

SUPPURATIVE PERICARDITIS FOLLOWING AP-  
PENDICITIS; RECOVERY AFTER INCISION  
AND DRAINAGE OF PERICARDIUM.

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L. S., white, female, aged twelve years, was seen with Dr. John R. Abercrombie, March 3, 1900, presenting the following history and symptoms: Family and previous history are negative so far as having any bearing on the present illness. Four days previous to the above date (February 28), the child was seized with general abdominal pains, nausea with vomiting, fever, and accelerated pulse. Dr. Abercrombie saw the child twenty-four hours after the onset of the symptoms.

March 1, A.M., he found the temperature  $103 \frac{3}{5}^{\circ}$  F.; pulse, 120, and respirations, 30. There was severe abdominal pain, not localized in any particular place, nausea, and vomiting. Constipation had existed for several days. The abdomen was moderately distended, with increased resistance at a level with the umbilicus under the right rectus muscle, this particular point being somewhat tender and painful on deep pressure.

A diagnosis of probable appendicitis was made, and the patient was kept quiet. Small doses of calomel were ordered and a liquid diet. During the day the local conditions remained about the same, with a slight drop in the temperature towards evening to  $102 \frac{1}{5}^{\circ}$  F.; pulse, 120; respirations, 28.

March 2, A.M., temperature,  $102^{\circ}$  F.; pulse, 120; respirations, 25. Patient not so well as yesterday; pain in abdomen was more severe, with decided distention, nausea, and vomiting, bowels constipated; resistance under the right rectus muscle more marked than yesterday, but no tumor was felt. The child was given a high rectal enema, containing one ounce of Rochelle salts and sweet oil; teaspoonful doses of salts were frequently given during the day by the mouth.

P.M., temperature,  $103^{\circ}$  F.; pulse, 122; respirations, 28; condition about the same.

March 3, A.M. I saw the little patient with Dr. Abercrombie, and found her in about the condition as described above,—temperature,  $103^{\circ}$  F.; pulse, 120; respirations, 26. The child had been vomiting during the night quite frequently; the bowels not being moved. The abdomen was found to be much distended; the movements of the intestines could be felt and heard through the abdominal wall. There was marked resistance on the right side under the rectus muscle at about the level of the umbilicus, and extended several inches downward. An ill-defined mass could be made out in the right iliac fossa, pressure upon which caused pain; in addition, she complained of pain in the right wrist and in the knee and ankle on the left side, which were found to be red, swollen, and painful, fluctuating, containing fluid; the synovitis resembled an acute articular rheumatism. The diagnosis of appendicitis was agreed to, and an operation was thought would be required.

The patient was sent to the Church Home and Infirmary, so as to be convenient if an operation should be found necessary. Soon after entering the hospital she had a number of large loose stools during the afternoon, followed by marked improvement in all the symptoms except as to the joints, the temperature and pulse falling nearly to normal, the nausea and pain disappearing.

March 4. No pain or distention of the abdomen, resistance normal, and nothing to be felt in the iliac fossa. The joints, however, are much swollen and very painful, and a slight rise in temperature and pulse, presenting the appearance of an acute articular rheumatism. The joint symptoms continued for several weeks, notwithstanding large doses of salicylic acid.

March 7. Dr. Abercrombie, while auscultating the chest, discovered a mitral murmur, it not being present before, as the chest had been examined each day. The joint symptoms about the same, with only a moderate febrile reaction.

March 10. During the afternoon the patient was found to have difficulty in breathing and was much collapsed. Dr. Abercrombie was sent for, and found the patient in the following condition: Temperature,  $104^{\circ}$  F.; pulse, 140; respirations, 40, the symptoms looking like a severe septic intoxication. Upon examining the chest, the cardiac dulness was found to be much in-

creased, extending several inches to the right of the sternal line and as low as the eighth rib, the heart sounds indistinct, with a mitral murmur.

March 11. The patient presented quite the same condition,—temperature, 104° F.; pulse, 146; respirations, 42. During the night the child had several spells of great difficulty in breathing, with collapse, the pulse being extremely weak and irregular.

On examining the chest we found the cardiac dulness much increased, extending about three and one-half inches to the right of the sternum, and on the left to the axillary line on the level of the sixth rib, and a dull place in the back, Ewart's (*British Medical Journal*, January 23, 1897) "pericardial dull spot," extending to the middle line along the lower border of the scapula and to the left for a distance of about four inches, reaching as high up as the spine of the scapula. The heart sounds were transmitted to the ear very indistinctly through the back. The murmur also could be heard. The heart sounds were also very indistinct through the anterior chest wall, and sounded far off. The heart dulness was marked out on the anterior chest wall with an aniline pencil, so that any increase of the effusion might be watched.

March 11. Condition unchanged.

March 12. Temperature during the evening reached 104 1/5° F.; pulse, 150; respirations, 46. General condition more septic. The area of dulness was found to be slightly larger. A diagnosis of suppurative pericarditis was made, and operation done early in the morning.

March 13. Drs. Abercrombie and Gavin assisted at the operation. Ether was the anæsthetic. The field of operation was rendered aseptic in the usual way. A large aspirating needle was pushed through the fifth intercostal space to ascertain the character of the fluid, and at once came in contact with the heart; the violent cardiac pulsations against the needle could be plainly felt. No fluid could be aspirated except a few drops of blood. The needle was then withdrawn and introduced through the fourth intercostal space about two inches to the left of the border of the sternum. The resistance disappearing, the needle was found to be in a cavity, with the heart pulsating against it. On making the vacuum in the aspirator, about two drachms of a bloody purulent fluid were drawn out. The needle was then disconnected from the aspirator, but allowed to remain in the pericardium to

serve as a guide. An incision four and a half inches long was made parallel with the border of the sternum and two inches to the left down to the ribs. Two inches of the fourth rib were resected, the internal mammary artery was ligated, and the pericardium then opened, whereupon a quantity of a purulent bloody fluid ran out. The pleura was not seen, being pushed out of the way to the left. The heart was suspended in the large pericardial sac in close relation to the anterior chest wall, the pericardium being much distended. The fluid was nearly all posterior to the heart, as in a case related by Money (*British Medical Journal*, December 1, 1888, p. 1220), where at an autopsy twenty-four fluidounces of pus were found in the pericardium, "almost entirely stowed away behind the heart." The patient was then rolled over on the left side, and about 800 cubic centimetres of pus ran out. On placing the patient on her back, the pericardium did not collapse very much, not coming in contact with the heart, the heart being suspended by its great vessels and pulsating in space, so to speak. The pericardium was then freely opened and stitched to the edges of the wound, and a long strip of sterilized gauze was put in the pericardial sac below and behind the heart; a large sterile dressing was then applied, and the patient returned to bed in good condition. The temperature and pulse did not drop very much, reaching  $103\frac{2}{5}$ ° F. and 140 respectively during the evening. The next day she was comfortable; no distress in breathing; but the temperature and pulse continued high.

March 15, A.M. The dressing was removed, the gauze was taken out of the pericardium, whereupon a quantity of pus escaped, the gauze stopping rather than assisting the drainage. Two medium-sized rubber tubes were then put into the pericardial sac; there was, however, much difficulty in keeping them in place, owing to the pulsation of the heart. The trouble was easily overcome by fastening them to the skin with a small safety-pin. There was much discharge through the tubes during the day, sufficient to wet a large dressing. The temperature and pulse dropped to  $99\frac{1}{5}$ ° F. and 120 respectively during the afternoon, never reaching 100° F. after. The little patient commenced to improve from then; in the course of three weeks the wound was healed, and she was able to be out of bed. The tubes remained in ten days. She has gained very much in weight during the year, but still has a mitral murmur; otherwise she is in good health.

Some of the fluid was caught in sterile test-tubes for examination. Fresh preparations under the microscope showed many red blood-corpuscles mixed with the pus-cells, and large numbers of diplococci were seen in the fresh stained specimens. Cultures were made in the usual way and pure cultures of the pneumococcus were obtained, no other organisms being present.

The case is of interest for several reasons: first, on account of the severe abdominal symptoms which were present at the beginning, which were definite enough to lead to a highly probable diagnosis of acute appendicitis; the rapid subsidence of the abdominal symptoms as soon as the bowels were freely moved; the marked synovitis of the joints, which presented the appearance of articular rheumatism, or rather a part of a general septic infection, and the abrupt onset of the pericardial trouble.

I am much inclined to think that the patient, in the first instance, was suffering with appendicitis, which was most likely due to an infection of the pneumococcus; and this might have been the cause of a general infection, with localization in the several joints causing an acute synovitis, with effusion and infection of the pericardium and endocardium, the former going on to suppuration. There is nothing definite about this theory, however, as the exact condition of the appendix was not ascertained by operation. The symptoms, however, which the child presented in the first were typical of appendicitis. Another reason why one might suppose the infection of the appendix was due to the pneumococcus is the fact that the patient recovered without suppuration (?) in the appendix, as the infection of the pneumococcus does not always go on to the formation of pus. This is only a supposition, as the appendix might have recovered without suppuration, no matter what the nature of the infection, or burst into the intestine if it did suppurate.

Another point of interest in the case was the large size of the area of pericardial dulness in the back, and the extremely feeble heart sounds in front, notwithstanding the fact that

the heart was in direct contact with the anterior chest wall, and the marked displacement of the heart to the right.

One might have easily been misled on introducing the aspirating needle into the pericardium at the usual point, *i.e.*, in the fifth intercostal space close to the sternum, and, getting no fluid, might have supposed that the pus was not in the pericardium.

It was quite evident, after opening the chest, that no matter at what point the aspirating needle was introduced in front, the pus could not all have been withdrawn, owing to the extreme depth of the pericardial sac and the position of the heart.

The pericardium was much changed in appearance, being thicker than normal, also very brittle. It was lined with flakes of fibrin, and hæmorrhagic spots were seen on its surface. The visceral pericardium was covered quite extensively with a fibrinous exudate.

The pleura, which should be carefully avoided in these cases of operations on the pericardium, was not seen, as the great distention of the pericardial sac had so displaced the pleura as to push it quite to the axillary line. The statement of Fowler (*Transactions of the American Surgical Association*, 1896, Vol. xiv, p. 161), that the pleura boundaries are greatly displaced in pericardial distentions, was no doubt true in my case. Roberts (*American Journal of the Medical Sciences*, December, 1897, p. 625), however, does not think that such displacements occur, on account of the pleura attachment to the chest wall.

The recovery of the patient may have been somewhat influenced owing to the infection being the pneumococcus, as in empyema cases we know that recovery is more likely to follow an infection of this kind than from an infection of the ordinary pyogenic organisms, especially infections when due to the streptococcus pyogenes.

We also know that patients, especially children, often recover from extensive empyema after simple aspirations, when the infection is due to the pneumococcus alone. Such results,

however, are rare, and not to be looked for, if the infection is due to the pus organisms (pyogenic) or to a mixed infection. In such cases, opening the chest, resection of ribs, and drainage are called for. Therefore suppurative pericarditis due to the pneumococcus may run a more favorable course under proper treatment,—which should always be opening and drainage of the pericardial sac,—than if due to the pyogenic organisms or a mixed infection.

If such is the case, which can only be determined by careful investigations, then it is important that the variety of the infection should be determined at the earliest possible time after operation which would influence the prognosis in such cases.

The condition of the joints in this case resembled closely part of a general septic infection rather than a rheumatic inflammation, for, notwithstanding large and frequent doses of salicylic acid, the effusion and pain continued for several weeks.

In concluding this report, I can do no better than refer the reader to the article by Roberts (*American Journal of the Medical Sciences*, December, 1897, No. 6) which deals most fully with the treatment of suppurative pericarditis.