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A CASE OF SPINDLE-CELLED SARCOMA OF THE ANTERIOR MEDIASTINUM.

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On account of its interest as regards differential diagnosis, and because it illustrates the early and late phases of that bugbear of the pathologist, "the border-line neoplasm," it is thought that a short description of the following case would not be out of place.

The patient was a gunner, examined for enlistment at Liverpool on April 16, 1923, when he was 18 years and 3 months old. His weight at that time was 132 pounds, and the only defect noted was a slight hammer-toe.

On March 25, 1925, a small tumour (½ inch diameter) was removed from the skin of the upper aspect of the right shoulder under novocain. On section it suggested a fibroma with haemorrhagic areas, and it was sent to a pathologist for report.

The laboratory report described the growth as a very cellular soft fibroma, not malignant, but prone to local recurrence unless fairly widely excised.

The only other admission to hospital, noted on his medical history sheet, was to the British Military Hospital, Nowshera, on April 5, 1927, where he died on May 18 from a neoplasm of the anterior mediastinum.

His complaint, on admission to hospital, was of pain in the front of the chest. He stated that an uncle had died of tuberculosis, but that all the members of his own family were alive and well. The only illness to which he admitted was the small growth on the right shoulder removed two years before.

For six months before admission he had been working as a nursing orderly in the hospital, and on March 29 he experienced a slight pain over the right upper half of his chest in front. This pain gradually became worse, and he noticed that his temperature in the evening rose to about 100° F.

His condition on admission to hospital on April 5 was as follows:

He was a fairly well-developed, muscular man, weighing 134 pounds. Five weeks previously his weight had been 147 pounds. He liked to be propped up in bed, as lying flat was liable to bring on a sensation of choking. There were marked night sweats.

He complained of a constant pain over the right upper half of the chest in front, the pain being increased on coughing, which was frequent,
harsh, and dry in character. Sputum was very scanty and consisted of mucus, tinged occasionally with blood. Breathing was slightly harsh. Both sides of the chest moved freely and, on the right side, pulsation could be seen over the first and second interspaces close to the right border of the sternum. Percussion revealed dullness over the lower portion of the manubrium sterni, extending on the right side for two inches beyond the right border of the manubrium, and continuous below with cardiac dullness. No change was discovered over the remainder of the lung. No breath sounds could be heard over the dull area to the right of the manubrium sterni, but, over the rest of the right lung the breath sounds, though faint, were not abnormal; neither was any abnormality detected in the breath sounds over the left lung. Vocal resonance was absent over the dull area, but was unchanged over the remainder of the chest.

The pulse was of moderate tension, rate 104, and rhythm regular; the apical pulsation was in the fifth interspace immediately below the left nipple. No enlargement or displacement of the heart was discovered by percussion. At the apex and pulmonic areas the heart sounds were healthy, but no sounds could be heard over the aortic area.

The tongue was clean, the teeth in good condition, and there was no irregularity of the bowels. The spleen and liver were not enlarged.

A potassium iodide mixture was ordered.

The notes which follow indicate the progress of the case until he died, forty-four days after admission to hospital.

April 7. Condition much the same. Slept well. No tubercle bacilli found in the sputum.

April 9. No change. Potassium iodide mixture stopped.

April 13. States that when he moves from his right to his left side, he feels as if a weight were moving inside his chest to the left side.

April 14. A radiogram of the chest was taken and it was reported that there was evidence of a tubercular lesion in the right apex, but the radiogram was not satisfactory. No tubercle bacilli were found in the sputum. Leucocytes numbered 6,550 per cubic millimetre and erythrocytes 4,237,500.

April 16. The pain on the right side of the chest is becoming worse. Cough remains the same. Sleeping well.

April 19. Weight 132 pounds, a loss of two pounds since coming into hospital.

April 21. Dyspnoea more marked. Both pupils equal in size. No difference in the radial pulses of the right and left side.

April 23. Complaint of pain under the left clavicle and also in the fifth interspace on the right side.

April 25. Seen by the officiating medical specialist. A diagrammatic representation of his findings is given in fig. 1, and the points to which he drew attention were as follows:—

A young man, aged 24. Town dweller. Illness commenced with hæmoptysis. No history of rheumatic fever. Tumour (? fibrosarcoma)
cut out of shoulder two years ago. Family history negative. Symptoms are advancing quickly. Hectic flush both cheeks and sweating (possibly heat, possibly infection). Low irregular fever with daily remissions. Dyspnoea marked, with stridor. Orthopnoea. Insomnia. Wassermann reaction not done. Leucocytes 6,000.

On the physical signs elicited the most probable diagnosis is new growth or aneurysm. Fever and history of a doubtful tumour are in favour of new growth.

Fig. 1.—Signs on April 25, 1927.

The youth of the patient, the facies, flush, fever and hemoptysis make one think of tubercle. Against tubercle are the following points:—

1. Absence of typical signs of tubercle.
2. The dyspnoea is too great for a man with one sound lung, lying in bed.
3. Orthopnoea is very rare in tubercle, more like a heart condition.
4. Absence of tubercle bacilli in sputum on repeated examination.
5. Sputum not like that of tubercle in kind or in quantity.
6. No lymphocytosis present.

The points against pericarditis are absence of the typical dullness
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(pulsation away from the dullness and Traube's area resonant) and no previous history of rheumatic fever.

Mitrail stenosis and bronchiectasis are ruled out by lack of evidence.

Suggestions: Watch carefully for any confirmatory signs of aneurysm, especially anginal attacks and paroxysmal dyspnoea.

Ask the throat specialist if there is any paralysis of the vocal chords or ulceration of the trachea and larynx.

Obtain a good radiogram of the chest, both antero-posteriorly and laterally. Screen for dilated aorta.

Continue to look for tubercle bacilli and repeat the total and differential leucocyte count.

Have the Wassermann reaction done.

Give morphia and paraldehyde or chloral to obtain sleep.

April 27. Pain now present over the whole chest in front, and interferring with sleep. Weight 132 pounds; sputum repeatedly examined for tubercle bacilli with negative results.

April 30. Pain in chest very severe. Morphia, $\frac{1}{2}$ grain, given at night.

May 2. Cough has a harsh, clanging sound. Sputum scanty, mucopurulent, tinged with blood. Respiratory rate increasing. Percussion over the front of the chest causes very severe pain. Heart dullness increased downward and to the left. Posteriorly, breath sounds are very faint over the left lung. Vocal resonance is unchanged. Over the right lung posteriorly the breath sounds are faint, but louder than those heard over the left lung.

May 7. Pain worse, and morphia has to be given at night. Does not wish to eat and refuses to be radiographed again.

May 10. Pulse increasing in rate and becoming feeble. Food vomited about an hour after ingestion, apparently not due to pressure on the esophagus.


May 18. Died.

During the time he was in hospital the pulse rate increased steadily from 76 to 140, and the respiration rate from 20 to 38. The temperature varied between 97° F. and 102° F., being steadily above normal from April 19 till May 9, when it became subnormal and remained so, with the exception of one evening rise to 100° F., until the end.

A post-mortem examination was performed on the evening of May 18, six hours after death, and the following relevant findings are recorded:—

There were numerous dark brown petechiae over the chest and face, but no dilatation of the superficial blood-vessels. There was blood-staining on the lower lip. On the crest of the right shoulder, half-way between the acromion and the root of the neck, was a round, puckered scar, $\frac{1}{2}$ inch.
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in diameter. On the circumference of this scar could be felt some small, rather hard nodules, about \( \frac{1}{4} \) inch in diameter. None of the superficial glands were markedly enlarged. There was oedematous swelling over both ankles, more marked on the right.

The abdominal cavity was free of fluid. The liver was enlarged (ninety-four ounces), brown in colour, very greasy to the touch, and contained about half a dozen round white nodules, the largest of which was \( \frac{3}{4} \) inch in diameter. Two of these were superficial, but were not raised above the general surface. Apart from some moderately enlarged mesenteric glands, no other abnormality was found.

When the chest was opened, it was found that the parietal pleura was disorganized and friable on the left side, and the left pleural cavity full of a golden coloured, clear fluid of the consistence of serum, which escaped as soon as the sternum was removed. There was a small quantity of serous fluid in the right pleural cavity. When the sternum and costal cartilages were removed, it was found that nothing presented but a mass of new growth, roughly divided into three lobes, the central one of which occupied the anterior mediastinum, while one lateral rounded mass occupied the anterior part of each pleural cavity. The heart could not be seen or felt, and neither lung could be seen, but the left lung, soft, shapeless and collapsed, could be palpated behind the left mass of the growth, and the right lung, which felt rather more normal in consistence, though some small hard nodules could be felt in it, was palpable behind the right lobe of the growth. Both lungs were adherent to the posterior aspect of the growth, which was irregularly coloured, dark red, white and yellow, and to palpation felt hard in some areas, moderately soft in others.

During removal of the thoracic viscera, considerable congestion of the neck muscles was noted, and the muscles were soft and oedematous. There was no enlargement of lymph glands, the mucous membrane of the oesophagus showed no abnormality, and the thoracic duct was healthy in appearance and not distended. The thyroid gland was slightly enlarged, but otherwise healthy. The larynx and trachea appeared normal, but there was considerable inflammation with collection of mucus in the bronchi. The smaller bronchi on both sides contained mucopurulent fluid which, on the left side, was almost like gangrenous material. The mass of the growth was separated from the heart and lungs, and it was found that this could be effected fairly cleanly, there being no actual extension of the growth into any of these structures. The heart was found behind the central mass of the growth, and must have been situated at least two inches from the anterior chest wall.

The pericardium was free from fluid and the heart healthy, though small; it weighed nine ounces. The arch of the aorta was very acute, and showed signs of having been kinked during life, but there was no apparent disease in the wall, and no stretching of the wall could be detected.

The left lung was brown, shrivelled, shapeless and very soft. It weighed
Small nodule in lung.

Main tumour in mediastinum, showing type of cells.

Tumour cells growing among the red cells in a haemorrhage.

Primitive blood-vessels in main tumour.

Low power.

High power. Includes a fairly well-formed blood-vessel.

Original tumour removed in 1925.

Recurrent nodule in scar.

Main tumour in mediastinum.

twelve ounces. There was no functioning lung tissue present, and it contained numerous round, whitish nodules, up to about half an inch in size. The cut surface of these nodules showed a dull, dense white appearance. The right lung was more normal but showed general congestion. It weighed nineteen ounces and also contained a few round nodules.

One nodule in connection with the left lung was larger than the others and deserves special mention. It measured 1\frac{1}{2} inches in diameter, was situated at the apex of the lung, and was pedunculated apparently under the visceral pleura, so that it had quite a free range of movement. Its cut surface was spotted red and white.

The complete main growth was found to weigh five pounds, and was apparently of anterior mediastinal origin. It was not infiltrative to any extent, but was intimately wrapped round the vessels at the root of the neck. It showed no tendency to erode the chest wall. The cut surface was mottled, red, yellow and white, and showed large areas of haemorrhagic softening.

Portions of the main growth, of the lungs and liver, a portion of skin from the right shoulder including the old scar, and an enlarged gland from the mesentery were removed for microscopic examination.

The neoplasm was found to be a sarcoma of the large spindle-celled type, the cells fleshy, with large oval nuclei. Nuclear mitoses were not common. Blood-vessels were numerous and badly formed, and haemorrhages with resultant necrotic softening were scattered throughout. The nodules in the liver, lungs, and in the old scar on the shoulder closely resembled the main growth in structure. The mesenteric gland showed no abnormality.

It was fortunately possible to obtain a slide from the original tumour removed in 1925, and the photomicrographs, here reproduced of this preparation and of sections made at the R.A.M. College from the post-mortem material, were taken by Major J. S. K. Boyd, R.A.M.C.

The similarity between the low power appearances of the tumour removed in 1925 and the mediastinal growth is well shown. The cells of the latter are, however, more irregular in size and shape, and the blood-vessels of a more rudimentary development.

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