery of our system, and into all its ramifications and sub-divisions.

Having now accomplished its work, having given up its life and health to all portions of the body, the blood is to all intents and purposes, dead without its oxygen renewed.

The *venules* then collect it from all parts, pour it into the smaller veins, and from thence into the larger, and so on until it again returns into the ascending and descending *Vena Cava*, again to pass into the right auricle and to go its round as before.

For the completion of the mechanism of such an organ, it is necessary during the play of the ventricles, that some arrangement should be made to prevent a return flow of blood from whence it came, Just such, do we find in the valves placed at the *auriculo-ventriculo* openings, on the right side the tricuspid, on the left, the mitral. As the Ventricles contract the closure of these orifices by these valves, completely prevent a return flow of blood. At the pulmonary artery and aorta, we find three valves semilunar in shape and so arranged, that as the Ventricles dilate, their falling together effectually shuts off a backward flow of blood.

The perfect action which the heart exhibits, is indeed wonderful, Although in reality a double organ, its action is that of one. The two Ventricles contract together, and dilate together, then comes a short period of rest; this process occurs about sixty-five or seventy times in the course of a minute.

In the examination of a heart, a thorough systematic method must be observed throughout, or else we will constantly encounter innumerable difficulties. As various methods are given for this purpose, some rather confusing to a student, I wish to describe the most perfect with which I have ever met, one formed rather from a combination of the most perfect, and calculated in the main, always to yield up the wished for results.. In so doing, I mainly follow the precepts of my honored Master, and that prince of teachers "Schrötter",*

First, by inspection of the heart region a few points may be gleaned in regard to the position and character of the impulse as well as anything of an unnatural appearance in that neighborhood.

More important still are the results obtained from palpation

* Professor Extraordinary and Successor to the Clinic of Oppolzer, in the University of Vienna.

or placing the hand over the seat of the organ. In this way may not only the position of the impulse be more accurately determined, as well as its character more readily appreciated, but also a peculiar trembling movement (the purring tremor of Laennec,) or a rougher feeling reach the hand at times, and almost always indicative of mischief.

Far more important though, are the results obtained from percussion of this organ. You will bear in mind that the heart lies obliquely in the chest, behind the lower two thirds of the sternum, and projecting over towards the left side. The right lung extends to the middle of the sternum. The left does the same, as far as the fourth costal cartilege, when its boundary line ceases to extend so far, leaving a portion of the heart uncovered, which mainly consists of the lower portion of the right ventricle, with the apex of the left. In percussing a heart then, the first thing to do, is to find its apex. This is done by placing the hand over the chest wall, when, at a point corresponding to an inch and a half to two inches below the left nipple, and somewhat to the inner side, its beat against the chest wall is felt. In order to insure ourselves against error, let us commence percussing from the outer side towards the point taken for the apex, and upon reaching it if we have been correct in our surmise, the clear note of the lung tissue is immediately changed for the dull sound of a solid organ. Let us now crrry our percussion obliquely upwards towards the sternum, upon reaching the edge of which, or a little over, the clear lung note again strikes our ear. This brings us to the right boundary. To find the upper boundary, we commence below tne middle of the clavicle, and proceed downward over the lung until at the lower border of the fourth costal cartilege, a dull sound tells us that we have reached the point sought. Although as we can see, this does not give us the actual size of the heart, but only that portion left uncovered by the lungs, but yet we find that it answers for all practical purposes.

Equally as great, if not more important, results do we obtain from a close study of the heart *sounds*. The ear placed over this region receives two sounds, the first occurring during the contraction of the Ventricles, or as we commonly express it,

the *systole* of the heart, and produced mainly by the closing of the *auriculo-ventriculo* valves, although the contraction of the ventricles and bound of the heart against the chest wall, aid in its formation; the second occurring during the dilation of the Ventricles or *diastole* of the heart, and produced by the sudden falling together of the semilunar valves of the pulmonary artery and aorta.

If we wish to separate the sounds of the individual valves, we listen for the tricuspid at the lower portion of the sternum, for the mitral at the apex. The semilunar valves of the pulmonary artery, are best heard in the second intercostal space near the left edge of the sternum, while the ear is carried to the second intercostal space of the right side to catch the play of the aortic valves.

In disease, the heart-sounds vary greatly from what they are in health, and this condition makes itself known to us by more or less blowing sounds commonly classed under the term of *murmurs*. These vary greatly both in intensity and character, and may be so low that the ear can scarcely detect them, or, may be so loud as to be distinctly heard at some distance from the patient. They may be soft and musical, or harsh and grating. In order to appreciate any deviation from the normal sounds and the meaning conveyed thereby, it is important to have constantly at our fingers ends (so to speak), the events taking place during the systole and diastole of the heart. At the moment of the systole, the two ventricles contract, producing the impulse against the chest wall, the *auriculo-ventriculo* valves close and the blood rushes along the pulmonary artery and aorta. At the moment of the diastole the ventricles dilate the blood passes from the auricles into the ventricles and the semilunar valves guarding the orifices of the pulmonary artery and aorta, suddenly close together producing the short abrupt second sound of the heart.

The first question always to be answered then is, does the murmur we hear occur during the systole or diastole of the heart, and this point undetermined, the mere fact of hearing a murmur gives us very little, if any, aid in the examination of our case. Nor is this by any meads so easy as it may seem at first sight. If the heart would only beat as in its natural condition,

giving us a murmur in one or the other of its sounds, we could then easily tell to which the murmur belonged, but unfortunately in its diseased state its action is often so stormy and rapid that it becomes a matter of considerable difficulty to tell where it belongs. We sometimes hear of a pre or peri systolic or diastolic murmur, and that such and such is the case, because a pre systolic or a peri systolic (or diastolic) murmur is at hand. I wish to impress upon you that if we are only sure that the murmur belongs to either the systole or diastole it is a matter of no importance whatever whether it be pre, peri or anything else. As before stated however, this is at times a matter of considerable difficulty and as the prolonged sounds seem to run into each other to a degree indeed perplexing to an auscultator, we do find that by separating a pre systolic from a peri diastolic or a peri systolic, from a pre diastolic murmur, a certain amount of aid may be given us in isolating the abnormal sounds.§

The next question which naturally strikes us is, whence comes this murmur, and to what is it due, which valve is at fault, or is any valve at fault; and as this brings us at once to the examination of our patient, let us se if the symptoms as they present themselve, together with the physical signs we obtain, will not give us all we require to fully understand the case as it really exists.

The patient comes to us complaining of shortness of breath, asthmatic attacks, these attacks brought on by the slightest exertion, pain at the same time being frequently felt over the heart region accompanied by palpitations greater or less in degree. Adopting the method shown, we find that inpsection does not gives us as much aid as is usual in these cases, but palpation reveals the heart's impulse instead of being in the fifth intercostal space somewhat to the inner side of the line from the nipple, to be in reality nearly an inch and a half to the outer side. Percussion not only confirms this, but tells us also that its line of dullness extends almost to the middle of the sternum, showing the heart enlarged in its transverse diameter. On placing our ear over the chest, instead of the two clear ond distinct tones, we always get from a healthy heart, we receive a prolonged first sound, in other words a *systolic*

§ Note; The manner in which this is more clearly shown to students, cannot at present, well be represented without an especial diagram for the purpose.

murmur, but with the second sound remaining unchanged.

Closely listening to the different valves, we soon recognize this murmur as loudest at the apex, telling us of trouble at the mitral valve.

Still attentively listening, we notice that the second sound, although everywhere clear and distinct, has nevertheless a decided accentuation over the pulmonary artery. What then do these facts tell us, and what conclusion may we draw from them? If we are sure that the heart is enlarged in its transverse diameter, that we have present a systolic murmur, heard loudest at the apex, accompanied by a decided accentuation of the second sound over the pulmonary artery we may with all certainty know that we have to deal with an imperfect action of the mitral valve, an action insufficient during the contraction of the left ventricle, to prevent the blood from pouring back into the left auricle. Let us look a little further into this.

The increased amount of blood which reaches the left auricle distends and enlarges it. This reversed pressure, so to speak, continuing through the pulmonary veins reaches the lungs and from thence extends through the pulmonary artery to the right ventricle, and unless here arrested by the compensating action of this latter, reaches the right auricle and finally the entire venous system producing numberless troubles into which, we have not time at present to go. We can easily see then that the compensating action of the right ventricle necessarily tends to its hypertrophy. In addition to this the left ventricle being over-filled with blood during its dilation from the engorged left auricle, naturally works under a high pressure and becomes enlarged. Hence the increased area of percussion dullness. The increased column of blood, also, thrown upon the semilunar valves of the pulmonary artery gives rise to the accented second sound heard over this region.

Some time back, at our clinic, we had a case of insufficiency of the aortic valves, as well as what is quite rare, one of stenosis of the pulmonary artery, and did time permit, the differential diagnosis would be interesting in the extreme, but this unfortunately we must defer for another lecture.

A few words in regard to the treatment of this affection. Unfortunately the heart cannot be taken out and its valves repair-

ed, or a new one put in as a pump sent to a plumber, yet, for all that, much may be done towards comfortably prolonging the life of our patient, and greatly relieving the unpleasant symptoms to which the insufficiency gives rise. The tendency of the affection as the rule, is not bad, and the patient carefully warned to observe a few hygeinic rules, may live a lifetime of comparative comfort. So long as the compensating action of the right ventricle is well kept up, so long have we nothing particularly to fear. All our attention therefore, should be directed to this end, and every thing strictly guarded against which tends to interfere with it. A quiet life, regular hours, a freedom from all excitement, should be rigidly enforced.

Violent exercise, such as running, walking rapidly, climbing heights and the like, as well as intemperance in eating and drinking must be carefully avoided. As the rule, spirituous liquors, tobacco, strong tea and coffee, should be forbidden.

When the right ventricle fails in its action, or even the left becomes uncertain and weak, our main reliance consists in the administration of digitalis and iron, but as digitalis in heart affections, constitutes quite a subject in itself, a discussion of it we must put off for another time.

And now gentlemen, in conclusion let me say, that although in reality there is scarcely a department of medicine, where in the large majority of cases we can tell with such mathematical accuracy with what we have to deal, yet equally true is it that scarcely a department demands on our part more painstaking and patience. A thorough appreciation of the normal heart, is not acquired by the examination of one but of many normal hearts, much more so is this the case when we come to deal with the numberless affections to which this organ is liable. Not by the examination of one, but of hundreds of abnormal hearts can we ever hope to obtain anything like proficiency or be able like the leader of some grand orchestra to isolate among the confused Babel of sounds, anything that tends to produce discord or lessen the harmonious workings upon which the great effect depends.