Aleukemic Stem Cell Leukemia with Polyserositis

Report of Case

By ARTHUR H. RAYNOLDS, RENZO G. OLIVETTI AND RICHARD W. EKSTRAND

ACUTE LEUKEMIA has many clinical variations, of which involvement of serous surfaces is one of the most uncommon. Of these unusual cases, involvement of both the pericardial and pleural surfaces has never previously been recorded and that fact is the justification for the present case report.

Wendkos reported a case of massive pericardial effusion as the first clinical manifestation of lymphocytic leukemia. In this case, pericardial effusion appeared first, to be followed by left pleural effusion, both confirmed by the necropsy finding of leukemic plaques and infiltrations in pericardium and left pleura.

Friedman and Silverman reported a case of pericardial effusion in the course of chronic granulocytic leukemia. Effusion was not the first manifestation in this case; it disappeared during the course of the disease. Permission for necropsy was refused.

Bierman, Perkins and Ortega reported 4 cases of leukemic pericarditis. Two of the cases were granulocytic, and necropsy showed an adhesive pericarditis. The remaining two were lymphocytic in type, and in these necropsy showed a pericarditis with effusion.

The case presented here possesses several features of unusual interest, chief of which was the simultaneous involvement of both pericardial and pleural surfaces, thus making diagnosis difficult until the unusual hematologic features became apparent.

REPORT OF CASE

The patient (G. S.) was a 26-year old white male who was apparently well until April 25, 1952 when he first noticed mild dyspnea on exertion, which became progressively worse. He consulted a physician who found bilateral pleural effusion, a small pericardial effusion, and splenomegaly. The patient was hospitalized, and twelve chest taps were performed, the amount of fluid removed averaging 1,000 to 1,500 cc. The fluid was yellow and with high fibrin content, the specific gravity varying between 1.015 and 1.018, the cellular content largely "lymphocytes", averaging 2,000 per cc. The fluid remained sterile to routine and acid fast cultures and no malignant cells were found. Because of the rapidity of formation of fluid, closed tube drainage was performed on the left and then on the right, using Tryptar to facilitate aspiration of fibrin balls. There was moderate improvement on the above therapy. The closed tube drainage was then discontinued, and the patient was discharged. However, one week later, the dyspnea recurred and the patient was then admitted to the Veterans Administration Center, Bay Pines, Florida, June 27, 1952.

Physical examination revealed a poorly nourished, mildly dyspneic white male; temperature normal, pulse 120, blood pressure 96/68. A pulsus alternans was present. The apex beat was not palpable; no murmurs were noted. The heart was enlarged to percussion. Heart tones were distant. Dullness to percussion and diminished breath sounds were present over the lower thorax posteriorly and laterally. Spleen was palpable 4 cm. below costal margin.

From Veterans Administration Center, Bay Pines, Florida
Submitted April 10, 1954; accepted for publication July 13, 1954.
The liver was greatly enlarged, smooth, firm, and tender. The lower border was palpable in the pelvis. A small amount of ascites was present. There was no peripheral edema. Several small non-tender lymph nodes were present in the left supra-clavicular region and the left axilla.

X-ray of the chest revealed a moderate bilateral pleural effusion. The heart appeared to be enlarged in the transverse diameter. There was no change in the cardiac contour with prone and upright views. X-rays of the skull, pelvis and long bones were negative.

The blood showed: white blood cell count 6,500 with 67 per cent neutrophils, 29 per cent lymphocytes, 1 per cent monocyte, 1 per cent blast forms, 2 per cent juveniles; hematocrit 46; red blood count 4,680,000 with 93 per cent hemoglobin; urinalysis and serology were negative; culture of the pleural fluid was negative on routine and acid fast cultures; specific gravity of pleural fluid was 1.022; total protein 5.35; cell count of pleural fluid 419 per cu. mm. with 79 per cent mononuclear cells, 20 lymphocytes, 1 per cent eosinophils.

An electrocardiogram taken on admission showed a sinus tachycardia, low voltage in all 12 leads, but otherwise within normal limits. Serial electrocardiogram taken during the patient’s hospitalization showed the persistence of low voltage but no changes indicative of pericarditis. Of interest was the presence of electrical alternans seen in one of the latter tracings.

During his early hospitalization the patient was treated with 200 mg. sodium diet, mercurial diuretics and thoracentesis as necessary to relieve dyspnea. Because of increasing dyspnea, pericardial paracentesis was done on two occasions, and approximately 250 cc. of serosanguinous fluid was obtained. A bone marrow aspiration revealed marked white cell proliferation with 13 per cent blast forms, with absence of intermediate forms of the granulocytic series, presence of atypical myeloblasts and definite Auer bodies in the cytoplasm of two myeloblasts. The diagnosis of acute "stem cell" leukemia was made. A biopsy of a small supra-clavicular node was reported as "malignant lymphoma". At this time, it was noted that the spleen had become somewhat larger. Intramuscular Cortisone was given in doses of 300 mg. the first day, 200 mg. the next day, and then 100 mg. daily, with no demonstrable response to this therapy; the patient actually appeared worse. ACTH 25 mg. every 6 hours was substituted for Cortisone and was followed by an excellent response. There was marked subjective improvement with disappearance of dyspnea, increase in strength, and moderate euphoria. The pleural effusion disappeared, the liver receded below the costal margin and the spleen became smaller. The supra-clavicular and axillary nodes were no longer palpable. A "moon face", and a moderately severe acne developed as result of ACTH therapy. Hyperglycemia and glycosuria were controlled with insulin and diabetic diet. ACTH was reduced in dosage, because of these complications, to 40 mg. daily. This improvement continued for 6 weeks, but then a relapse occurred with return of the pleural effusion and hepatomegaly. White blood count at that time was 700 with 64 per cent blast forms, 8 lymphocytes, 14 segmented forms, 3 juveniles and 3 band forms. The red blood count was 3.39 M with 64 per cent (9.8 grams) hemoglobin. The platelet count fell to 3,390. Numerous ecchymoses and scattered petechiae developed. Blood transfusions and terramycin were given with only temporary benefit, and the patient grew progressively weaker and expired December 11, 1952.

An autopsy was performed 1 hour after death. The pertinent gross findings are reported:

**Heart**

The heart weighed 250 grams and lay free in the pericardial sac, which contained about 150 cc. of bloody fluid. The epicardium was granular and gray, with areas of hemorrhage. The subepicardial fat was up to 0.8 cm. in thickness, and lardaceous. The parietal pericardium was increased in thickness, measuring up to 4 cm. in maximum width because of firm, light gray tissue especially prominent on its anterior surface, where the pericardial tissues were adherent to the posterior surface of the sternum. Lardaceous gray tissue extended around the great vessels at the base of the heart and constricted the intrapericardial portion of the inferior vena cava. There was moderate dilatation of the right auricular...
appendage. No thrombi were noted in the cardiac cavities and no septal defects were present. The ventricular myocardium on section was uniformly light brown, averaging 2 mm. on the right and 11 mm. on the left. The atrioventricular and semilunar leaflets did not show changes of note. The coronary arteries were thin-walled and patent throughout.

**Lungs**

The right lung weighed 350 grams; the left weighed 200 grams. Fibrous adhesions were noted about both apices, whereas the lower portions of both pleural cavities were occupied by a multiloculated, encapsulated hemothorax (400 cc. of fluid on the right, and 800 cc. on the left). The left lung was markedly atelectatic and an infarction 4x4x4 cm. was noted in the lower lobe. The parietal pleura was thickened up to 1.5 cm.; it was light gray and granular, with hemorrhagic striations. Similar changes in lesser degree were noted on the visceral pleura. The cut surfaces of the right and left lung did not show changes of note except for the reddish-brown, firm, well-defined areas of infarction previously mentioned in the left lower lobe. The trachea was surrounded by a firm gray-white mass in which anthracotic nodules were identified.

**Mediastinum**

The mediastinum seemed to be considerably widened as a result of infiltration of light gray lardaceous tissue in which some lymph node outlines could be vaguely recognized. As previously mentioned, this infiltration extended down over the parietal pericardium and around the trachea. No thymic tissue was seen.

**Peritoneal Cavity**

The peritoneal cavity contained about 1,000 cc. of clear straw-colored fluid. The peritoneum was smooth and glistening.

**Liver**

The liver weighed 1,400 grams. External surface and cut surface did not show changes of note and the entire organ was markedly congested.

**Spleen**

The spleen weighed 220 grams. The cut surface was uniformly reddish-brown. No infarcts were noted.

**Lymphatic System**

No enlargement of the lymph nodes was found. Many lymph nodes inspected were small and firm and on section the cut surface was gray, with distinct cortex and medulla.

**Bone Marrow (Vertebra, Sternum, Ribs, and Femur)**

Bone marrow was grayish-red and soft.

The examination of other organs and systems not specifically mentioned did not reveal changes of note.

**Histologic Description**

**Heart**

The pericardium and the epicardium showed massive leukemic infiltration. The small subepicardial blood vessels were compressed by the extensive leukemic infiltration of the fat. The leukemic cells were represented by large mononucleated elements, with nuclei rich in chromatin, and prominent nucleoli; their cytoplasm was abundant and slightly
The epicardial lining was flattened and barely recognizable; fibrin was absent. Large areas of hemorrhage were noted in the outer portion of the subepicardial fat. The underlying myocardium did not show changes of note. The valvular leaflets were unaltered. The endocardium was well preserved. The coronary arteries were unaltered.
Peri-aortic Fibrous Tissue

Areas of hemorrhage surrounded by small leukemic nodules (perivascular in distribution).

Mediastinum (Fibro-Fatty Tissue)

Extensive fibrosis. Small perivascular leukemic infiltrates. No thymic tissue was identified in multiple sections.

Pleura (Pericardial)

Moderate leukemic infiltrate.

Bone Marrow (Vertebrae, Sternum, Ribs, and Femur)

There was a massive leukemic replacement in the marrow substance. The bony trabeculae were unaltered. Microscopic examination of the other organs and systems failed to reveal any leukemic process; the liver showed only moderate dilatation of the sinusoids; the structure of the spleen and lymph nodes was well preserved and the lungs showed small areas of recent lobular pneumonia, bilaterally.

Final Diagnoses

1. Leukemia, aleukemic, stem cell type, (with slight myeloblastic differentiation) of bone marrow; pericardium and epicardium, (massive); pleura, visceral, right and left, (moderate); fibro-fatty tissue of the antero-superior mediastinum, (slight).

2. Pneumonia, lobular, lower lobes, right and left.

Comment

Several features of this case are worthy of discussion. The onset of leukemia with pericardial and bilateral pleural effusions as the presenting clinical findings is quite unusual. To complicate the diagnosis still further, the usual early manifestations ordinarily associated with acute or subacute leukemia, i.e., gingival hemorrhages, leukemic peripheral blood changes, splenomegaly, and gross adenopathy, were lacking. The presence of just palpable nodes in the left supraclavicular area was considered of no diagnostic importance. The hepatomegaly was believed to be secondary to the tamponade resulting from the pericardial effusion, i.e., stasis of the liver. The essentially normal peripheral blood was of no diagnostic help. The presenting picture, then, was that of a polyserositis of unknown pathogenesis.

Bone marrow aspiration revealed the true nature of the process and it was apparent that aleukemic “stem cell” leukemia was present with polyserositis as the presenting feature.

The effects of steroid therapy in this case were of interest. It was apparent that ACTH benefited the patient temporarily and that Cortisone appeared to make the situation worse. The other effects of ACTH, i.e., acne, hyperseborrhea, and the disturbance of carbohydrate metabolism, presented no particular problems, either in pathogenesis or therapy.

Summary and Conclusions

A case of acute leukemia is reported in which there was onset with pericardial and bilateral pleural effusions, simulating polyserositis.
ALEUKEMIC STEM CELL LEUKEMIA WITH POLYSEROSITIS

SUMARIO IN INTERLINGUA

Es reportate un caso de acute leucemia distinguite per le facto que su declaration esseva accompaniate de effusiones pleural pericardial e bilateral que simulava polyserositis.

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