Case Report

Primary Plasma Cell Leukemia Presenting as Acute Kidney Disease

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ABSTRACT

Plasma cell neoplasms represent 1.4-2% of all malignancies. Primary plasma cell leukemia (pPCL) is a rare and aggressive malignancy of plasma cells with a poor prognosis, constituting only 1-4% of all plasma cell neoplasms. pPCL is characterized by the presence of >2X109/ l peripheral blood plasma cells or plasmacytosis accounting for >20% of total leucocyte count. Direct renal involvement in pPCL is rarely reported with only few cases in the English literature.

We present a case of 41 year old female came to outpatient department with complains of fever, cough and breathlessness since 3 days and multiple joint pains and fatigue since 1month. Patient was investigated for symptoms and peripheral blood smear revealed leucocytosis with 40% of plasma cells and thrombocytopenia. Complete urine examination revealed proteinuria and hematuria. Bone marrow aspiration and biopsy showed plasmacytosis and immunohistochemistry confirmed the diagnosis. As patient was in renal failure, dialysis was done. Renal biopsy revealed cast nephropathy. Chemotherapy with bortezomib was started. Despite an initial favourable response, the patient died within two weeks due to an infectious complication. pPCL has short unfavourable outcome, requiring the achievement of better data to improve the disease course.

Keywords: Primary plasma cell leukemia, acute kidney disease

INTRODUCTION

Primary plasma cell leukemia (pPCL) is a rare plasma cell disorder representing 1-4% of all plasma cell neoplasms, and current knowledge regarding survival in this disease is limited to small series of patients.It is defined by the presence of circulating plasma cells exceeding 20% of peripheral blood leukocytes or 2 x 10/ L9.

Plasma cell leukemia (PCL) is classified as either primary (60%) or secondary (40%). In pPCL, a malignant plasma cell clone is thought to arise de novo and the peripheral blood proliferation is the presenting condition. Secondary PCL occurs through clonal evolution of an underlying multiple myeloma and is a terminal event.

PCL is seen more frequently in light-chain only, IgE, and IgD myeloma, and less frequently in IgG or IgA myeloma. Although similar, PCL exhibits distinct clinical, immunophenotypic, and cytogenetic features that distinguish it from multiple myeloma. Direct renal involvement in pPCL is rarely reported with only few cases in the English literature.

We report a case of a 41-year-old female who presented with acute renal failure and heavy proteinuria and was found to have primary PCL invading the kidney coupled

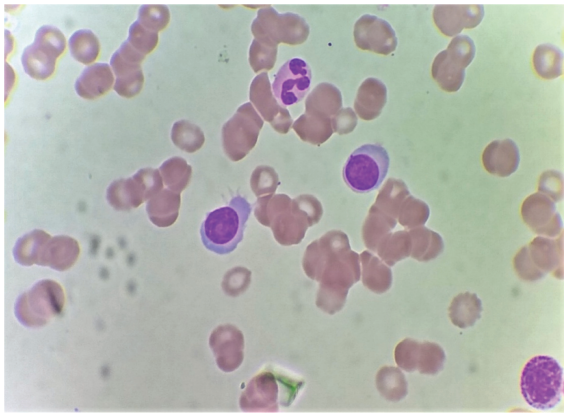

Figure 1: A) Peripheral smear showing plasma cells(arrow) (Leishman stain X100)

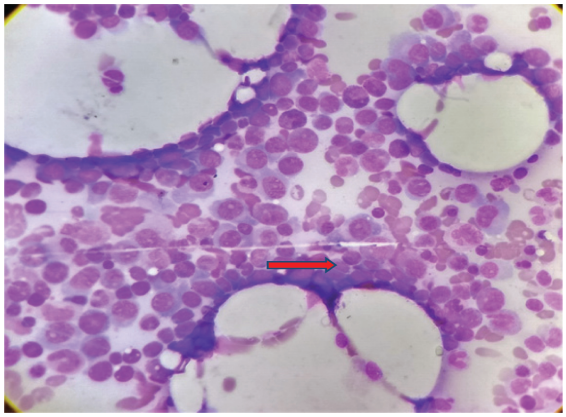

Figure 2: B) Bone marrow aspiration showing plasmacytosis and plasma blasts(arrow)(Leishman stain X100)

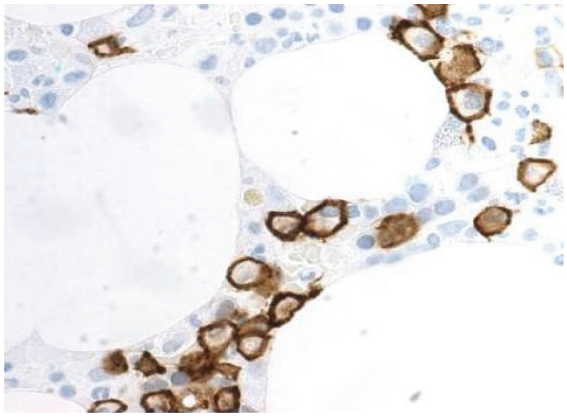

Figure 3: C) CD138 positivity in plasma cells in bone marrow aspiration (IHC X400)

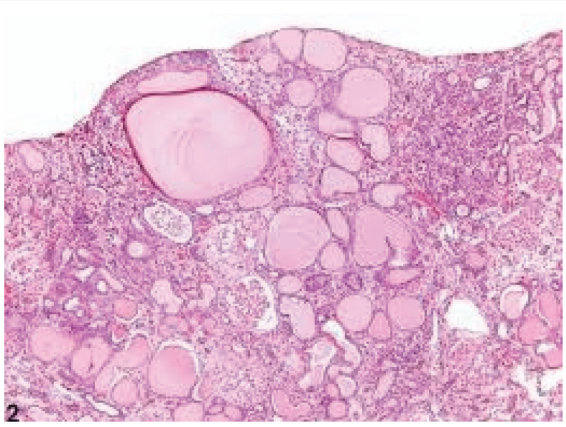

Figure 4: D) Renal biopsy showing fragments of renal cortex &medulla with tubular atrophy. Tubules contain dense casts and cortex infiltrated by atypical plasma cells.(H & E X10)

with light-chain cast nephropathy.

CASE REPORT

A 41-year-old female presented to the outpatient department with fever, cough, and breathlessness since 3days and multiple joint pains and fatigue since 1 month.

Laboratory data showed total leucocyte count 32.2 × 103/µL, haemoglobin 5.4 g/dl, platelet count 20 × 109/L, BUN 34 mg/dL, creatinine 1.2 mg/dL, and calcium 11.5 mg/dL. Initial urinalysis showed 2+ blood and 4+ protein. Peripheral blood smear revealed leucocytosis with 40% plasma cells and thrombocytopenia. No lytic lesions were noted in the imagology.

Serum protein electrophoresis demonstrated myeloma band. Serum flow cytometry with kappa chain was positive. Beta-2 microglobulin levels were 8448ng/ml which is 12 times more than normal. Bone marrow aspiration and biopsy showed >45% plasmacytosis and immunohistochemistry with CD 138 showed cytoplasmic positivity and confirmed the diagnosis. As patient was in renal failure, dialysis was done. Percutaneous renal biopsy revealed cast nephropathy. Chemotherapy with Bortezomib was started. Despite an initial favourable response, the patient died within two weeks due to an infectious complication.

DISCUSSION

PCL can be primary or secondary. The primary form occurs in individuals without preceeding multiple myeloma whereas the secondary form typically arises as a late manifestation in individuals with multiple myeloma. It develops in 1-2% of cases of multiple myeloma. Hepatosplenomegaly and lymphadenopathy are more common in primary than in secondary plasma

cell leukaemia. The lytic bone lesions are more common in patients with secondary plasma cell leukaemia (100% versus 60%). The median age of patients with PCL is 50-60 years with an approximately equal proportion of male and female patients.

Pathologic diagnosis of PCL is based on histologic, immunophenotypic, and cytogenetic findings in addition to circulating plasma cell count. Bone marrow biopsy typically reveals aggregates or sheets of neoplastic plasma cells that displace normal marrow elements.

Peripheral blood plasma cells range from mature forms with characteristic "clock-face" chromatin and perinuclear hof, to immature blastic forms with loose reticular chromatin, high nuclear/cytoplasmic ratio, and prominent nucleoli. Immature neoplastic cells may be indistinguishable from myeloblasts.

PCL displays multiple adverse prognostic indicators at presentation such as elevated lactate dehydrogenase, elevated beta2-microglobulin, hypercalcemia, high percentage of Bence-Jones proteinemia andrenal involvement.

Plasma cells in PCL frequently display a more immature phenotype. Expression of pan-B cell antigen CD20 has been shown in 50% of PCL cases compared to 17% of multiple myeloma cases. In addition, neoplastic cells in marrow and peripheral blood in both primary and secondary PCL typically do not express CD56, which is considered to have an important role in anchoring plasma cells to bone marrow stroma.

Immunophenotypic differences could be relevant in explaining survival differences between the two entities. Expression of CD56 in a minority of PCL cases has been associated with a favorable prognosis, while CD20 expression has been associated with shorter survival.

An increased incidence of cytogenetic abnormalities has been reported in PCL compared to multiple myeloma. Conventional cytogenetic studies have shown abnormal karyotypes in 30 to 40% of myeloma cases compared to 68% of PCL cases. Complex karyotypes with multiple chromosomal gains and losses are the most frequent changes.

Specific numeric chromosomal abnormalities described in PCL include monosomy 13, gains or losses in chromosome 1, trisomy 18, and monosomy X in women. Monosomy 13 may be present in up to 85% of PCL cases and, in multiple myeloma, has been associated with short post-treatment survival. The most common structural abnormality involves the immunoglobulin heavy chain (IgH) locus at 14q32, which is usually part of a translocation. Translocation t(11;14) (q13;q32) in particular has been associated with adverse outcome in patients with PCL .

Renal involvement in pPCL is considered to have unfavourable prognosis. Renal biopsy plays a major role in the diagnosis and management of acute kidney disease. In this case, the presence of acute kidney disease coupled with heavy proteinuria, the biopsy revealed kidney infiltration by PCL coupled with light-chain cast nephropathy. Treatment includes induction therapy with alkylating agents.

Patients with pPCL may initially respond better to chemotherapy including single agent drugs commonly used in multiple myeloma like Bortezomib. However, resistant disease is expected and a median survival of less than six months for both types of PCL has been observed. Infection, haemorrhage and renal failure contribute significantly to morbidity and mortality.

CONCLUSION

PCL is an aggressive and rare variant of multiple myeloma with poor outcome, requiring the achievement of better data to improve the disease course. No large trials are available on treatment of this disease but bone marrow/stem cell transplant has shown some long term survivals in individual cases.

CONFLICT OF INTEREST :

The authors declared no conflict of interest.

FUNDING : None

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