Ultrastructural Features of the Plasma Cells in "Non-secretory" Myeloma*


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Summary. A case of "non-secretory" multiple myeloma is described. The diagnosis was based on the clinical picture, typical radiological findings, and infiltration of the bone marrow by myeloma cells which showed specific immunofluorescence staining mainly with antisera for IgM and kappa light chains. An attempt is made to explain the absence of pathological proteins in the serum, based on the ultrastructural findings of the myeloma cells, which showed "buddings" of the cell membranes containing endoplasmic reticulum and cytoplasmic material. It is suggested that the cells of the "non-secretory" type of multiple myeloma possess a normal excretory mechanism, but the pathological proteins are prevented to be secreted in the serum being surrounded by portions of the cell membrane.

Key words: Plasma cells – Non-secretory myeloma – Electron microscopy.

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Plasma cell myeloma is the most common form of plasma cell dyscrasia. According to Osserman and Fahey [16], plasma cell dyscrasias are defined by three main criteria: 1. proliferation of immunologically competent cells, usually identified as plasma cells, in the absence of recognizable antigenic stimulus; 2. elaboration of M-type gamma globulins with characteristic structural homogeneity and/or polypeptide subunits of these gamma globulins of the Bence Jones type, and 3. an associated decrease in the synthesis of normal gamma globulins. Monoclonal gammopathy and/or Bence Jones protein are found in the serum or urine of 99% of the cases with symptomatic plasma cell myeloma, but in 1–6% of these patients, the serum and the urine are without pathological findings [2,4,5,9,15]. These cases are defined as “non-secretory” plasma cell myeloma. Osserman and Takeda [15] have found three similar cases among 267 patients with myeloma. Azar et al. [2] reported 5 cases of “non-secretory” myeloma in a series of 132 patients. The clinical picture and the light microscopic morphology of the myeloma cells in the bone marrow are difficult to be distinguished from cases of the secretory type. In the absence of pathological immunological findings, the question arises whether the ultrastructure of the myeloma cells could allow the differentiation between secretory and non-secretory myeloma.

In the present report the clinical features, the ultrastructural and the immunofluorescent findings of the myeloma cells of a patient suffering from the “non-secretory” type of plasma cell myeloma are described.

Case Report

A 70-year-old woman, born in Russia, mother of 2 children, was admitted to our department in September 1974 because of diffuse pains in the thorax, spine and lower limbs. Her illness began in 1971 when she started to suffer from bone pains.

X-ray examination at that time revealed moderate osteoporosis and bone marrow aspiration biopsy showed clusters of plasma cells. The patient was treated for three months with calcium, prednisone and alkeran. During the following three years, she continued to complain of bone pains which were treated with analgetics alone.

On physical examination the patient was in a good general condition, not pale. There was marked sensitivity of almost all the bones on palpation; lymph nodes, spleen and liver were not palpable.

X-ray examination showed osteolytic, punched-out lesions in the skull, the low costal regions and the hip bones.

Laboratory examinations: ESR = 15/33 mm, hemoglobin = 11.9 g/dl, hematocrit = 35%, white blood cell count = 4,500/µl, with normal differential count, platelets = 151,000/µl. Bone marrow aspiration showed infiltration by large, immature and occasionally multinucleated plasma cells, seen in clusters and composing 29% of the nucleated cells. Additional examinations revealed: GOT 7 u/l, creatinine = 1.6 mg/100 ml, Cl = 105 mEq/l, Na = 143 mEq/l, K = 4.4 mEq/l, Ca = 9.2 mg/100 ml, P = 2.8 mg/100 ml, albumin = 4.0 g/100 ml, globulin = 3 g/100 ml. Electrophoresis of the serum proteins on cellulose acetate showed: albumin = 65%, α1 globulin = 4%, α2 globulin = 6%, β-globulin = 10%, γ-globulin = 15%, and the immunoelectrophoresis: IgG = 1300 mg/100 ml, IgA = 110 mg/100 ml, IgM = 80 mg/100 ml. Cryoglobulins were not found.

Urine examination was normal. Bence Jones protein was not found and electrophoresis on cellulose acetate of concentrated urine revealed only traces of albumin.