

measure; it gets flustered, as it were, and its beats become rapid, irregular, and even more inefficient than at first; the diastole never lasts long enough for the ventricle to fill itself, the systole for the ventricle to empty itself. Then it is that digitalis lays its strong grasp upon the organ and bids it keep still; it gives it time to fill itself with blood, and power to propel this blood through the system. In this way it is that the tissues, being satisfied, cease to urge the heart, that the lungs clear, and the dyspnoea abates.

Never as long as you live, gentlemen, give, in these cases of rapid pulse with cardiac weakness, aconite or veratrum viride. They are the very antagonists of digitalis, and when the latter does good they would act as true poisons.

Suppose we now consider the opposite extreme to dilatation,—namely, hypertrophy of the heart; where the organ heaves and throbs and the whole frame is shaken by the powerful impulse. Digitalis will very readily bring about in this heart a condition of spasm, and the patient may drop dead from syncope, depending upon a contracted heart. Thus digitalis, by stimulating a muscle already too powerful, does harm in simple hypertrophy of the heart. Here it is that veratrum viride and aconite are of service. Veratrum viride, whilst stimulating slightly the inhibitory apparatus, weakens most decidedly the muscular force of the heart.

Under its use the pulse grows weaker and smaller.

There is another disease of the heart not connected with valvular lesion, in which digitalis is of great service. I refer to the irritable heart. It is most frequently found in soldiers, and in persons subjected for a long time to muscular strains.

As an instance of this irritable heart occurring in civil life, I mention the following case which I recently saw. A robust young man was in training for a rowing-regatta on the river. After a while he began to lose his wind sooner than his companions; and at last he had to give up the exercise altogether, for he was hardly able to walk up-stairs without severe palpitations and distress about the heart.

Irritable heart is nearly always due to over-strain of the viscus, is generally associated with weakness, and usually tends towards the production of cardiac dilatation. It is, I suspect, in some measure dependent upon a loss of power in the cardiac inhibitory apparatus. For obvious reasons, then, in most cases of irritable heart digitalis is of the utmost service. In some instances, however, the tendency is towards hypertrophy, and not towards dilatation. Under such circumstances, veratrum viride, not digitalis, is indicated.

In valvular disease with dilatation there always is weakness of the heart. Here the effect of digitalis is not so marked as in simple dilatation; but still, by regulating the heart's action, it probably diminishes the leakage of blood, and, by giving strength to the muscle, makes up to a certain extent for the deficiency.

Some of you may have seen me prescribe digitalis in cases of hypertrophy with valvular disease, and you may think that I contradict myself; but it is not so. The mere existence or non-existence of hypertrophy in a case of valvular disease is no criterion for the administration of the drug. The point to be decided is whether there be or be not *relative* hypertrophy; whether the increase in the strength of the cardiac muscle has or has not been proportional to the increase in the work required of it. To make this clearer, let us suppose that the healthy heart has to exert a force equal to 100 to pump the blood through the system. When there is a leakage, the amount of work being increased, the amount of force needed will also be much greater. Suppose that the amount of work needed of the diseased heart then equals 200. It may be that hypertrophy shall occur under these circumstances to such an extent as to double the cardiac power; then all will be well: double work and double power will mutually balance each other. If, however, the increase of power shall fall short, amounting only, let us suppose, to 150, the organ is really in the condition of dilated heart. It is not the amount of power in the muscle, but the proportion of power to the demand, that is the question. A heart may be absolutely hypertrophied, but relatively dilated. Hence it is that the great question for the therapist is not to know which valve is diseased but whether there is force enough for the demand. This is the criterion that must guide you in the administration of digitalis.

Practically, I believe the minute diagnosis of the exact character of the valvular lesion is often not important, and the question as to the availability of digitalis may be determined by studying the condition of the system. If the heart cannot pump the blood with sufficient power, of course the arterial system will be comparatively empty, whilst the veins will be full. Imagine the mitral valve to be eroded; at each contraction of the left ventricle there is a certain amount of blood thrown back into the auricle; this become distended, and cannot empty itself properly; the pulmonary veins opening into the auricle become engorged, and fail to carry the aerated blood away from the lungs. These become congested, so that the right heart, whose business it is to pump venous blood into the lungs, fails to do so properly, becomes distended, and prevents the unloading of the venous system through the two venæ cavæ; as a consequence of this general venous engorgement, oedema and dropsy come on. Almost always when you have venous congestions and dropsies the heart is weak; and you may set it down as a practical rule, with exceedingly few if any exceptions, that cardiac general venous congestions and dropsies call for digitalis.

In concluding this lecture, I call attention to the man before you as illustrative of the value of digitalis in giving temporary relief in cases of the most desperate and hopeless character. You will