THE CASE OF FISSURE OF THE STERNUM.

To the Editor of THE LANCET.

SIR,—I shall be obliged if you will allow me to make a few remarks on the case of fissure of the sternum, to which you have called the attention of the profession in the last two numbers of THE LANCET. This case has been under the notice of several medical men of eminence in Paris and Strasbourg, who have given their opinions to the medical journals of those towns. These opinions, however, differ widely from each other; for whilst M. Forget and M. Jules Béclard consider that the phenomena connected with the heart in this case support the ancient and usual doctrine of the action of that organ, Dr. F. A. Aran believes that they confirm the extraordinary doctrine that the impulse of the heart against the walls of the chest is caused by the penetration of the blood from the auricles into the ventricles, and that, in fact, what is considered to be the systole of the ventricles is the diastole. All the observers agree, however, in believing that the pulsation which is seen through the integuments, in the centre of the fissure, is caused by the alternation of expansion and contraction of the right auricle—that is to say, by its being alternately filled with blood from the two veins, and emptied by its own contraction.

When M. Groux, the subject of the malformation, called on me, on the 18th ult., I formed a very different opinion respecting the cause of the pulsation; and on seeing him again, on the 26th, I became confirmed in my conclusion, which is as follows:—When the ventricles contract, the portion of blood which is at their entrance is necessarily driven back into the auricles before the closing auriculo-ventricular valves, and the moment the ventricles become relaxed the blood in the auricles is drawn onward by the tricuspid valve, as it is closed back into the right auricle by the tricuspid valve, as it is closed by the contraction of the right ventricle, which causes the pulsation seen and felt in the situation of the right auricle, in the case of M. Groux, whilst the relaxation of the ventricle causes the sudden subsidence of the tumour.

The following circumstances, as I consider, prove the above view of the case:—When the hand is placed over the situation of the right auricle, it is felt to pulsate with a force nearly equal to that of the aorta, which can be found by pressing deeply a little higher up in the fissure; but it is impossible that the blood should be propelled from the cave into the auricle with a force of this kind. Again, the pulsation, or filling out of the tumour, takes place from below upwards, and slightly from the left side towards the right, whether M. Groux be upright or lying, but this is exactly the direction from the ventricle to the auricle, and not from the two veins. The subsidence of the tumour takes place of course exactly in the opposite direction. Thirdly, the filling of the tumour caused by the right auricle seems to be exactly synchronous with the first sound of the heart and the pulsation of the aorta.

I believe the contraction of the right auricle is not apparent in the case under consideration. I did, indeed, on one occasion, observe a slight motion for a few moments in the intervals between the greater and more apparent ones; but this slight motion, which might have been caused by the contraction of the auricle, disappeared, and I could not again observe it.

It is somewhat curious that there is a difference of opinion amongst the observers of this case, on the other side of the Channel, respecting the exact time when the rise and subsidence of the tumour in the situation of the right auricle takes place; some of the observers stating that the subsidence of the tumour occurs with the impulse of the heart, and some with the impulse of the aorta against the wall of the thorax; and Professor Forget stating that the dilatation or impulse of the tumour coincides with the impulse of the heart and the subsidence of the tumour directly after that impulse. The explanation of this is as follows—the contraction of the ventricles occupies an appreciable part of a second. The closing of the auriculo-ventricular valves, and the impulse in the right auricle above described, take place at the beginning of the ventricular contraction, and the impulse of the apex of the heart against the ribs near its conclusion, when the ventricles have injected their blood into the large arteries, and have consequently altered their shape, and are just on the point of relaxing.

There are many interesting points connected with the case of fissure of the sternum that I have not thought it necessary to touch on, as there appears to be no difference of opinion about them. I believe the explanation I have offered above, respecting the chief feature of the case, will remove the cause of disagreement that previously existed, and will show that the phenomena presented by the heart, in this instance, are quite in accordance with the physiology of that organ which is usually taught and received.

I am, Sir, your obedient servant,

Sackville-street, July, 1855.

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