

FIBRO-SARCOMA OF THE MEDIASTINUM

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GREAT progress in chest surgery cannot be obtained until thoracotomy has become a safe procedure and until diagnostic thoracotomy has left us in no doubt. As no general surgeon has done a sufficient number of thoracotomies to form an opinion entirely acceptable to others, it will not be amiss, nay, it becomes the duty of every one who has had experience with thoracotomies to report his experience. It is with this in view that I here report the following case.

A man, H. C. K., fifty years of age, married and father of eight children, was operated upon for gall-stones in 1916. Gall-stones were removed and the appendix vermiformis also. The gall-bladder was not removed. Good recovery. No recurrence. September 17, 1927, he consulted Dr. W. D. Sexton, complaining of general weakness, general malaise, slight cough, and shortness of breath, and at times pain in his left chest below the heart. No bloody expectoration, no night sweats. His face was slightly flushed. There was limited respiratory movement over the entire left chest, also flatness on percussion, except over the upper and anterior part where there was resonance. Vocal fremitus absent. Breath sounds very distant, hardly audible. No râles. Percussion of right chest is hyper-resonant. Here breath sounds are slightly exaggerated, no râles. Heart inside of left nipple line. Temperature normal. Fluoroscopic examination gave darkness over entire left side of chest (Fig. 1).

He was subjected to aspiration September 19, 1927. Physical findings as before. A needle inserted in the mid-axillary line between the seventh and eighth ribs was without results, as also was the insertion in the fourth intercostal space, slightly more posterior. A third puncture made posteriorly about four inches from the spine was positive and about 1000 cubic centimetres of a bloody fluid was withdrawn. The patient felt easier after this. Five days later additional fluid to the extent of 700 cubic centimetres was aspirated.

An X-ray examination on September 20 and October 1 showed almost the same picture as was obtained before punctures were made, except that now it was apparent that the heart and mediastinal contents were displaced more decidedly to the right than was noticeable before the aspirations.

October 3, feeling much improved, he returned to his home. On October 21, while at his office, he became quite excited regarding a business transaction. He talked incessantly and irrationally. The next day he was decidedly better and was feeling well. The pulse and temperature were normal. On the morning of October 24, he became very irrational. He was taken to the hospital and his nervousness controlled by morphine and scopolamine. Glucose was given per rectum, and the patient returned to a normal condition in about two days. From then on he relapsed at intervals into a state of irrationality, which at one time at least increased to maniacal proportions.

Examinations of his urine were made frequently. It occasionally showed a light trace of acetone. He had a trace of albumen but at no time showed evidence of uræmia. On two or three occasions his pulse would suddenly become very weak and thready, but under the influence of morphine would improve and become normal again. Two aspirations resulted in the removal of but small amounts of fluid. The doctor had the sensation that the needle entered a solid mass or tumor, and the patient was advised to

consent to an exploratory thoracotomy in the hope that this tumor might be removed. The case was then referred to Dr. K. W. Doege for exploratory thoracotomy.

November 7, 1927, under local para-vertebral anæsthesia, the patient being in a semi-sitting, semi-reclining position and on his right side, an incision about ten inches in length was made, beginning posteriorly at the level of the fourth rib and sloping downward and forward ending at the tenth rib in the anterior axillary line. The skin and muscles were reflected to both sides and the sixth, seventh, eighth and ninth ribs exposed and laid bare. These ribs were resected sub-periosteally to the extent of about four to six inches. After all hæmorrhage had been stopped the chest cavity was opened by forming a horseshoe flap of the intercostal muscles and beds of the ribs, the base being at the lower border of the fourth rib. A turbid, milky fluid escaped and a solid pale-

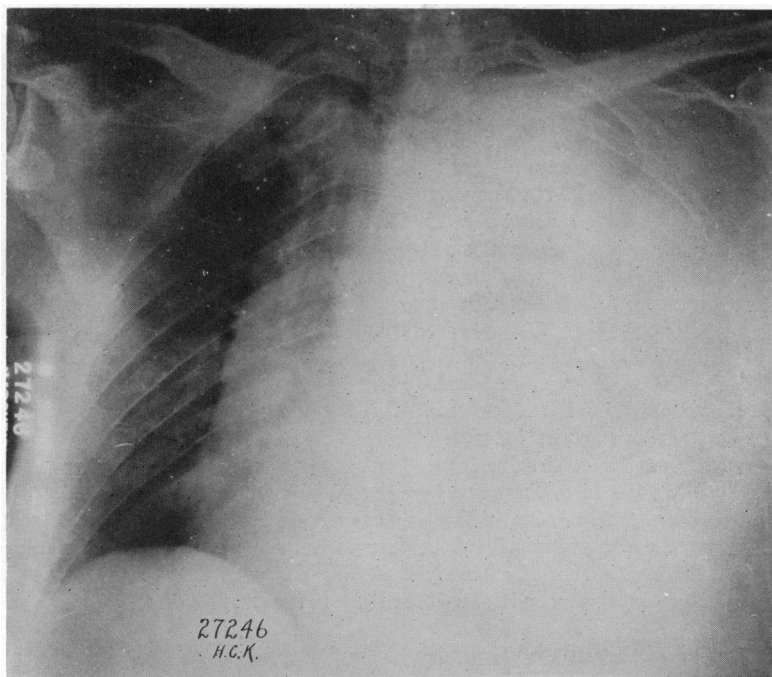


FIG. 1.—Chest before operation.

looking tumor, apparently filling the entire left thoracic cavity, became visible. It extended from the apex of the chest to the upper surface of the left diaphragm, pushing the latter downward and forward and forming a concavity instead of a convexity in the diaphragm.

The tumor was hard, not nodular, and adhered in many places to the parietal pleura. These adhesions were not firm and gave the impression that they were the result of repeated former punctures. The lung and heart could not be seen through the thoracic opening as the entire mediastinum and its contents were pushed over into the right pleural cavity. The adhesions were easily separated and the tumor became quite movable especially at its lower end. The upper end could not be reached through the opening. The movability of the mass made it appear probable that it could be removed. By this time the patient showed signs of weakness and having lost considerable blood it was thought best to interrupt the operation, especially as we had no knowledge of the extent to which the tumor might be attached medially; i.e., to the lung, heart, vessels and mediastinum, and, therefore, could not judge of the difficulties we might

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encounter. The horseshoe flap was placed loosely over the tumor and the skin incision closed by interrupted sutures. At the close of the operation the patient's pulse was 120 and of good quality. The only time he had a weak and irregular pulse was when we explored toward the lung and mediastinum. The patient was not any the worse for the operation except that his hæmoglobin, which had been 80 per cent before, had dropped to 55 per cent.

November 11, four days after the operation, we transfused 350 cubic centimetres of blood and on the next day, November 12, followed it up with the final operation. The size of the tumor made it necessary to enlarge the incision and to remove more ribs in

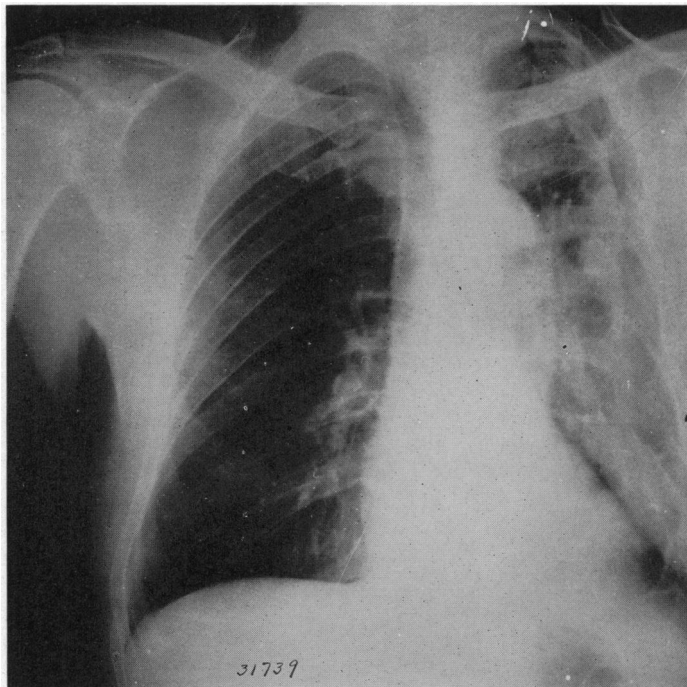


FIG. 2.—Chest about three weeks after operation.

order to get it out of the thoracic cavity. Under para-vertebral anæsthesia the incision was extended upward to the top of the shoulder and three inches of the fifth, fourth and third ribs were removed and the remaining costal wall incised upward. Now almost the entire length of the tumor could be seen except the apex which, however, could be surrounded by the palpating fingers. Palpating the tumor it became evident that it could be lifted from the thoracic cavity. The lungs and heart were still not visible. Remembering our experience at the first operation when palpation in the region of the mediastinum had resulted in a small, irregular pulse and signs of collapse, I decided at this stage to give the patient gas anæsthesia to diminish and possibly avoid nerve reflexes and shock from handling the lungs and the heart.

Under gas anæsthesia, the tumor was gradually lifted from its bed and pulled outward. Now the pericardium with the slowly pulsating heart could be seen, the lung began to inflate slowly and move from the right pleural cavity across the spine to the left side. The middle lobe of the lung was densely adhering to the tumor to the extent of a fifty-cent piece. The rest of the lung was free. The arch of the aorta could easily be made out and a pedicle led from the upper and inner aspect of the tumor toward the mediastinum, but no attachment to any special organ could be made out. This

pedicle was surrounded by a ligature and then tied off. By this time and while attempting to separate the adhesions to the lower portion of the upper lobe of the lung respiration of the left lung became active and violent and the adhesion tore away, releasing the tumor and lung.

The tumor being out, the left lung now expanded with each inspiration and collapsed suddenly with the expiration, causing a violent flapping of the lung and mediastinum, and serious heart irregularity resulted. Separation of the pulmonary adhesion had resulted in a tear in the lung and a bloody foam exuded from it. I made an attempt to grasp this place with forceps and to sew the tear, but the breathing became so violent that further tears resulted in the attempt. It became evident that the patient's condition was critical and that the violent motion and flapping of the mediastinum must be stopped to avoid serious heart reflexes. Several large pieces of salt gauze packing were pushed against the lung and mediastinum and held there, steadying its action. The patient's condition now began to improve.

Fearing renewed cardiac disturbances the attempt to suture the lung was abandoned and the operation ended. The packing was left in place and the chest cavity closed,

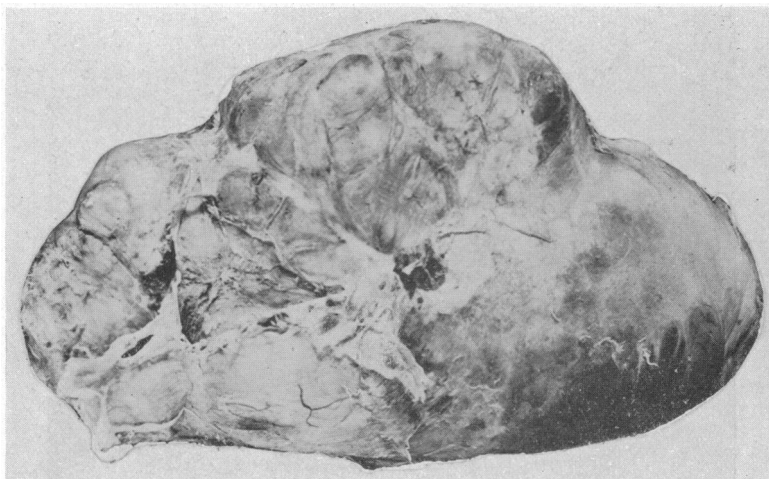


FIG. 3.—Gross appearance of tumor. Long diameter—10¼ inches. Transverse diameter—6¼ inches. Largest circumference—25 inches. Short circumference—17 inches. Weight—4½ pounds.

permitting the ends of the gauze to protrude from the lower extremity of the incision. The pleura and intercostal muscles were reunited as far as possible and the skin closed by interrupted silkworm-gut sutures as far as the protruding drains. The entire length of the incision was eighteen inches.

Post-operative progress: There is not much to be said regarding the post-operative history. At no time did the patient seem to be in real danger. There was a moderate febrile reaction during the first week. December 1, i.e., nine days after the operation, it was deemed best to give the patient another blood transfusion from which he derived marked benefit. The gauze packs were gradually removed so that after two weeks a rubber drain could replace the gauze. Subsequent X-ray examination disclosed the fact that, while a pneumothorax was still present, the left lung was expanding gradually and the heart was approaching its normal position. The space in the right thorax was not encroached upon any longer and the lung was expanding normally. The mediastinum with the trachea had moved back to its position behind the sternum and the wound was healing satisfactorily. The patient gained in strength, had no dyspnoea, was rational and sat up in bed after eighteen days and left the hospital six weeks after the operation. The sinus in the left chest continued to discharge for several months. The

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fistulous tract ultimately closed spontaneously. To all appearances the patient now is a well man, his strength has returned and he is back at his business.

Specimen (Fig. 3): An oval, solid tumor, having the shape and size of a football, pale in color, long diameter $10\frac{1}{4}$ inches, transverse diameter $6\frac{1}{4}$ inches, largest circumference 25 inches, short circumference 17 inches. Weight $4\frac{1}{2}$ pounds.

Microscopic examination (Figs. 4 and 5): Slides show a highly cellular structure composed of atypical cells of the fibro-blastic series. The tumor cells are well differ-

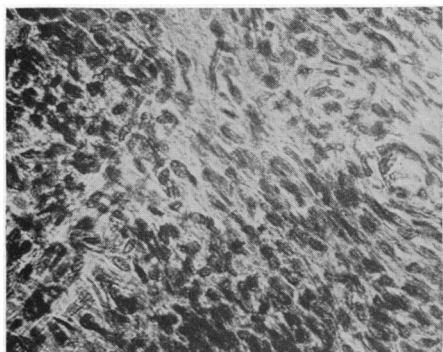


FIG. 4.—Slide—fibro-sarcoma—high power field.

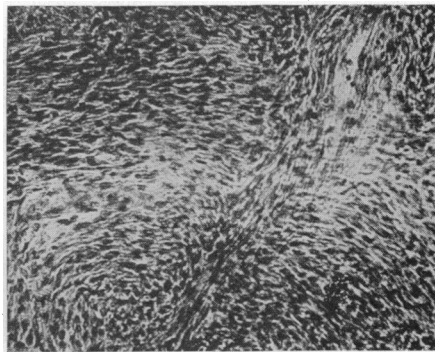


FIG. 5.—Slide—fibro-sarcoma—low power field.

entiated and mitotic figures are occasionally seen. Diagnosis: Fibro-sarcoma, low-grade malignancy.

Epicrisis: From the nature of the growth it is safe to assume that the tumor was of fairly slow development even though the subjective complaints were of but short duration. The rather acute development of symptoms can readily be explained on the assumption that it was the rapidly forming pleural exudate that finally brought on the severe cough and dyspnoea. But how explain the maniacal seizures during the last two weeks? In the absence of kidney complications, a toxæmia from that source can be excluded. It is more than likely that the extreme displacement of the heart with the resulting torsion and displacement of the large arteries and veins resulted in serious interference with the cerebral circulation. The veins being much more easily compressed through torsion and displacement of the heart than the arteries would cause venous cerebral congestion, insufficient oxygenation of the brain cells and consequent mental unbalance. Lack of nourishment to the brain and accumulation of toxæmia in the brain could induce mental disturbances in the case under consideration just as readily as these disturbances are frequently noticed in cases of prolonged cardiac failure. In the absence of fainting spells and facial pallor or signs of anæmia of the brain it could not have been the arterial blood supply that failed and it is most likely that the venous return was responsible for the occasional cerebral disorders, as the patient's face appeared rather flushed.

Inefficient respiratory exchange could, of course, also have resulted in toxicity of the blood and mental incoherence. However, such toxicity would most likely have led to coma rather than to violent maniacal seizures.

To perform the operation in two stages was probably a wise thing to do under the circumstances as the loss of blood during the one stage had increased the anæmia decidedly. It appears to me now that with a little more forethought and better preparedness immediate suture of the lung might have been accomplished. A dull forceps, say a ring forceps, might have grabbed the lung with less danger of tearing. The lung could have been pulled away from the mediastinum and, by thus steadying it, we would have prevented the violent flapping of the mediastinum and avoided the serious pleural and mediastinal reflexes. Then suture of the torn lung tissue could have been done at leisure and more accurately. It also would have been possible to inflate the lung and to close the pleural cavity instead of draining it. More rapid and more complete expansion of the lung from the first would have been possible. As in the peritoneal cavity, closure of the pleura without drainage should be the aim. Even if a certain amount of infection of the pleural cavity can be anticipated and even if a serous or bloody exudate can be expected, I would still think it best to close the pleura without drainage. For if a pleural exudate should form and were large enough to need attention, aspiration can be done easily and repeatedly.

Finally, theoretically it must be considered an error not to have radiated the chest to prevent recurrence of the growth, but the patient refused. It is now three years since the operation and there is no evidence of recurrence.

CORRIGENDUM

On page 529, October ANNALS, 7th line from the top, instead of 1810 read 1910.

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