LYMPHOSARCOMA OF THE MEDIASTINUM WITH METASTASES TO THE SKELETON

REPORT OF A CASE

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Lymphosarcoma, as originally described by Kundrat, is an invasive tumor composed of lymphocytes or their forbears. Grossly it consists of a localized tumor involving a group of lymph nodes and invading the surrounding tissues. There may be metastases of varying extent. Microscopically the cell type is usually fairly uniform in a single case, but varies in different cases from a primitive cell or lymphoblast to an apparently mature lymphocyte. Some authorities conceive of reticulo-endothelioma of the lymph nodes as an extremely primitive lymphosarcoma, whereas others prefer to regard this as a separate type.

Lymphosarcoma partakes somewhat of the character of leukemia, in that it may infiltrate tissues with very little destruction. It resembles the sarcomata in (1) its localization to one group of nodes, to which the lesion remains confined longer than is the case in other proliferative lymph node lesions, and (2) its definite invasive properties. A leukemic blood picture may be present, (Sternberg's leukosarcomatosis).

A case belonging to this group was observed recently on the Medical Service of the State of Wisconsin General Hospital, having been referred by Dr. Oscar Lotz of Milwaukee.

CASE REPORT

A young man sixteen years of age, complaining of "chest trouble," was admitted to the hospital on Dec. 8, 1935. Two months before admission he had had pain in the right shoulder and more recently had suffered some vague pain in the region of the right hip. For the past two months he had also had vague fleeting pains in the chest, which were not localized. For the past month he had had a low-grade fever, reaching 102° on a few occasions. He also had severe night sweats. There was no history of cough, sputum, dyspnea or palpitation. Tachycardia was present. The history by systems revealed nasal obstruction, poor appetite with recent improvement, chronic constipation, and recent slight weight loss. The social and family histories were negative. The patient had had the usual childhood diseases. A rectal abscess was said to have been incised at the age of two years.

In November 1935 roentgen examination of the chest had revealed a mass in the left mediastinal region adjacent to the heart silhouette. The consulting radiologist at that time rendered a diagnosis of dissecting aneurysm of the thoracic aorta. Re-examination a few weeks later by competent clinicians and radiologists confirmed this diagnosis and the patient was sent home without treatment.

Physical examination on admission revealed a well developed, somewhat obese young white male with slight generalized pallor of the skin and mucous membranes; there was slight injection of the nasal mucosa. No enlargement of the peripheral lymph nodes could be established. Examination of the chest showed dullness over the 2nd, 3rd, and 4th left interspaces anteriorly, with diminished breath sounds and tactile fremitus over the same
area. The left border of the heart was percussed 9 cm. to the left of the midsternal line, in
the 5th interspace. A soft systolic apical murmur was not transmitted. The blood press­
ures were 120/78 right arm, 116/74 left arm, 168/90 right leg. There was pain over the
region of the subdeltoid bursae. There was some mottling of the skin over the left shoulder.
Neurological and rectal examinations revealed no pathologic changes.

Laboratory studies included two urinalyses, both of which were essentially negative.
Blood study on admission showed 55 per cent hemoglobin, 4,400,000 red cells, 5,500 white
cells with 88 per cent neutrophils, 1 per cent eosinophils, 10 per cent small lymphocytes
and 1 per cent large monocytes. The blood counts were repeated on three occasions without
essential variation. The percentage of neutrophils remained about 90. The blood Wasser­
mann was negative. The blood sugar was 87 mg. and the non-protein nitrogen 27 mg. per
cent.

Fluoroscopy of the chest showed a lobulated area of density overlying the left cardiac
border and extending well out into the lung field. This shadow could not be separated from
the heart shadow. It showed a pulsation synchronous with the auricle, but this seemed to
be transmitted. The chief extension of the mass was posteriorly. The esophagus was out-

![Fig. 1 and 2. Roentgenograms taken on admission, Dec. 9, 1935 (left), and on readmission, Jan. 20, 1936 (right)](image)

lined with barium but showed no displacement or pressure from an enlarged left auricle.
Roentgenograms demonstrated this mass in the left lung field (Fig. 1). The consulting
cardiologist agreed that the tumor was in all probability extracardiac. The roentgen diag­
nosis was, therefore, lymphoblastoma of the left mediastinum. Roentgen studies of the
pelvis and both shoulders taken at the same time, because of the pain experienced in these
areas, failed to show any evidence of disease.

Deep x-ray therapy was started on Dec. 11, 1935. One anterior and one posterior area
were treated daily, with 150 r (in air) per field for a total of 10 sittings (HVL_{in} = 1.0 mm.).
Only a moderate systemic reaction occurred, consisting of nausea, occasional vomiting, loss
of appetite, and slight fever. Roentgenograms of the chest taken on Dec. 21, 1935, did
not show any significant changes, and the patient was discharged on the following day.

The patient was re-admitted to the hospital on Jan. 19, 1936. The interval history
revealed that he had remained in bed the greater portion of the time after discharge from
the hospital. He continued to complain of severe pain in the right shoulder and right hip,
which was incompletely relieved by the local application of heat and administration of
codeine and aspirin by mouth. Night sweats were severe, and there was daily fever, ranging
between 99° and 102°. Other complaints were general malaise, anorexia, and palpitation of
the heart. Physical examination revealed maintained nutrition, with a decided increase in the yellowish pallor of the skin and mucous membranes. There was pallor of both fundi. A small ulcer was seen on the left surface of the nasal septum. Dental caries was present; the gums were bleeding. There was a strong suprasternal pulsation with tachycardia, and a systolic murmur was audible over the entire precordium. There was an area of impaired resonance; breath sounds and vibratory phenomena were diminished over the left upper mediastinum. The blood pressure was 108/68. The liver edge was palpable 2 cm. below the right costal margin, and the spleen tip 3 cm. below the left costal margin. There was severe pain on motion of the right shoulder and right hip. Swelling and tenderness were present in the right upper gluteal region. Rectal examination was negative.

Urinalysis on this admission showed a specific gravity of 1.029, reaction acid, albumen ±, glucose none, acetone none, two white blood cells per high-power field, and three hyalin casts per ten low-power fields. Blood studies on this admission showed 38 per cent hemoglobin, 2,130,000 red blood cells per cubic millimeter, 2,050 white blood cells per cubic millimeter, and a differential count of 81 per cent neutrophils, 1 per cent eosinophils, 7 per cent small lymphocytes, 1 per cent large monocytes, 5 per cent young lymphocytes, 3 per cent lymphoblasts, 1 per cent metamyelocytes, and 1 per cent abnormal large monocytes. The blood group was II. Smears of the blood showed anisocytosis, poikilocytosis, polychromatophilia, reduced platelets, and stippling of the red cells. A blood Wassermann test was negative. The blood sugar was 106 mg. per cent and non-protein nitrogen was 24 mg. per cent. The basal metabolic rate was +23 and −120 on two determinations. Blood studies were carried out daily thereafter without essential change except for progression in the anemia, which was combated with blood transfusions. The differential blood picture did not change and the severe leukopenia persisted.

Roentgen examination on Jan. 20, 1936, showed a definite increase of the mass in the left chest as compared with films taken on Dec. 21, 1935 (Fig. 2). Roentgenograms of the right shoulder (Fig. 3) showed spotted areas of rarefaction in the head and neck of the humerus and slight periosteal reaction along the upper ends of the shaft. In the pelvis were mottled areas of rarefaction in the right ilium adjacent to the sacro-iliac joint. The upper margin appeared ragged, but there was no evidence of new bone formation (Fig. 4). The changes in the humerus and ilium were interpreted as metastatic processes. No lesions could be demonstrated in the ribs.

A total of four deep x-ray treatments (200 r in air each) were given to the right posterior sacro-iliac region and to the right shoulder. This promptly relieved the pain but
numbness developed throughout both lower extremities. In spite of eight blood transfusions of 500 c.c. each (citrate method), no improvement in the blood picture was effected. Metastatic lesions appeared in the left parietal region of the skull and on the left posterior thorax. Edema of the face, eyelids, and lower extremities developed. There was frequent severe bleeding from the nose, requiring packing. The patient rapidly lost strength and died on Feb. 13, 1936.

**Autopsy**

The mediastinal mass, which was about 15 cm. in diameter, was firmly adherent to the anterior chest wall in the upper part of the thorax, and less firmly adherent to the structures surrounding it. The mass itself seemed fairly soft, although it was surrounded by a thick connective-tissue capsule. When the capsule was opened, its contents appeared as a soft hemorrhagic friable mass, apparently entirely necrotic.

The lungs were crowded posteriorly and were somewhat collapsed. Numerous firm nodules were felt in the lung tissue.

![Fig. 5. Mediastinal Tumor, Showing Necrosis and Hemorrhage. X 200](image)

The heart, apparently of normal size, was firm and was pushed posteriorly and downward, so that the great vessels were stretched and compressed.

The liver was enlarged and on its anterior surface were seen two pale nodules, 2 and 3 cm. in diameter respectively.

The spleen was apparently enlarged, and a few fibrous adhesions were present about it. Manual exploration of the abdomen revealed nothing remarkable except a firm mass of indefinite extent in the region of the right ilium.

**Microscopic Examination.** The mass in the mediastinum was almost entirely necrotic and hemorrhagic. A few tumor cells in a state of poor preservation were seen about the blood vessels (Fig. 5).

The nodules in the liver showed central necrosis, but the picture in the peripheral portions was that of a lymphosarcoma composed chiefly of primitive or blast cells (Figs. 6 and 7). The liver tissue was destroyed in some parts, but in others there was dense infiltration by tumor cells, the liver cells being merely crowded aside.

1 Permission was originally limited to examination of the mediastinal mass through a short abdominal incision, but it was deemed advisable to remove a small block of liver tissue.
FIGS. 6 AND 7. LIVER NODULE. × 200 AND × 400
There are two interesting features in this case. The first is the diagnostic differentiation between tumor and aneurysm of the aorta. This problem offers serious difficulties in many instances and, as shown in our report, even experienced observers may be deceived. The therapeutic response of this growth as shown roentgenographically, if compared with the histologic picture, is certainly confusing. After the microscopically proved destruction of a large portion of the neoplasm (Fig. 5) one would reasonably expect a reduction in size demonstrable in the x-ray studies. The absence of this reduction—as a matter of fact, there was an increase in size following treatment—can perhaps be explained by the presence of a capsule expanded by the pressure from necrosing tumor tissue and bleeding from eroded vessels into this capsule. The fact that the severe pain in the secondarily involved bones was so promptly relieved by irradiation again recommends this treatment in painful metastatic bone lesions.

Summary

A case of lymphosarcoma (primary in the mediastinum) with metastases to the skeleton and inner organs is reported. Although the tumor proved to be radiosensitive as shown microscopically, there was no decrease of the mediastinal mass demonstrable in the roentgenogram. The pain in the secondarily involved bones was promptly relieved by deep x-ray therapy.