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Multiple myeloma in a 23-year-old man

A case report

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A case is reported of multiple myeloma in a 23-year-old man, including extensive clinical studies and postmortem examination. Multiple myeloma for this age group is considered to be extremely rare.

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Multiple myeloma has been described infrequently in younger age groups. Its occurrence in patients younger than 35 years of age is extremely rare. The present case is being reported because of the young age of the patient who showed classical clinical manifestations of multiple myeloma. Findings of the postmortem examination are confirmatory.

Case report

This 23-year-old single black male, a college student, was admitted to Henry Ford Hospital on March 20, 1973, after six weeks of heartburn, bloated feeling in the epigastrium after meals, and shortness of breath from the exertion of walking.

Past history revealed that birth was normal and there was no significant illness in childhood. In 1960, at age 9, he had been admitted to Henry Ford Hospital because of ruptured appendix with generalized peritonitis.

Physical examination for the current admission revealed a blood pressure of 160/80 mm Hg, pulse rate 130 per minute, regular, thyroid mildly enlarged, and no lymphadenopathy. The breasts were normal. The lungs were clear to percussion and auscultation. A grade II to grade VI systolic ejection murmur was heard over the left sternal border and there was a loud S-3 gallop at the left sternal border and at the base of the heart. The liver was palpable 15 cm below the right costal margin and was tender. The tip of the spleen was questionably palpable. There was no edema of the legs. Neurologic examination was within normal limits. The rectal examination was negative. Laboratory studies revealed the following: Hemoglobin 9 gm/100 ml, hematocrit 26%, white blood cell count 5,700/cmm, myelocyte 1, segmented neutrophils 60, bands 1, lymphocytes 20, eosinophils 7, basophils 1, monocytes 10. Peripheral blood smear revealed marked rouleaux

formation with three polychromatic normoblasts and four orthochromatic normoblasts per hundred white cells. Platelets were 99,000/cmm. The sodium 130 meq/litre, potassium 4.2 meq/litre, chloride 101 meq/litre, carbon dioxide 27 millimols/litre. The BUN 23 mg/100 ml, creatinine 1.9 mg/100 ml. The CPK 17 U/litre, LDH 189 U/litre, SGOT 21 U/litre, alkaline phosphatase 4.8 U/litre. The calcium 13.2 mg/100 ml and phosphorus 5.1 mg/100 ml. Serum protein electrophoresis revealed total protein 10.6 gm/100 ml, albumin 3.56 gm/100 ml, alpha$_1$ globulin 0.4 gm/100 ml, alpha$_2$ globulin 0.36 gm/100 ml, beta globulin 5.52 gm/100 ml and gamma globulin 0.22 gm/100 ml (Figure 1). Micro-double immunodiffusion of serum[1] revealed IgM less than 1.0 mg%, IgA greater than 2,000 mg%, IgG 166 mg% and IgE less than 0.04 mg%. Immunochemical analysis of serum either immunoelectrophoresis or micro-double immunodiffusion indicated resemblance of IgA myeloma and IgA was identified as lambda type[1].

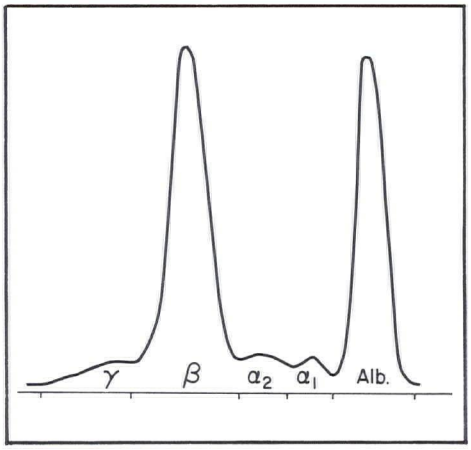

Figure 1
Serum protein electrophoresis, a monoclonal spike at beta region identified immunoelectrophorectically as IgA globulin.

Bone marrow aspiration and biopsy revealed 77.4% of myeloma cells, 70.2% of which were poorly differentiated plasma cells (Figure 2). Metastatic bone survey showed findings consistent with diffuse myelomatous involvement of the skeleton. Urinary immunodiffusion on two occasions was negative for IgM, IgG 0.3 mg%, IgA 2.1 mg%; the lambda light chain was positive. Scans of liver and spleen revealed hepatosplenomegaly. The prothrombin time was 14.5 seconds with a control of 11 seconds. Haptoglobin was negative. G-6PD was normal. Antinuclear factor was negative. Cardiopathy was suspected but a cardiac fluoroscopy was negative. Intravenous pyelogram showed a nonfunctioning left kidney and a nephrotomogram revealed multiple calcified structures in the vicinity of the left kidney suggesting calcified cystic lesions. Rectal biopsy was performed and was negative for amyloid. The patient was treated supportively for his mild azotemia. The consultant cardiologist considered possible cardiomyopathy secondary to plasma cell infiltration or amyloidosis.

Chemotherapy was initiated on April 12, 1973, using cytoxan, D-5W, BCNU, alkeran and prednisone. The patient responded and appeared to be in remission. Bone marrow in October, 1973, revealed degenerating fatty particles, very few hematopoietic elements and no evidence of tumor. However, metastatic survey on November 9, 1973 (Figure 3a) suggested diffuse myelomatous involvement of the skeleton. Clinical remission continued until March, 1974, when bone marrow again revealed 70% of myeloma cells. On July 22, 1974, he was again admitted to the hospital because of low platelet count, anemia and a two-week history of intermittent palpitation. He was admitted to the hospital two more times in September and in November, 1974, for multiple blood transfusions because of anemia and thrombocytopenia with intermittent epistaxis. Bone survey showed progression of involvement (Figure 3b). He was last admitted on December 5, 1974, with symptoms of generalized weakness, chest pain, fever and chills. On admission, his blood pressure was 120/20 mm Hg, with a pulse rate of 144 per minute. The cervical and inguinal lymph nodes were enlarged. Breath sounds were decreased bilaterally with bilateral basilar rales. A grade II to VI systolic ejection murmur was heard at the left sternal border. The abdomen was slightly tender to palpation, but no organomegaly was present. Blood culture revealed growth of Staphylococcus aureus. Urine culture was negative. Chest x-ray revealed infiltrates in the right lower lung field. The hemoglobin was 7.9 gm/100 ml, the WBC was 8,000/cmm with 84% polymorphonuclear leukocytes, 5% bands, 4% lymphocytes, 5% monocytes, the BUN was 45 mg/100 ml, creatinine 2.5 mg/100 ml. A diagnosis was made of pneumonia with septicemia and he was treated with antibiotics. However, he expired on December 6, 1974.

Postmortem Findings

At autopsy, the bone marrow including ribs, sternum, vertebrae and pelvic bones showed multiple small myelomatous nodules. The extramedullary myelomatosis was fairly wide spread, involving the liver (Figure 4), spleen and abdominal lymph nodes. Seen microscopically, the tumor was composed of sheets of closely packed plasma cells, predominately immature in form. Some abdominal lymph nodes were completely replaced by tumor cells (Figures 5a,b,c). Both lungs showed marked edema which can be ascribed to septicemia. There was also patchy bronchopneumonia. The

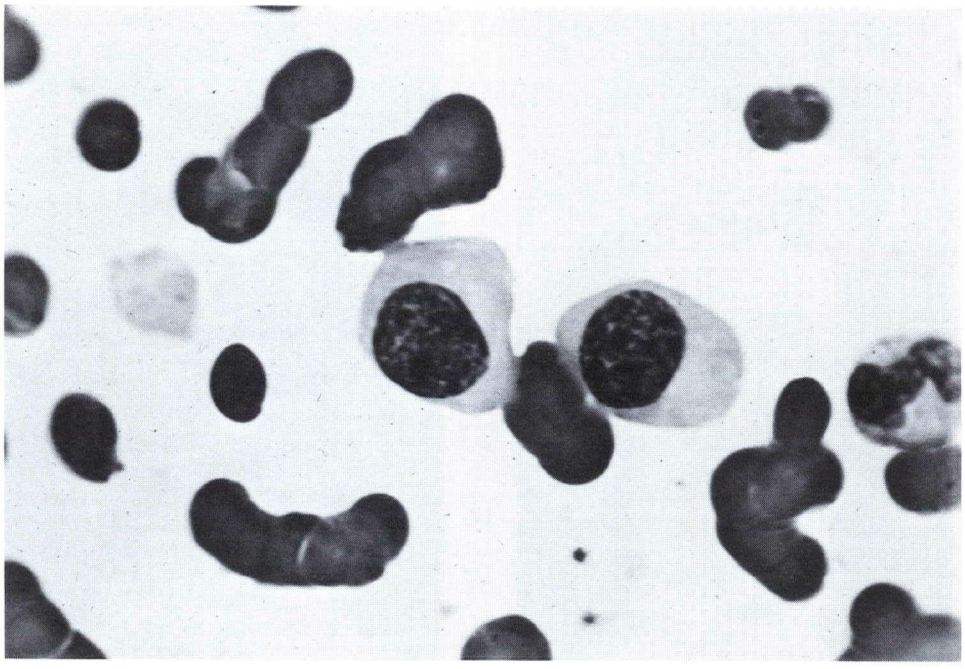

Figure 2
Bone marrow smear. Note two immature plasma cells with fine nuclear chromatin pattern. Leishman's stain; magnification, X 1,650.

left kidney was cystic with only a remnant of kidney tissue, the left renal artery and ureter were hypoplastic. These findings were consistent with dysplasia. No amyloid was found in the heart or other organs.

Family Survey of Immunoglobulins

We also had an opportunity to perform a study of serum immunoglobulin levels of five family members, including the patient's father, three brothers and one sister. His mother had died of stroke at age 54, and serum was not available. Serum immunoglobulin levels of all available family members are summarized in Table I. No significant abnormality was noted in IgA levels except for this patient.

Comment

Multiple myeloma is primarily a disease of the older age group, the highest incidence being reported in the ages from 50 to 70. One of us reviewed nine cases of myeloma in the literature of the pediatric age group adding another case of his own.[2] However, eight of these cases were reported 20 years ago. The precisely recorded serum and urine protein studies were found in only one case studied. Postmortem examination was performed in five cases,[2-6] four being described in detail. Since myeloma patients under 35 years of age are very exceptional,[7] we have described clinical manifestations, hospital course, serum and urine protein studies and postmortem examinations. All of these findings show rather classic manifestations of this disease in this young patient.

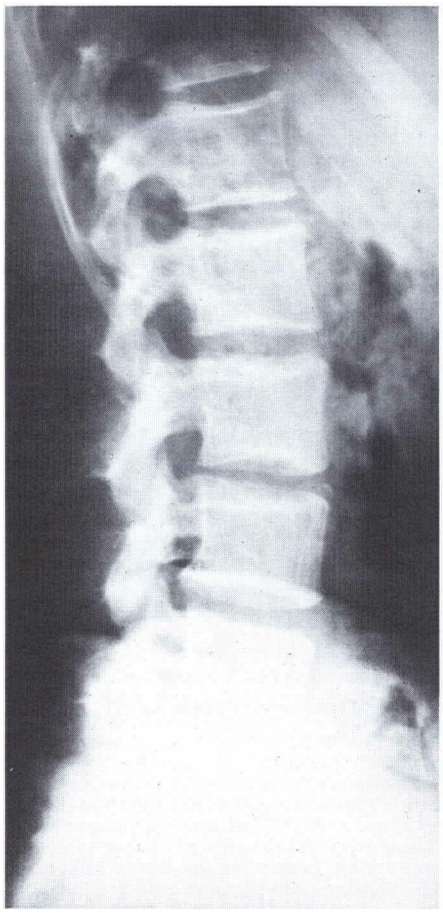

Figure 3a
Roentgenogram of the spine, showing diffuse demineralization.

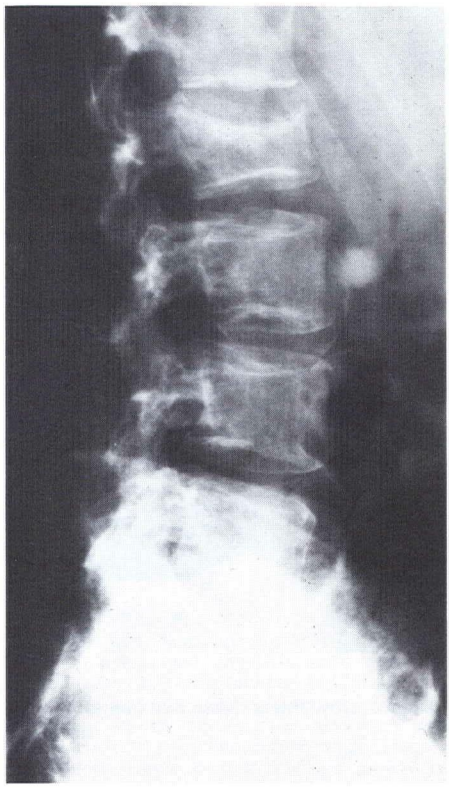

Figure 3b
Roentgenogram of the spine, taken 1 year after the previous film (Figure 3a), showing a mottled appearance with end plate deformities and collapse of L-2 vertebra.

Table I

FAMILY STUDY OF IMMUNOGLOBULIN LEVELS

	IgM	IgG	IgA
Normal range (mg%)	30-120	600-1400	30-135
Patient	< 1.0	166	>2, 000 *
Father	87	1, 557	103
Brother I	74	2,368	107
Brother II	101	1, 757	208
Brother III	70	1, 525	210
Sister	67	1, 550	180

* Myeloma IgA was identified as lambda type

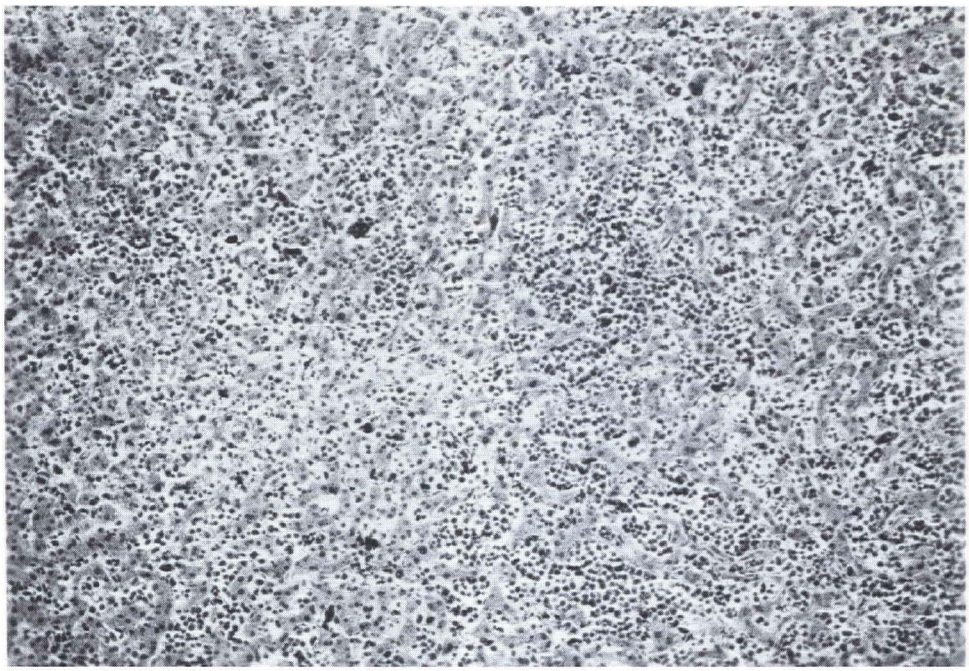

Figure 4
Liver, diffusely infiltrated by myeloma cells. Hematoxylin and eosin; magnification, X 150.

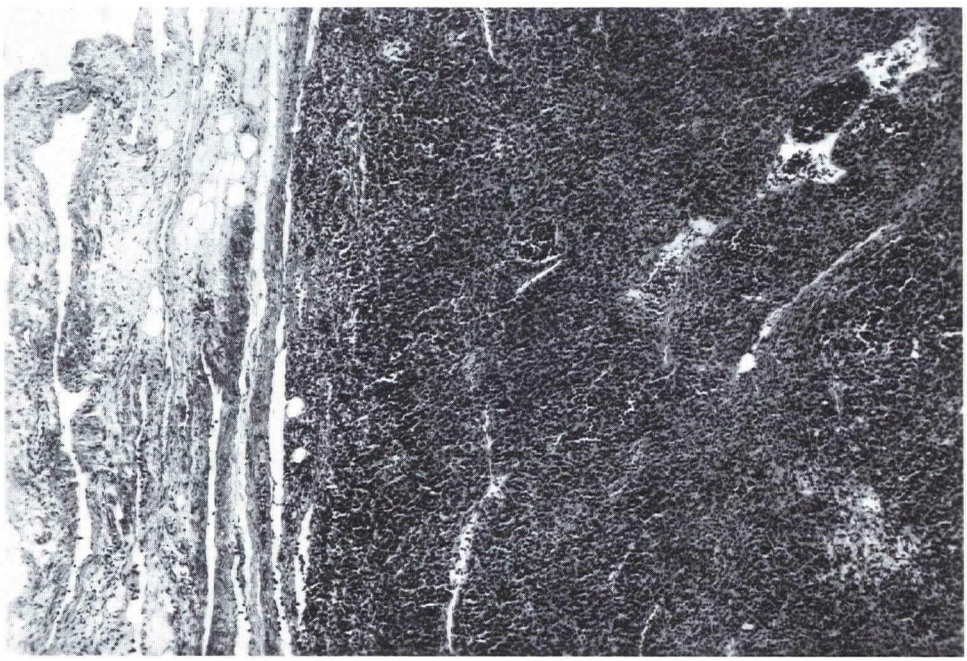

Figure 5a
Myelomatous infiltration of the lymph node. Hematoxylin and eosin. Complete distortion of the normal architecture, magnification, X 90.

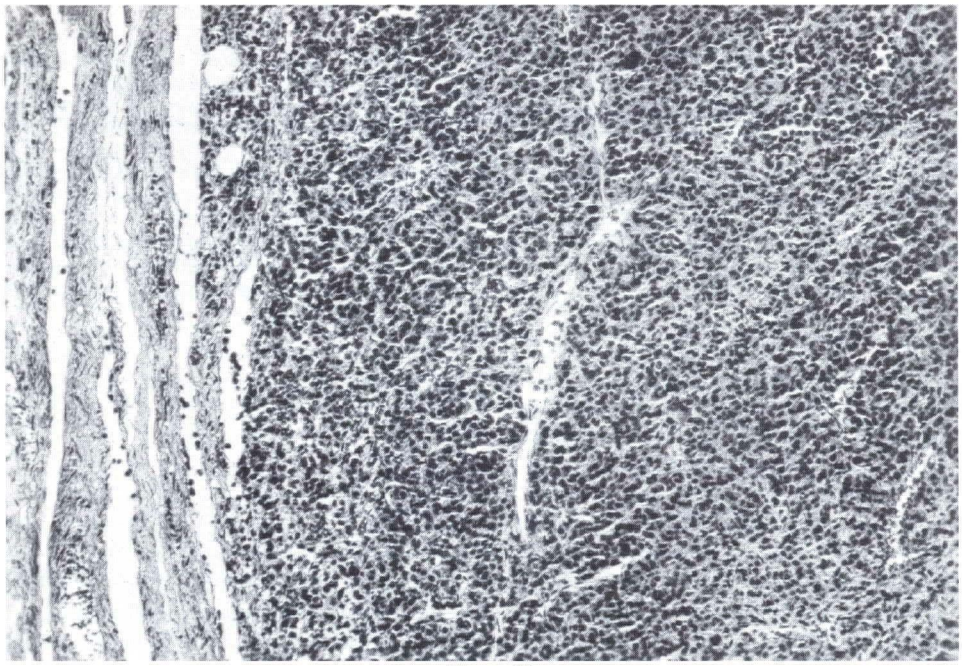

Figure 5b
Myelomatous infiltration of the lymph node. Hematoxylin and eosin. Capsular infiltration, magnification, X 175.

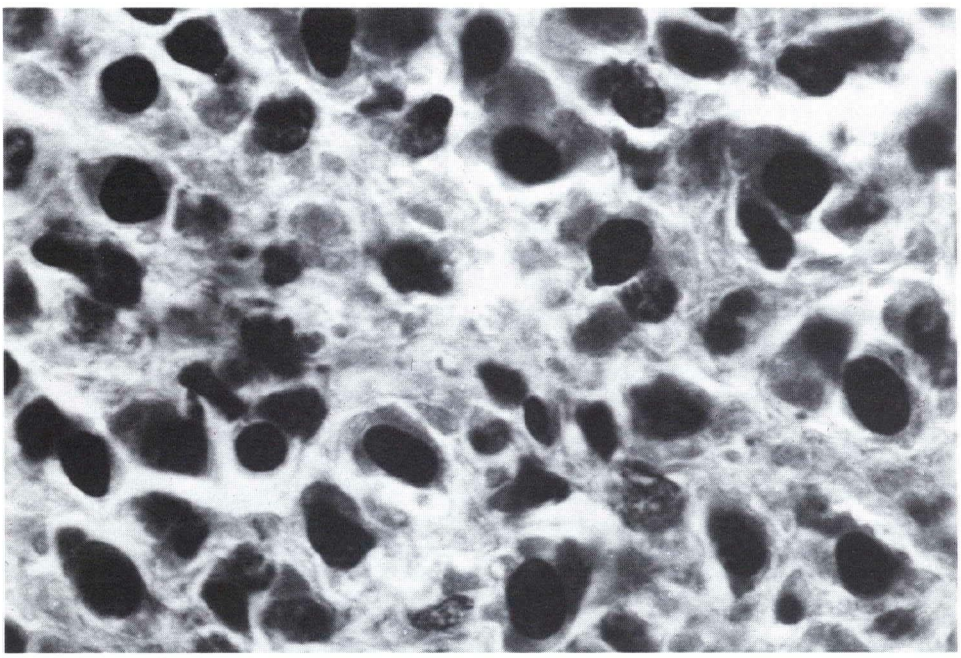

Figure 5c
Myelomatous infiltration of the lymph node. Hematoxylin and eosin. Myeloma cells, magnification, X 1,650.

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