IgD Multiple Myeloma with Renal Involvement: Case Report

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IgD multiple myeloma is a unique type of multiple myeloma which is characterized by increased serum IgD and IgD type M-component in immunoelectrophoresis. It frequently shows renal involvement but it is a rare form of myeloma. The distinctive features of IgD myeloma are the dominance in males, high frequency in younger persons, and the uncertain appearance of M-component in serum electrophoresis. We experienced 3 cases of IgD multiple myeloma with renal failure which required hemodialysis before IgD myeloma was diagnosed. It is important to consider IgD myeloma when treating the patients with renal involvement of unknown origin.

Key words: IgD, Multiple myeloma, Renal failure

Immunoglobulin D was first reported by Rowe and Fahey in 1965 in the serum of a patient with multiple myeloma (1). IgD myeloma is a rare form of multiple myeloma, comprising 2.1% of all myelomas (2). It is characterized by dominance in males, a high frequency in younger people, uncertain appearance of the M-component in serum electrophoresis, dominance of the \( \kappa \) light chain over the \( \lambda \) chain, the frequent appearance of Bence-Jones proteinuria, and the main characteristic of IgD multiple myeloma is a higher frequency of renal failure than in other types of myelomas. The mean survival period after diagnosis of IgD myeloma is 13.7 months (2), which is the shortest among all types of myelomas. We experienced three cases of IgD myelomas, all of which had renal failure requiring hemodialysis before the diagnosis of IgD myeloma.

CASE REPORT

Case 1

A 28-year-old woman was admitted to a local hospital because of fever and vomiting in September 1984. Oliguria and high levels of serum creatinine and blood urea nitrogen (BUN) were found. With a diagnosis of acute renal failure, temporary hemodialysis was performed eight times. Laboratory data at the time of the first hemodialysis were as follows: peripheral blood examination showed hemoglobin of 8.3 g/dl, hematocrit of 24.2%, white cell count of 6,500/mm\(^3\) and platelet count of 147,000/mm\(^3\). Serum biochemistry showed BUN of 71.3 mg/dl; Cr of 10.6 mg/dl; uric acid of 7.1 mg/dl; TP of 7.1 mg/dl; TP of 7.5 g/dl with 56.2% albumin, 4.2% \( \alpha_1 \)-globulin, 12.0% \( \alpha_2 \)-globulin, 7.2% \( \beta \)-globulin and 20.4% \( \gamma \)-globulin; amylase of 614So.U; IgG of 869 mg/dl; IgA of 69 mg/dl and IgM of 59 mg/dl.
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(IgD was not tested). We did not consider the origin of this renal failure to be IgD myeloma. Hemodialysis treatment was effective in improving renal dysfunction and the patient was discharged. For 12 months after discharge, she was in good health but serum creatinine and BUN levels gradually increased. With a diagnosis of chronic renal failure, maintenance hemodialysis was initiated 13 months after the first manifestation. Outpatient hemodialysis was successfully performed, but she began to suffer from lower back pain in October 1986 which became worse. She was readmitted to our hospital in April 1987. Abnormal findings in the physical examination on readmission were anemia and systolic murmur (Levine II°). Laboratory findings were as follows: peripheral blood examination showed remarkable anemia with hemoglobin of 4.7 g/dl, hematocrit of 14.3%, white cell count of 10,400/mm³ and platelet count of 98,000/mm³. Serum biochemistry showed GOT of 11 KU, GPT of 8 KU, LDH of 309 W-U, TP of 8.1 g/dl with 45.0% albumin, 2.8% α₁-globulin, 11.4% α₂-globulin, 21.3% β-globulin and 19.3% γ-globulin (M-peak shown in the β-globulin fraction), amylase of 1,363 So.U (no amylase-linked immunoglobulins were found), BUN of 110 mg/dl, Cr of 16.9 mg/dl, uric acid of 13.4 mg/dl, Na of 136 mEq/l, K of 5.2 mEq/l, Cl of 104 mEq/l and Ca of 5.7 mEq/l. Among the serum immunoglobulins, IgD was increased and the other immunoglobulins were suppressed. Serum immunoelectrophoresis disclosed increases in IgD and the λ-type light chain. Bone marrow aspirates were attempted three times but all were dry taps. Gallium scintigraphy showed abnormal uptake in the thoracic and lumbar vertebrae and ribs. IgD multiple myeloma was diagnosed based on the findings of serum IgD M-components and suppression of other immunoglobulins (IgD 3,240 mg/dl, IgG 220 mg/dl, IgA 8 mg/dl and IgM 7 mg/dl). Administration of cyclophosphamide and prednisolone was started and the clinical symptoms and serum IgD level improved. Since these immunosuppressants sometimes cause bone suppression, administration of these drugs temporarily was stopped several times. Although her general condition was well controlled for more than 18 months after diagnosis of IgD myeloma, she suddenly died of pneumonia in October 1988.

Case 2

A 52-year-old man visited our hospital with a complaint of exertional dyspnea. Renal dysfunction and hypertrophic cardiomyopathy had been found in July 1980. He was in good health except for fatigue and was treated as an outpatient. Renal insufficiency gradually worsened, therefore maintenance hemodialysis was initiated in July 1986. Laboratory findings on initial hemodialysis were as follows: peripheral blood examination showed hemoglobin of 8.7 g/dl, hematocrit of 28.5%, white cell count of 6,900/mm³, and platelet count of 153,000/mm³. Serum biochemistry showed BUN of 66.8 mg/dl, Cr of 10.6 mg/dl, uric acid of 6.0 mg/dl, LDH of 287 W-U and TP of 6.0 g/dl with 66.1% albumin, 3.6% α₁-globulin, 9.8% α₂-globulin, 8.2% β-globulin and 12.2% γ-globulin (the protein fraction was within normal range). Immunoglobulins were not studied. We did not consider IgD myeloma to be the cause of renal involvement. Because his general condition became worse three months after the beginning of dialysis, he was readmitted to our hospital for further evaluation. Abnormal findings in the physical examination on readmission were anemia, macroglossia, swelling of the cervical lymph nodes and edema in the lower extremities. Laboratory findings were as follows: peripheral blood showed anemia with hemoglobin of 7.0 g/dl, hematocrit of 22.0%, white cell count of 5,200/mm³ and platelet count of 239,000/mm³. TP was 5.3 g/dl with 65.1% albumin, 3.9% α₁-globulin, 10.6% α₂-globulin, 7.9% β-globulin and 12.5% γ-globulin (protein fraction was within normal range), BUN 100 mg/dl, Cr 10.9 mg/dl, uric acid 6.0 mg/dl, Na 139 mEq/l, K 5.3 mEq/l, Cl 107 mEq/l and Ca 5.0 mEq/l. IgD was increased to 2,200 mg/dl and other values were suppressed. Serum immunoelectrophoresis showed increases in IgD and the λ-type light chain. X-ray examination revealed a punched-out lesion in the skull and calcification of the left femoral bone. Based on findings of serum IgD M-components and the suppression of other immunoglobulins (IgD 2,200 mg/dl, IgG 646 mg/dl, IgA 88 mg/dl, IgM 46 mg/dl) and bone findings, he was diagnosed as IgD myeloma just after readmission. His general condition did not improve and dyspnea occurred. He died suddenly ten days after admission due to
respiratory failure.

Case 3

A 69-year-old man with renal insufficiency underwent surgery for a urinary bladder tumor at a local hospital in September 1987. Before the operation hemodialysis was initiated. At the time of the operation, a bleeding tendency was found and his general condition hardly improved after operation. The patient was transferred to our hospital for further examination in October. Abnormal findings in the physical examination were anemia, systemic edema and hepatomegaly, and moist rales were heard over the entire lung field. Laboratory findings on admission were as follows: peripheral blood showed hemoglobin of 6.2 g/dl, hematocrit of 18.7%, white cell count of 10,800/mm³, and platelet count of 100,000/mm³ and LDH of 744 W-U. TP was 6.6 g/dl with 50.4% albumin, 4.3% α₁-globulin, 12.9% α₂-globulin, 24.7% β-globulin and 7.6% γ-globulin (M-peak was found in the β-globulin fraction). BUN was 72.3 mg/dl, Cr 6.8 mg/dl, uric acid 9.2 mg/dl, Na 137 mEq/l, K 5.1 mEq/l, Cl 101 mEq/l, Ca 6.8 mEq/l, P 8.4 mg/dl and CRP 3.13 mg/dl. Immunoglobulin levels were IgG 420 mg/dl, IgA 31 mg/dl, IgM 15 mg/dl and IgD 138 mg/dl. Serum immunoelectrophoresis revealed increases in IgD and the κ-type light chain. Bone marrow aspiration showed an abnormal increase of immature plasma cells (immature plasma cells: 54%). Bone X-ray showed a compression fracture in the lumbar spine. IgD myeloma was diagnosed based on the myelogram (immature plasma cells: 54%), the pathological fracture and increase in serum IgD. Administration of melpharan and prednisolone was started but his general condition became worse and he died of disseminated intravascular coagulation and pneumonia three weeks after admission.

DISCUSSION

Renal insufficiency frequently occurs in the patients with multiple myelomas, especially IgD myelomas (2, 3). Causes of renal dysfunction in cases of multiple myelomas are assumed to be 1.) toxic effects of Bence-Jones protein, 2.) hypercalcemic nephropathy, 3.) deposition of amyloid substance in the kidney, 4.) plasma cell infiltration in the kidneys, 5.) cryoglobulinemic glomerulonephritis (4). IgD multiple myeloma produces more Bence-Jones protein than other types of multiple myeloma and this may be the reason for the high frequency of renal involvement in IgD multiple myeloma. The reason for the greater production of light chain by IgD myeloma is unknown.

The prognosis of multiple myeloma is closely related to renal involvement, therefore IgD multiple myeloma has a poorer prognosis than other types of myeloma. The mean survival period is 13.7 months after diagnosis (2), but diagnosis of IgD multiple myeloma is difficult and the diagnosis tends to be too late for sufficient treatment. IgD myeloma is diagnosed based on clinical symptoms (low back pain, general fatigue, anorexia, fever, anemia, etc.), laboratory examinations (M-component of IgD, immunoelectrophoresis, bone marrow findings) and other factors (bone fracture, punched-out lesion in bone X-rays etc.). However the clinical symptoms are inconclusive and overlap with those of chronic renal failure. Additionally M-component in the serum does not appear in all cases, so the diagnosis of IgD myeloma tends to be late. As in case 3, serum IgD is not always increased. Case 1 survived longer than the other cases because it was diagnosed before the general condition deteriorated and treatment could be started earlier.

The treatment of IgD myeloma is almost the same as that of other myelomas; cyclophosphamide, melpharan, and prednisolone are used for chemotherapy (2, 3). Hemodialysis and plasmapheresis are performed in cases of renal failure and hyperviscosity, but these therapies are only temporary (5—9). Hemodialysis patients have sometimes undergone hemodialysis without differential diagnosis. There is a possibility that some of them may have multiple myelomas, especially IgD myeloma. Therefore it is important to consider IgD myeloma when treating patients with renal failure of unknown origin.

REFERENCES

4) Dahlberg PJ, Keimowitz RM. Renal disease and
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