

**On a case of tapping the pericardium, and on tapping of the pleura in the treatment of cardiac disease / by T. Grainger Stewart.**

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ON  
A CASE  
OF  
TAPPING OF THE PERICARDIUM,  
AND ON  
TAPPING OF THE PLEURA IN THE TREATMENT OF  
CARDIAC DISEASE.

BY  
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IN this communication I purpose to bring under the notice of the Society two subjects, which, although neither novel nor recondite, seem to me of considerable practical importance.

I. A CASE OF PERICARDITIS.

On Monday, 12th May 1884, I found in Ward XXIII. of the Royal Infirmary a young man who was evidently dangerously ill. He was very pale, his lips somewhat livid, his face covered with perspiration, his respiration was rapid and shallow, his pulse extremely quick and feeble. On examination of the heart, slight bulging was observed, while the area of dulness was markedly increased in all directions. On auscultation the sounds were indistinct, but no friction could be made out. On examining the lungs, I found marked dulness at the left base posteriorly, with diminution of vocal fremitus and of respiratory sound, and my resident physician, Dr Charles Brown, informed me that he had introduced an exploring needle, but failed to get any fluid from the pleura. I found that the patient had been admitted on 10th May, with a note from my friend, Dr Longmuir of Bathgate. The family history was favourable. The young man was 17 years of age, em-



ployed as a pupil teacher ; he had been quite well until November 1883. He had then got a chill, followed by inflammation in the chest, which confined him in the house for two months. In January, however, he had been able to resume his duties, although he did not feel quite well. In the middle of April his illness again became more formidable, and early in May he consulted Dr Longmuir, who recommended his removal to the Infirmary. He was accordingly admitted on the 10th May.

His temperature on admission was  $102^{\circ}8$  F., his respirations 35, his pulse 160, pretty regular. The house physician, finding the dulness at the back of the chest, made the exploratory puncture to which I have already referred, and ordered various medicines, and on Sunday, the 11th, the temperature was  $100^{\circ}2$ , the respirations 32, and the pulse 98. But on the following morning he was worse. There was great oppression in the chest, the temperature was  $101^{\circ}$ , the breathing more rapid, and the pulse so quick, feeble, and irregular, as to be uncountable.

From the facts which were elicited, it was clear that in addition to the thoracic inflammation, which had existed during the winter, pericarditis with considerable effusion had set in. I directed that the patient should be kept perfectly quiet, should have a good supply of nourishing soup and milk, and brandy in frequent small doses. I visited him again at 5 P.M., and found the pulse hyperdicrotic, markedly affected with the respiration, but firmer, more regular, less rapid than it had been in the middle of the day. Tracing A shows the characters of the pulse at that time. During the

A.



evening the condition again got worse, and I was sent for at 10 P.M. The pulse was then threatening to fail. A tracing (B) was

B.



obtained with difficulty, and it showed characters approaching those of the pulsus paradoxus of Küssmaul. The area of dulness, although considerably enlarged, was much less than I have often



seen it in cases of pericarditis, but the danger to life was so obvious from threatened failure of heart, that I deemed it right to decide upon operative interference. I introduced the needle of a Wood's syringe towards the left margin of the area of absolute dulness in the fifth intercostal space, and found that a reddish blood-stained serum flowed freely. A fine needle connected with an aspirator was then introduced, and two ounces of fluid were withdrawn. Distinct relief followed this operation. A tracing of the pulse (C),

C.



taken at 11 P.M., showed a much better character, while the patient expressed himself as being distinctly relieved.

On Tuesday, the 13th, he was markedly improved at the midday visit, but towards evening the heart again began to fail. A tracing obtained at 7 P.M. showed an unfavourable character, and although it improved somewhat under free use of brandy, it seemed advisable again to tap. Four ounces of blood-stained fluid were, therefore, drawn off from a point close to that at which the previous puncture had been made. Improvement immediately manifested itself, and even more distinctly than on the previous occasion. During the 14th his condition was more favourable, the temperature  $101^{\circ}8$  F., the respirations 23, the pulse 105, and quite regular. The area of dulness was distinctly diminished, and friction was audible over the whole surface of the heart. Digitalis was given in 10 m. doses of the tincture, three times a day; the alcoholic stimulant became less necessary; the patient continued gradually to improve. On 7th June friction had disappeared, and on 2nd July the patient was dismissed cured.

I have not thought it necessary to trouble the Society with many details of this case, because for the present purpose such details are unnecessary.

It is impossible to assert positively that the tapping saved the life; possibly the patient might have survived without it; but I think he would have died. It is true that one often deems it unnecessary to resort to operation even when effusion is more extensive than it was in our case, but the state of the pulse so alarmed me as to immediate danger to life, that I thought it necessary to interfere. The operation is certainly very rarely required. Only once before in my practice have I thought it necessary to perform it, and in that case a complication with endocarditis rendered the patient's condition hopeless, and the relief was only temporary.



But, while rarely required, paracentesis pericardii has a well-established place. It is unnecessary for me to go into the history of it in detail, but I may remind you of its introduction by Romero of Barcelona in 1819, of its being performed by Schuh in one of Skoda's cases, of Trousseau's successful performance and warm advocacy of it, and of the valuable evidence in its favour supplied by Dr Clifford Allbutt of Leeds. My friend, Dr Philip, has gone over the literature of the subject for me, and has compared the statistical tables prepared by different writers. Three authorities have collected series of cases, namely, Dr Hindenlang of Freiburg, Dr Roberts of Philadelphia, and Dr Samuel West of London. I have written their results on the table.

HINDENLANG (*Deut. Archiv f. klin. Med.* 1879).—Total number of cases reported, 50. In some of these tapping was performed more than once, thus making really 65 tapplings, of which were

Successful.	Unsuccessful.
21	44

ROBERTS (*Paracentesis of the Pericardium*, Philadelphia, 1880).—Total number of cases reported, 60; of which

Successful.	Unsuccessful.
24	36

WEST (*Transactions of the Med. Chir. Soc.*, London, 1883).—Total number of cases reported, 80; of which

Successful.	Unsuccessful.
31	49

(*N.B.*—In almost every case, even in those ultimately unsuccessful, temporary relief followed the operation.)

Taking West's statistics as basis—

Successful.	Unsuccessful.
31	49

there have to be added from Hindenlang 3 cases, all of which were unsuccessful; and from Roberts 7 cases, of which 3 were successful and 4 were unsuccessful; and from other sources (not included in statistics) 7, of which 4 were successful, and 3 were unsuccessful.

Thus, from all sources we have 97 cases, of which

Successful.	Unsuccessful.
38	59

With results such as these, it is clear that the operation deserves recognition as justifiable practice in certain cases.

What are the indications for its use?



1. It should be tried wherever life is imperilled by the copiousness of the effusion.

2. It should be tried, even if pericarditis be not in itself dangerous, in any case of considerable pericardial effusion in which the pulse threatens to fail. Whether it be due to inflammatory or degenerative changes in the cardiac muscle, or to general debility from severe or prolonged disease.

It was upon the second rule that I founded my practice in the case under discussion.

What are the best rules for operative procedure?

1. Exploratory puncture should be made by means of a Wood's syringe or other fine perforated needle, the needle being cautiously introduced at a point where there is absolute dulness and least likelihood of injuring the heart.

2. If serous fluid be found, the fine needle of an aspirator should be introduced at the same point and the fluid drawn off.

3. If purulent fluid be found, either aspiration, or what is probably better, free incision should be resorted to and the pus evacuated. The splendid results obtained by the latter plan of treatment by Dr West and by Professor Rosenstein of Leyden must satisfy any one who reads their papers of the value of this method.

4. As to the quantity to be drawn off, opinions are somewhat contradictory. If the fluid be purulent, it is obviously desirable to remove the whole of it as speedily as possible; if it be serous, I think that this rule does not necessarily hold. While admitting that there is plenty of evidence to show that the pericardium may be emptied or almost emptied without danger to the patient, it appears to me that only a sufficient quantity to give relief should be removed. It is a sound principle that in dealing with vital organs only the minimum amount of interference required should be had recourse to, and especially in cases which threaten failure of pulse is this precaution necessary. It is conceivable that the sudden removal of considerable pressure from the surface of the heart might sometimes lead to a fatal syncope, while the removal of a small quantity of fluid would involve no such danger. You are familiar with the occasional occurrence of syncope when paracentesis of the pleura is being performed, and whatever may be the explanation of this fact, it seems quite as likely to occur in connexion with the pericardium. I therefore prefer, as at present advised, to draw off only a small number of ounces, and, if necessary, to repeat the operation rather than to adopt the method recommended by the majority of authorities, and draw off a large quantity at once.

5. At what point should the puncture be made?

It is not very important what point is selected for puncture, so long as the operation is performed with caution. Obviously wounding the heart is to be carefully avoided, notwithstanding the fact that it has been wounded, and even penetrated, without



seriously bad effect. I should insist upon the puncture being made where there is absolute dulness, and should prefer the fifth interspace as much to the left of the sternum as possible. By such a rule we most avoid risk of injuring the heart.

One other point in connexion with this case deserves attention, namely, the character of the fluid which was drawn off. It was markedly bloody, much more so than my experience of post-mortems in cases of the kind had led me to expect. One would not be surprised at finding the serum bloody in a case of pericarditis associated with purpura or scorbutus, or even in one associated with malignant disease, but I was not prepared for the appearance of such fluid in this case. Küssmaul, however, has recognised the fact that bloody serum is common in pericarditis, and mentions one case in which, desiring to tap the pericardium, he got a straw-coloured serum, and, suspecting that he had only reached the pleura, pushed the needle further in and got the characteristic pericarditic fluid. I would, therefore, warn anyone who is performing the operation that he need not be startled if he find the fluid of a reddish colour.

## II. TAPPING THE PLEURA IN THE TREATMENT OF CARDIAC DISEASE.

The subject of tapping the pleura in cases of cardiac disease is one which I should scarcely have thought of bringing separately under the notice of the Society, seeing that it is so obviously suggested by the condition of such patients, and might, therefore, be assumed to be very generally adopted. But I find that it is little used by practitioners, even such as have become familiar with tapping for pleurisy, and in four recent standard works upon diseases of the heart, into which I have looked for reference to this special point, I find no mention of the procedure. In these circumstances I hope that the Society will not consider that I am wasting its time in drawing attention to the subject.

There are two classes of cases which should be recognised—first, the obvious cases of hydrothorax in which, along with cardiac disease, there is great dyspnoea constantly present, although occasionally aggravated by severer paroxysms. With these symptoms there is also extensive dulness on percussion in the lower part of the thorax, absence of fremitus and of respiratory sounds, and not unfrequently oedema of scrotum or general anasarca.

But there are other cases in which the physical signs are less distinct. There is again cardiac disease with persistent dyspnoea, the dyspnoea often extremely distressing. There may or may not be some degree of general dropsy. On examination of the chest there is little dulness, not more than an inch or two inches at the base of the pleura on both sides, or only on one, the vocal fremitus is not lost though diminished, and the respiration, although indistinct, is audible. At the upper margin of the dulness crepitations are



often heard, and the symptoms and signs might be assumed to indicate a mere œdema, or a quite unimportant effusion into the pleura. Nevertheless, when paracentesis is performed, fluid flows readily, and perhaps twenty, thirty, or even more ounces are removed, with the effect of immediately relieving the dyspnœa, improving the heart's action, and, consequently, dispelling any general dropsy which may have been present. Now, when I first adopted this practice, a good many years ago, I used to wonder how so large a quantity could be present in the thorax with so little dulness on percussion. The explanation appears to me to be that, in these cases, a depression of the arch of the diaphragm takes place either from changes in the muscular fibre of that structure itself, or from long continued pressure downwards by effused fluid. If such depression exists, it is obvious that the capacity of the thorax may be greatly increased.

It is unnecessary to say anything about the mode of performing the operation. The only point on which I should insist is the preliminary exploration with the injection syringe. I always carry such an instrument in my pocket, and in any doubtful case can satisfy myself at once as to whether fluid is present or not. If it be present, I introduce the needle of an aspirator, and draw off whatever quantity of fluid may be present. The results obtained are usually very satisfactory, the patient's suffering being greatly diminished, and life being prolonged for months, or even for years.

I may refer to one or two illustrative cases. I saw, with my friend Dr Ronaldson, a gentleman, between 60 and 70 years of age, who had for some years had a tendency to bronchitis with distinct mitral incompetence and dilatation of the heart, a good deal of œdema, and other signs of backward pressure in the circulation. An attack of bronchitis had increased the embarrassment of the heart, and the condition became very alarming. There was great dyspnœa, slight dulness at the right base, marked dulness at the left. After trying digitalis, carbonate of ammonia, and other medicines, without getting rid of the dyspnœa, the left pleura was tapped, and thirty-eight ounces of fluid withdrawn. Steady improvement set in, and in a short time the patient was able to walk on the level without dyspnœa. Both Dr Ronaldson and I were satisfied that this good result could not have been otherwise obtained.

The next case which I shall mention is that of a man who was for upwards of a year under my observation as a hospital patient. He was nearly 70 years of age, free from important disease, excepting pretty widespread atheromatosis, with mitral incompetence and cardiac dilatation. He suffered from persistent dyspnœa, with occasional exacerbation of great severity. Examination of the lungs showed only a limited area of dulness, from an inch to an inch and a half at the bases, more marked on one side than the other. I drew off the fluid from one pleural cavity, with the



effect of immediately, and for a considerable time, relieving the respiration. The fluid gradually again accumulated, and it became necessary to tap the pleura once in a fortnight or three weeks. By this means the patient was kept alive and in tolerable comfort for more than a year, and ultimately died from another cause, to which I need not refer.

Another illustration is afforded by a case in which, in addition to cardiac disease, there was general dropsy, such distension of the scrotum and prepuce as made walking impossible and micturition extremely difficult. Diuretics and other appropriate remedies failed to give any relief, and puncturing the distended skin seemed to be hazardous. Finding effusion in the pleura, I proceeded to draw it off, and from that time all the symptoms became relieved, and the dropsy gradually disappeared, so that the man was able to return to his work as a labourer.

I had recently in the wards a patient suffering from mitral disease, and in a state of extreme dyspnoea. On examination I found œdema of scrotum, some swelling of legs, and a little dulness at the base of the thorax posteriorly. Having made sure of the presence of fluid in the usual way, I directed the house physician to draw it off. He removed twenty-eight ounces. The breathing was immediately relieved, and the dropsy speedily began to subside.

These instances may suffice as illustrations. I might have given them in greater detail, but consider that a brief statement is sufficient.

It is often worth while to remove the fluid from the pleura even in cases in which no prolonged benefit is to be looked for. In illustration, I may refer to a case which I saw along with my friend, Dr Malcolm, a case of mediastinal sarcoma, which was attended by effusion into the pleura and great dyspnoea. The pleura was tapped on several occasions, and great relief was experienced on each occasion, life being prolonged for a few weeks in consequence. It is unnecessary to cite other cases in illustration of this point.

Such operative interference does not always succeed. The heart may be so much affected, or the lungs so œdematous, or other complications may exist of so formidable a nature, that it is impossible for the removal of fluid to prove serviceable; but I have never seen a bad effect from it, unless, perhaps, a little temporary disturbance of respiration.





