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CASE REPORT

Special IgD-λ type multiple myeloma based on bone marrow cell morphology: A case report

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Abstract

We aimed to explore the changes of laboratory indexes of IgD- λ type multiple myeloma with special cell morphology, and to improve the cognition of IgD-λ type MM. To explore the changes of laboratory indexes of IgD-λ type 1 multiple myeloma with special cell morphology, and to improve the cognition of IgD-λ type MM. The morphology of bone marrow cells, immunofixation electrophoresis, serum free light chain (sFLC) and other detection indexes of a patient with IgD-λ type MM treated in Handan Central Hospital in December 2020 were analyzed. The patient bone marrow smears showed 62% of abnormal cells–which were distributed in clusters and resembled lymphoma and metastatic cancer cells. The Flowcytometry indicates that the cell is a plasma cell tumor.Immunoglobulin IgG, IgA and IgM were all lower than the normal range.There is a monoclonal light chain λ component in immunofixation electrophoresis.The serum free light chain λ was 2700.00 mg/ L, light chain k/λ is 0.0023, the high of serum calcium, LDH, β2 microglobulin. IgD-λ type MM is a rare type of MM. The age of onset is young, the invasiveness is strong, the prognosis is poor, the clinical manifestation is complex, and it is easy to be misdiagnosed or missed. The analysis of the clinical symptoms and laboratory characteristics of the disease plays a positive role in the diagnosis, treatment and prognosis of the disease .

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Key words: IgD-λ type multiple myeloma; bone marrow cell morphology; immuno fixation electrophoresis; serum free light chain

A 66-year-old man sought treatment from the Department of Cardiology at a local hospital. His main symptoms were cough and shortness of breath, accompanied by dizziness, weakness, and edema of the lower limbs for since over half a month prior, which led the doctor to suspect "pulmonary heart disease." The laboratory examination results were: white blood cell count (WBC) 3.04×10^9/L, red blood cell count (RBC) 3.05×10^9/L, hemoglobin (Hb) 97 g/L, and platelet count (Plt) 87×10^9/L. However, hematological diseases could not be excluded, and the patient was admitted to the Handan Central Hospital for further treatment. Since the disease onset, the patient had a poor mental diet, normal stools, hematuria, no significant changes in body weight, moderate anemia, edema of both lower extremities, no bleeding point or ecchymosis in the systemic skin and mucosa, no palpable superficial lymph node enlargement, red pharynx congestion, coarse respiratory sounds in both lungs, no rrrhoea, no fever, and a blood pressure of 122/69 mmHg. The laboratory examination results were as follows: calcium 2.64 mmol/L, globulin 18.1 g/L, lactate dehydrogenase 1136 U/L, ferritin 1129.00 ng/L, uric acid 884.3 μmol/L, WBC 3.9×10^9/L, RBC 2.58×10^{12}/L, Hb 81 g/L, Plt 65×10^9/L. His quantitative immunoglobulin (Ig) levels were: IgG 0.45 g/L, IgA 0.63 g/L, IgM 0.14 g/L, and IgE 5 IU/mL. The blood light chain ration κ was 402 mg/dL, ration λ 280 mg/dL, and κ/λ 1.4357. His blood free light chain κ was 6.1 mg/L, blood free light chain λ 2700.00 mg/L, and blood free light chain κ/λ 0.0023. His serum β2 microglobulin was quantified at 3.78 mg/L.

The monoclonal proliferation of abnormal plasma cells is a specific pathological feature of multiple myeloma, but most malignant tumor plasma cells are well-differentiated, morphologically similar to normal plasma cells, and are easy to identify. The confusing aspect of this case was the bone marrow smear: hyperplasia was significantly active,

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and abnormal protoplast cells accounted for 62%. The cells were of different sizes, irregular shapes, contained rich cytoplasm, stained gray-blue, and contained some vacuoles, along with coarser chromatin with markedly large nucleoli that were scattered or clustered and fused (Fig. 1a–c). The following were noted: (1) possible lymphoma with bone marrow infiltration; (2) metastatic cancer was not excluded. In the patient's bone marrow smears, there were more abnormal cells distributed as clusters, which were morphologically similar to metastatic cancer cells. Some cells adhered to the clusters, and the cytoplasm appeared fused, but closer observation revealed a more cytoplasm-like superposition. However, single cells were relatively regular with clear nucleoli, which is more similar to lymphoid hematopoietic system cells, and morphologically indistinguishable from lymphoma cells and metastatic cancer cells.

IgD type multiple myeloma (MM) can manifest at a younger age and predominantly affects male individuals. Patient survival time is short, and the disease can be difficult to detect in its early stages. Most patients are in stage III period when symptoms appear. λ light chain type is more common, and such patients are more prone to anemia, kidney damage, hypercalcemia, and extramedullary infiltration, with a poor prognosis[1-3]. Therefore, early diagnosis is of great significance for the clinical treatment of IgD type MM, quality of life improvement, and prognosis assessment. In this case, serum protein electrophoresis revealed M protein bands, immunofixation electrophoresis for blood Ig (G, A, and M), κ, λ: monoclonal light chain component λ was observed in region λ, and immunofixation electrophoresis for blood IgD: monoclonal IgDλ component was observed in region β (Fig. 1d–f). His urine trace albumin was 4.65 g/24 h. Urine light chain λ ration was 378.00 mg/L, and the urine free light chain κ/λ was 0.0049 mg/L. FISH(CKS1B/CDKN2C) (1Q21.1p32.3) 40% (1Q21) and 20% (1p32) were detected as positive for chromosome-related CKS1B gene deletion. Currently, the most sensitive method that can identify monoclonal free light chains is the detection of serum free light chain (sFLC) levels, and the sFLC κ/λ ratio can reflect the clonality of plasma cells [4–5]. However, this requires a high proliferation rate of tumor cells, while 1q21 amplification indicates a poor prognosis in IgD MM [6].

Flow cytometry (FCM) revealed plasma cell tumors, with abnormal cell populations accounting for 14.68% of the nuclear cells. Due to the destruction of plasma cells by FCM, the proportion of abnormal cells was significantly lower than that of the bone marrow smears. The cells expressed CD56 and cLambda and partially expressed CD138, but did not express CD38, CD19, CD45, and cKappa. We considered that the early plasma cells were more primitive, which may be related to the special morphological manifestation of bone marrow cells. The morphological characteristics of myeloma cells are also different in different pathological stages and can be used to guide the clinical treatment, judge the curative effect, and evaluate the prognosis of myeloma cells [7–8] (Fig. 2).

In conclusion, in the diagnosis of IgD MM, the morphological study of bone marrow cells, immunofixation electrophoresis, and the detection of sFLC are of great clinical significance. In this case, in addition to the special cell morphology, the patient had a high plasma cell number, a high LDH and β2-microglobulin expression, and a high sFLC λ level, all

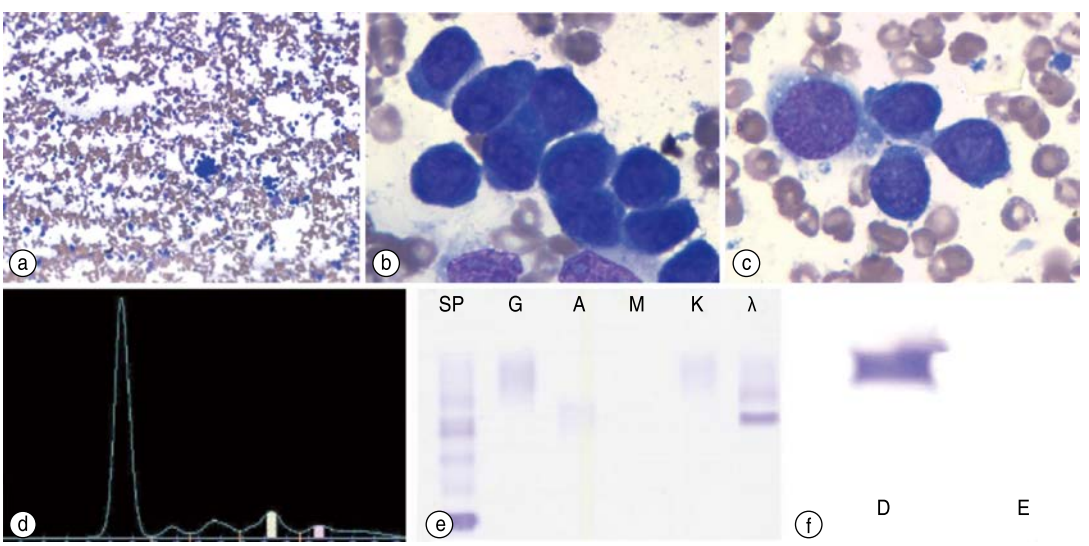

Fig. 1 Bone marrow image showing pancytopenia and a large number of abnormal cells (a) (Wright Giemsa 10 × 10). Bone marrow image showing abnormal plasma cells accounting for 62% (b–c) (Wright Giemsa 10 × 100). A detailed M-band appeared on serum protein electrophoresis (d). Serum immunofixation electrophoresis revealed a monoclonal light chain, which is a D-type immunoglobulin (e–f)

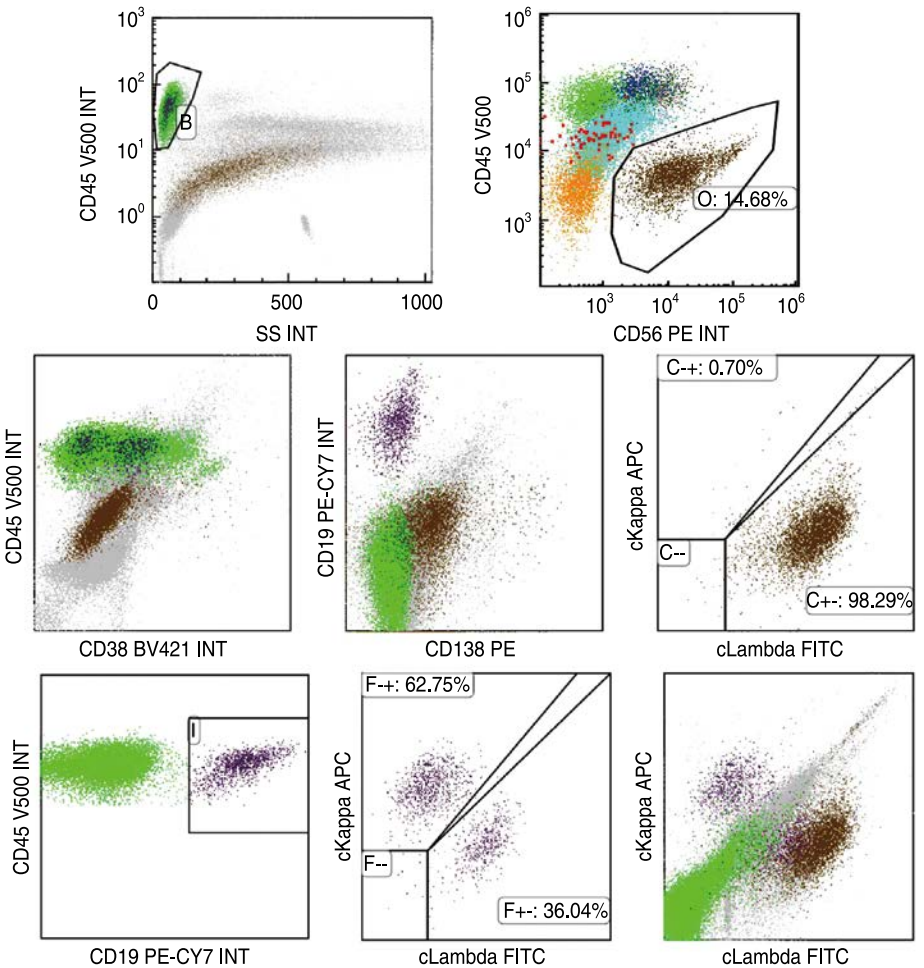

Fig. 2 Flow cytometry (FCM) revealing plasma cell tumors, with abnormal cell populations accounting for 14.68% of nuclear cells. Due to the destruction of plasma cells by FCM, the proportion of abnormal cells was significantly lower than that of the bone marrow smears. The cells expressed CD56 and cLambda and partially expressed CD138, but did not express CD38, CD19, CD45, and cKappa

suggesting a higher tumor burden and a more aggressive tumor invasion.

Conflicts of interest

The authors indicated no potential conflicts of interest.

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