Paracentesis Pericardii

Graduation Thesis
by
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An interesting case of Pericarditis with effusion, in Professor Jæger's ward in the Infirmary, came under my care as House Physician at the beginning of the present year.

Briefly, it was as follows:

Andreas Steensen, age 19, a Norwegian sailor, admitted suffering from Rheumatism, Pleurisy, & Pericarditis. He had been ill 10 days, had had a previous attack of Rheumatism 4 months before.

On admission, patient was very breathless on the slightest exertion. Temperature was 102.2°F. Pulse 90. Complained of pain and feeling of oppression over the precordial region; the usual signs of Pericarditis with effusion were present. Friction murmur being heard distinctly at the apex, a blister was applied. Anti-rheumatic remedies administered. Next day the murmur was softer; the effusion increased in amount, dyspnoea being also increased, although he was still able to lie down in bed. On the third day the friction murmur at the apex had disappeared, pain passed, the effusion and dyspnoea had increased.
Pericardial dulness measured at the level of
the 5th Costal Cartilage, 9 inches, beginning 1/2 in.
to right of sternum and extending fully 3 inches
beyond the left nipple line. Above it
reached almost to the clavicle, measured
at the level of the 2nd Costal Cartilage, 6½ in.

As the dyspnoea was becoming greater,
the pulse more irregular & weak, it was
decided that if no better next day
Paracentesis Pericardii be performed. Next
day, another blisters having been applied
over night, the patient was rather better,
so the operation was put off, and as
it so happened, was not required. For
after this, no more blisters on general treatment,
he daily improved, and left hospital at
the end of three months, feeling quite well,
and in very good condition.

My attention, having been thus
turned towards the subject, I have looked
out all the cases to be found in the Jour-
nals since 1854. These cases are few;
the operation not having been often per-
formed, owing I suppose to its having
always been looked upon as a daring and
dangerous one, although those who have performed it, as a rule pronounced it to be a simple, easy, and safe one.

From the annexed cases, I think it will be seen, that some of the best authorities look upon it, in this latter light, so that it may be undertaken without danger to the patient.

Paracentesis Pericardii, was advocated so long ago, as 1650 by Riobon, and was also recommended by other old writers such as Laennec, Ikoda et Leneae, but although it has been recommended by many, has been performed by comparatively few. The operation has in the main succeeded successfully, but at the same time there have been unsuccessful results.

Most writers look upon the operation as a safe one. But they do not say much as to its curative value.

For example, Dr. Sibson in the British Foreign Medical-Chirurgical Review for 1854 says, "We would strongly recommend Paracentesis Pericardii in all those cases, in which the effusion is so great as to cause
alarming distress, orthopnea, obstruction to
the venous circulation; interference with
the heart action," "in such cases" he goes
on to say, "we would employ the fluid ex-
ploring trocar - cannula, plunging it im-
below the heart, either to the left of the
diaphragm cartilage, or through the 5th inter-
vertebral space, close to its anterior extremity.
The fluid can very easily be drawn off
through the finest trocar by means of
aspiration, there can be no necessity in
attempting to remove a large quantity of
the fluid; it will suffice if the tension
be thoroughly relieved. This will be indica-
ted by the appearance of tingescence of the
fingler veins, this tingescence is doubt-
lessly caused by the pressure of the effused
fluid on the arteries, as was well remarked
by Dr. Markham, on the ascending vein,
cava."

I shall not relate several cases which
will, I hope, demonstrate, that the opera-
tion may be done in suitable cases with per-
fect confidence and safety.

M. Merat in the Dictionnaire des
Sciences medicales, XL. 340. quotes two cases of Pericardial effusion in which M. Rovas of Barcelona made an opening between the 5th & 6th Cartilages, then by a pair of scissors into the Pericardium, so as to let a portion of the fluid run off. He plugged up the wound with a disc of lint, by the removal of which, daily, for two or three days, a further drain of the fluid took place. Both cases recovered.

A case probably unique in the annals of Paracelsians, operated on by Roenlein of Leyden is recorded in the Lancet of 15th October 1871. page 698.

A child aged 10 suffering from Pericardial effusion, presented such a degree of interference with circulatin & respiration, that an aspirating needle was passed into the 4th interspace, near the sternum, & 22 ounces of liquid withdrawn. Left sided pleural effusion followed, and 39 ounces were evacuated. Cardial symptoms increased necessitated a second puncture of the pericardium when 4½ ounces of purulent liquid were with drawn.
a relapse occurring, a larger opening was made
1½ inches long at the 4th intercostal space.
A large quantity of pus escaped. Two drainage
tricks were inserted. The operation was followed
by an immediate return of the circulation
and respiration to normal condition. An
incision into the pleura however also became
necessary, at the end of 4 months of treat-
ment, patient left hospital in good
condition.

Dr. J. H. Bartlett of Birmingham re-
ports a case in Lancet Dec 19, 1874.
Pericardial effusion came on after Acute Rheu-
matism. Aspiration was performed. 140 ounces
removed, and patient recovered perfectly.
He remarks "There was no difficulty in
the operation itself, nor was there any subse-
quient symptoms to mar the steady pro-
gress of the case to recovery."

At a meeting of the Académie de Médi-
cine de Paris, on the 22nd Oct 1872, M. Chaixon,
Physicain to the Convalescent Hospital at
Vicinié, communicated an interesting case of
pericardium.
The patient was a young soldier in whom
Dropsey of the Pericardium appeared after an attack of Pleurisy. M. Chaineon employed a capillary needle by means of which he drew off a large quantity of sero-sanguineous fluid, which quickly gelatinized. No accident followed: next day he found the patient lounging about the passages of the hospital.

"The introduction of a trocar into this sac has hitherto been regarded as a dangerous proceeding; it has consequently been but rarely performed." Langett 30 nov 1872.

M. Trouseau records the following interesting case. A lad aged 16 was admitted on the 5th day of an acute disease with severe frontal headache, lassitude, pneumo-pneumonia: there was intense dyspnoea, a little cough, fast pulse, prominence in cardiac region, increased percussion dulness in the same, extending to the 2nd rib, to the right of the sternum; the heart sounds being feeble, distant.

In a monster, the Effusum remained the same, then the dyspnœa increased, the fluid augmented, as the dulness now reached the clavicle; there was also pleurisy.
effusion. The pericardium was punctured at the 5th intercostal 1/2 inch from the sterno-
man. 13 ounces of fluid escaped. The Car-
diae dulness decreased in amount.
Respirations could be heard in the hype-
dow on the fourth rib, a day or two after-
wards pleuritic effusion was formed to be increased; heart being displaced to the right. Thoracentesis was also per-
formed, neither pleural nor pericardial
friction reappeared. - Brit. Journ. Foreign

The operation was lately performed in the Leeds Infirmary by the House Surgeon.
The patient was ill 5 months before admission, had great dyspnea; pericarditis was discover-
ed some time after admission, Paracentesis was performed, on account of the increasing
urgent symptoms, only one time was with drawn, after this was intended to take
as much as could be got, from this time
the patient gradually recovered, having been up to the time of operation very
evidently sinking, showing the unaided part
the operation played in saving the patient's life.
The patient left hospital after being three weeks under treatment. Lancet, Jan 29 1883.

A prominent feature in this case is the fact that the only a very small quantity of fluid was withdrawn. Nevertheless it relieved the distress of the patient was sufficient to start absorption. - nature cure of the disease -

Dr. Clifford Allbutt has recorded two cases where the operation was performed for him by Mr. Wheelhouse. Who says,

"I chose for my purpose a small trocar, which I placed on the upper margin of the 5th rib, 

1/2 an inch to the left of the sternum and inclining it upward and inward, through it sheathing it forward thro the intercostal space, I formed toward what I believe to be the centre of the ventricle. I pushed it inward till I could distinctly feel the movement of the heart with the instrument. Then sheathing the point, I advanced the cannula, up to the heart, until I could feel the demonstration to three around, the impulse of the heart as communicated to the instrument. The trocar was then
withdrawn, the fluid allowed to escape, this is did at first in a steady stream, which soon assumed to a saltatory flow, coincident with the heart contraction.

The fluid consisted of a pale, pink coagulated serum, on the whole about 3 ounces escaped. During the operation the patient gradually obtained relief, and after the cannula was withdrawn the bed-rest was removed, he was able to lie down. Which, he could not do before. He recovered completely."

Fothergill's Diseases of the Heart p. 357.

The third part of D'Gulafles book on Aspiration is devoted to Aspiration of the Bronchial Cavity, beginning with the Pericardium.

Only three cases are recorded, but the result of these were most satisfactory. Great relief being experienced in all, altho' from the nature of the case too were incurable. "The operation with the aspirator embarks most favorably, with all former means of tapping the pericardium. It requires no special skill or address on the part of the operator, the difficulty formerly experienced—emptying
the cavity— is of course done away with. By experiment on the dead body, Deulafroy found that the pericardium eived contain 35—42 ounces, and that the most convenient spot at which to puncture such an accumulation is in the 4th or 5th interspace from 2—2½ inches from the edge of the sternum. In order to avoid wounding the heart, the needle must be pushed upwards, inwards; the needle used chlorine the latter n0. 1 or n0. 2, according to the certainty of presence of fluid.


There are other similar cases which Paracelsus Pericardii may be performed for the relief of urgent symptoms, resulting direct or indirect from pericardial effusion, requiring as we see it does no special skill or boldness for its performance.

From the nature of some cases, the operator cannot always be successful. That is to say, it has no curative value in certain cases, can only be done and looked upon as a palliative measure.
Another of M. L Deus's cases is the following.

A young man, aged 24, was admitted to the Hôtel de Dieu, having been ill a few days with violent fever and all the symptoms of capillary bronchitis; a few days later a blowing murmur was heard at the apex of the heart, and at the end of a week there was a double murmur at this point, while a few days later still, the second sound was reduplicated producing the bruit de rappel or gallop. — w.w. The cardiac symptoms diminished, while the cardiac dullness extended. So as soon to leave no doubt of the existence of pericardial effusion,

the cardiac dullness became less distinct and at last disappeared, the anxiety of the patient increased in the exact ratio of the increased effusion, the symptoms becoming urgent, after emaciation. Paracentesis was decided on. The dulness extended upwards to the 5th rib, downwards somewhat below the base of the thorax, and laterally from about 3½ inches to the right of the median line of the sternum to about 4 inches to the left of the nipple.
Luciferin was made, several ounces evacuated, but patient was only temporarily relieved, having the same evening, eclampsia or convulsions affecting the right side of the body. Next day there was paraplegia of the right side of the body, of the tongue. Pulse 60. Helium respiration, not more difficult. Patient died 5 days after operation. British Chirurgical Review. April 1887.

Dr. Mader, in the Wochenblatt der k. k. gesellschaft der Aerzte in Wien 97. 24. 1868. gives the following case. Patient a female. 68. had oppression, dyspnoea, increasing, but no inflammation. She was weak, emaciated, could not lie down. Vomis of neck described. Increased cardiac dulness. Beat of heart nowhere perceptible. Heart sounds weak. Small like foetos in utero. No friction. Pulse small, fast, irregular. No pulmonary or other disease. Remedies proving fruitless. Paracutaneous was decided upon. It was done with a glass syringe attached to a hypodermic needle. Two ounces were removed. Patient bore operation well, was greatly relieved, could now lie down relieved.
and veins of neck were less dilated. Improvement however was only temporary. Dullness returned and also dyspnoea on both sides. Fourteen days after first aspiration she was tapped again and 3 ounces removed, but with only slight relief. She died next day. P.M. exam. showed pericardial pseudomembrane, compact and, pitted with small tubercle masses. Pericardial sac was not dilated so probably no fluid would have come away with thorac cent.

D. M. also believes this to be the first case in which pericardial fluid has been removed by pumping. He thinks that this method is superior to simple puncture.

He says "the dangers the practitioners are fearful of when applying the suction pump in cases of pleuritic adhesions viz. the too rapid extension of the false membrane, bleeding from laceration of the same, a disease of the lungs as a consequence of forced diastasis - are not to be feared here, since the lungs will readily follow the relaxed parietal portion of the pericardium."

Another unsuccessful case is recorded in the
Medical Times & Gazette. Dec. 1845.

The case was that of a young sailor aged
23 who was admitted into hospital with symp-
toms which lead Dr. Chaireon to diagnose
pulmonary tubercle. Pulmonary of the left side
and Pericarditis. As the symptoms became ur-
gent, the patient was threatened with
suffocation. Dr. Chaireon practised Thoraecentesis
with Desculapis aspirator, drew off 1630 gms
of serous fluid, but as this afforded no relief
the pericardium was in its turn punctured with the same instrument, who was fol-
lowed by a discharge of about 1000 grammes
of bloody serum. Relief was immediate,
but not of long duration, and the patient
died some days later. An autopsy confirmed
Dr. Chaireon's diagnosis.

In these cases the operation was performed
in the hope more of relieving the symptoms, than
of effecting a cure, as palliative, rather than an
curative, In the two latter, the one an old
woman of 68, the other a man extending af-
feated with tuberculous disease, the result was
considering the condition present, hardly to be
Wounded as, though in the case done by M. Lousreau, I am at a loss to explain the symptoms immediately preceding death.

In Roger of Paris reporting to the Académie de médecine de Paris, the result of investigations on Paracelso Pericardii as a committee appointed for that purpose stated.

"That Paracelso Pericardii was an atheratim, not only useless, but most dangerous, ni active dropy of the Pericardium, also ni cases of effusion of Blood, wi' those of purulent collections, connected with a seural infectum", "Whereas" he continues, "it is opportune and perhaps salutary ni effusion ni Pericardiyi". He went on to say that the puncture ought to be made in the 5th interspace, at a point intermediate between the sternum, the breast, rather nearer the latter, bearing in mind the position of the apex of the heart, which may be displaced, and he cited several cases wi' wh. the男

had been wounded, owing to inattention to this point: more over it worned he advisable in all cases to use capillary trocan, not only
to avoid the heart, but because the wound produced by these instruments is perfectly innocuous.

Such then are the opinions of those who have performed the operation, or who are in a position to speak of its advisability.

But what is the condition of the heart and the surrounding organs in Pericarditis with effusion?

The Pericardium lies on the central tendon of the diaphragm, between the sternum and the vertebral column. Laterally it is in close relation to the lungs, pleura, and phrenic nerves, and posteriorly to the trachea and esophagus.

Inflammation of the Pericardium will effuse in fluid into its cavity; therefore will cause serious interference to those important organs which are so closely related to it.

The heart, which the pericardium encloses, is weakened by the preceding inflammation, and in this weakened state, has not only to propel the column of blood, but also to struggle with the pressure of a large quantity
of fluid round about it, while its action is
degraded by the presence of a deposit of co-
egnateable lymph.

The fluid too presses on the tendon of
the diaphragm, on which the Pericardium lies,
so weakening directly its action, while this
result may be further brought about by com-
pression of the phrenic nerves consequent
paralysis of the diaphragm.

Tibson considers "that compression
of the trachea at its bifurcation is what
causes great dyspnoea in cases of Peri-
carditis with effusion, more than pressure on
the lungs." Though, that too must help
to produce the same effect in conjunction
with other causes.

All the distressing symptoms therefore
depend directly or indirectly on the pressure
of the fluid within the Pericardium.

To relieve these symptoms when urgent,
can only be done by Paracentesis.

with all the means at our disposal.

Indeed, - the aspirin, antiseptic etc. etc.
are not only justified, but also of great
benevolence to use them for the relief of our
patients suffering from Pericarditis with effusion, in whom the symptoms have advanced to an alarming extent.

With antiseptic precautions the aspiration can be used with perfect safety.

I have seen the aspirating needle plunged boldly and deeply into various parts of the trunk with vessels of fluid. Several times at one sitting no harm came of it, with very slight discomfort to the patient.

I have used the aspirating needle of plurihili fluid, putting it deeply into the thorax. No fluid was obtained; still the operation gave me to very little discomfort or momentary pain.

How often in pleurisy and other effusions do we see the great relief a patient experiences when fluid, even a little, is withdrawn from the pleura, or an effused joint.

Why then should it not often be practiced in Pericardial effusion.

We have seen that the operation requires no special skill or baoiness.

Before Antiseptic and Aspiration came into use the operation was practiced with
good results, who are always considered a danger one. Now that these are the bad & it has been shown how safe they are, I think that Pericardiac may be performed much oftener than it usually is done.

The indications are such as Dr. Sibson describes; "in cases in which effusion is so great as to cause alarming distress, orthopnea &c."

As to the operation itself, all are agreed or nearly so as to the first part of prominence.

The aspirating needle, or a trocar, for according to the foregoing cases it does not appear to matter which is used, is entered in the 4th or 5th intercostal space, from 1-3 inches from the sternum, is then directed upwards & inwards, in a direction towards the right subcostal fossa.

Further it does not appear to be of great account how much fluid is evacuated, even so small an amount as one once being sufficient, as we see in the case of the man at Leeds Hospital to relieve the agony of the symptoms & set up the absorptive process.

These facts then cannot but point to
the conclusion that Paracoccus Pericardii might - age - ought to be performed after
than it is.

R.H. Alouise.

P.S. Since writing the above, a paper on the
Subject by Dr. Sarruell heant has appeared in the British
Medical Journal for April 28, 1883.
Dr. Reed reports a case of purulent pericarditis,
in which the pericardium, after being twice tapped
was freely laid open, washed out, and a drainage tube
inserted. The patient recovered perfectly in 5 weeks.
After discovering the point of clinical interest in the
Case Dr. Reed related the history of the operation from
its first suggestion by Riolan in 1849.
A list of cases published, unpublished follows,
according to all to 189. Of these 56 were in males,
23 cases were associated with Phthisis & Pleurisy.
11 " Rheumatism
9 " Scrovy.
5 " General dropsy.
3 " Lying.
12 " Little had been no associated disease.
Third in 58 cases was a sten. in 12 purulent -
in 9 bloody.
Amount in 33 cases more, in 46 cases less than a pint. Largest amount was 10 pints in a perforative case.

Dr. Rush's conclusion on urine distention.

1. Pericarditis Perforata is not only justifiable, but an operation which may be safely undertaken with ordinary precautions, for most of the cases is remedied in which the operation was itself fatal. With this exception, all the patients were greatly relieved by the removal even of small amounts of fluid, many recovered completely who doubtless would have died, had the operation not been performed.

2. The most suitable case for puncture is, in ordinary circumstances, in the 5th intercostal space, near the edge of the sternum. But if the pleura be adherent, the puncture may be made safely much further out, even in the 6th space. 3. The instrument employed should be a trocar, &c. Without aspiration, if the operation may be performed with advantage, not only in the pericardial effusion of rheumatic or primary origin, but also in those who occur in the late stage of acute dropsy, if it appears that the fluid in the pericardium is adding to the difficulties under which the heart is placed.

5. Pericardiocentesis is best treated on general principle, like empyema.

6. The pericardial one may be safely opened & drained. If this treatment were once applied, it would be the only one which affords the slightest hope of recovery. 8. The sequelae do not seem to be as unfavorable as those of empyema, as the walls of the cavity are better able to contract rapidly, this permits to complete obliteration.

These conclusions which were read before,
and enquired in by the Royal Medical and Chirurgical Society of London, so far I
consider, to show, how easy & safe is the operation, & how unnecessary it has been
to me been dreaded as dangerous.

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30 April 1883.