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# SEVERE HEMATOLOGICAL DISEASE IN A YOUNG PATIENT: CASE REPORT OF MULTIPLE MYELOMA ASSOCIATED WITH PLASMACYTIC CELL LEUKEMIA

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**Abstract:** Multiple myeloma is a hematological neoplasm of plasma cells characterized by clonal proliferation and production of monoclonal immunoglobulins, with the potential to cause bone damage, renal failure, anemia, and hypercalcemia. A particularly rare and aggressive variant is plasma cell leukemia (PCL), marked by the presence of circulating plasma cells and rapid clinical progression. This study presents the case of a 56-year-old female patient diagnosed with multiple myeloma associated with PCL during hospitalization initially motivated by an abdominal infection. The case highlights the importance of comprehensive diagnostic investigation and early referral to specialized onco-hematology services. After confirmation of the diagnosis of hematological neoplasia, treatment was initiated with VCD (Bortezomib, Cyclophosphamide, and Dexamethasone), but there was insufficient time to evaluate the therapeutic response due to the rapid progression of the disease.

**Keywords:** Multiple myeloma; Hematology; Plasma cell leukemia; Differential diagnosis; Prognosis.

## Introduction

Multiple myeloma (MM) is a malignant neoplasm of plasma cells, accounting for approximately 1% of all neoplasms and 10% of hematological cancers. However, among the various types of hematological cancer, it ranks second in diagnostic prevalence in Brazil, behind only non-Hodgkin's lymphoma. Plasma cells are represented by B lymphocytes, which are primarily responsible for antibody production and humoral immunity regulation. In general, these cells are found in the bone marrow, but they are

present throughout the body, especially in places where there is an immune response. The pathology is characterized by clonal proliferation of plasma cells in the bone marrow and the production of monoclonal immunoglobulins (M protein). These abnormal proteins result in tissue deposition and damage to target organs, comprising the set of manifestations known by the acronym CRAB: elevated calcium, renal dysfunction, anemia, and bone lesions.

The pathophysiology of myeloma involves multiple molecular mechanisms, including alterations in the NF-κB, RAS/RAF/MEK/ERK, and PI3K/AKT pathways, as well as the interaction of neoplastic cells with the bone marrow microenvironment, which promotes resistance to apoptosis and stimulates angiogenesis. Factors such as ionizing radiation, occupational exposure to pesticides and benzene, viral infections, and mutations in genes such as MYC and KRAS have been described as potential risk factors.

The disease is more prevalent in individuals over 60 years of age, with a slight predominance in males. In Brazil, according to the National Cancer Institute (INCA), multiple myeloma has a growing incidence, with an estimated 7,000 new cases by 2025.

Plasmacytoma leukemia (PL) is an aggressive variant of multiple myeloma, accounting for less than 3% of cases, characterized by >20% of plasma cells in peripheral blood or an absolute count greater than 2,000/mm³. It can occur primarily, without prior diagnosis of myeloma, or secondarily, as a terminal progression of the disease. Its average survival ranges from 6 to 12 months, even with modern treatment based on bortezomib and autologous bone marrow transplantation.

Given its rarity and aggressiveness, early identification of SCL is essential. This report seeks to contribute to the national literature by presenting a clinical case of multiple myeloma associated with secondary plasma cell leukemia, emphasizing the importance of clinical reasoning and differential diagnosis in patients with atypical systemic manifestations.

## Case Report

A 57-year-old female patient, L.C.F., was admitted to the emergency room at Santa Casa de Misericórdia de São Carlos with complaints of abdominal pain, specifically located in the right hypochondrium, which had begun 7 days earlier and progressed to flank pain, nausea, vomiting, and fever. She had a previous history of cholelithiasis scheduled for elective surgery, but the procedure was postponed due to anemia. Initially, the hypothesis of acute chronic cholecystitis was considered, but no emergency measures were taken by the general surgery team, which maintained the indication for elective surgery.

Over the following days, the patient developed a bloodstream infection caused by Escherichia coli, confirmed by blood cultures. Broad-spectrum antibiotics were administered (piperacillin-tazobactam, later meropenem).

During her hospitalization, the patient began to complain of significant pain in her left lower limb, specifically in the knee, which on physical examination presented with edema and hyperemia. A Doppler ultrasound was requested, confirming the diagnosis of pyarthritis, which was subsequently

addressed and resolved by the orthopedic team. Despite partial stabilization of the infection, the following laboratory abnormalities persisted: anemia, hypercalcemia, and progressive increase in serum creatinine.

Thus, the patient's blood count evolved as follows below.

Therefore, a hematological investigation was initiated in the emergency room, which showed a monoclonal peak in electrophoresis (shown in the figure below), with the presence of plasmacytosis ≥10% in the bone marrow, confirming the diagnosis of multiple myeloma.

| ERYTROGRAM | | | | | | | |
|---|---|---|---|---|---|---|---|
| Red blood cells | 2,78 | 10^6/uL | 3,08 | 2,11 | 2,16 | 3,8 - 4,8 | 10^6/uL |
| Hemoglobin | 8,5 | g/dL | 9,4 | 6,6 | 6,8 | 12,0 - 15,0 | g/dL |
| Hematocrit | 24,5 | % | 27,4 | 19,6 | 20,3 | 36,0 - 46,0 | % |
| VCM | 88,1 | fL | 89,0 | 92,9 | 94,0 | 83,0 - 101,0 | fL |
| HCM | 30,6 | pg | 30,5 | 31,3 | 31,5 | 27,0 - 32,0 | pg |
| CHCM | 34,7 | g/dL | 34,3 | 33,7 | 33,5 | 31,0 - 35,0 | g/dL |
| RDW | 19,2 | % | 19,3 | 19,6 | 18,6 | 11,6 - 14,0 | % |
| Moderate anisocytosis, moderate poikilocytosis, presence of moderate hamaccias in Relaux | | | | | | | |
| PRESENCE OF 5 ERYTHROBLASTS IN 100 LEUKOCYTES | | | | | | | |
| LEUKOGRAM | | | | | | Adulto | |
| White blood cells | 100 % | 20600 /uL | 25200 | 19107 | 11300 | 100 % | 4.000 - 10.000 /uL |
| Myelocytes | 4,0 % | 824 /uL | 756 | 573 | --- | 0 % | 0 /uL |
| Metamyelocytes | 3,0 % | 618 /uL | 504 | 1911 | --- | 0 % | 0 /uL |
| Sticks | 6,0 % | 1236 /uL | 1764 | 2484 | --- | 0,0 - 8,0 % | 0 - 780 /uL |
| Segmented | 52,0 % | 10712 /uL | 13608 | 10127 | --- | 40,0 - 80,0 % | 1.800 - 7.800 /uL |
| Eosinophils | 0,0 % | 0 /uL | --- | 191 | 136 | 1,0 - 6,0 % | 20 - 500 /uL |
| Basophils | 0,0 % | 0 /uL | --- | --- | 23 | 0 - 2,0 % | 20 - 100 /uL |
| Lymphocytes | 23,0 % | 4738 /uL | 5292 | 3439 | 3650 | 20,0 - 40,0 % | 1.000 - 3.000 /uL |
| Plasmocytes | 7,0 % | 1442 /uL | 2268 | --- | --- | 0 % | 0 /uL |
| Monocytes | 5,0 % | 1030 /uL | 756 | 382 | 1639 | 2,0 - 10,0 % | 200 - 1.000 /uL |
| EXAM RELEASED AFTER REVIEW | | | | | | | |
| Platelets | 66.000 | /uL | 88 | 95 | 145 | 150.000 - 450.000 /uL | |

1 . BLOOD COUNT

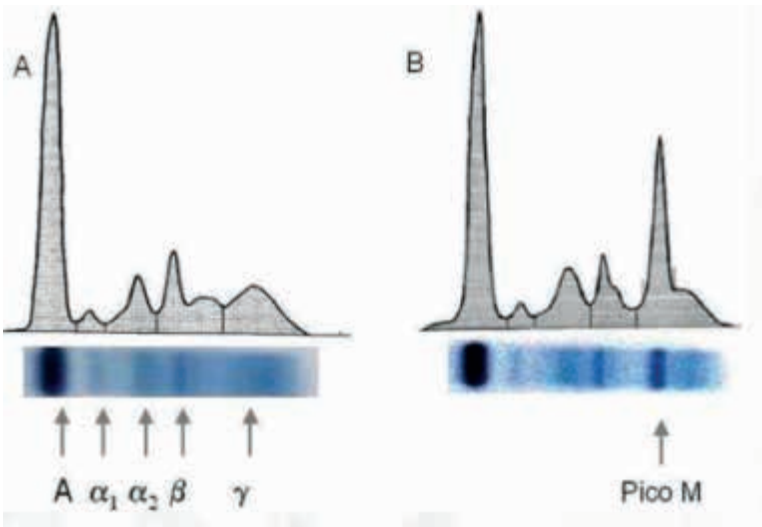


Figure 2 . ELECTROPHORESIS - MONOCLONAL PEAK.

Subsequently, the presence of plasma cell leukemia, an aggressive condition, was also confirmed. The patient was therefore referred to Santa Casa de Araraquara, a leading center for onco-hematology. At the specialized oncology and hematology service, treatment was initiated with the VCD regimen (Bortezomib 1.3 mg/m², Cyclophosphamide 300 mg/m², and Dexamethasone 40 mg/day). However, due to the rapid progression of the disease, there was no time to evaluate the therapeutic response. The patient died.

## Discussion

The reported case reinforces the need to maintain a comprehensive clinical perspective, especially in patients with persistent systemic symptoms that are refractory to conventional treatment. The initial presentation as an infectious condition masked the presence of a serious hematological disease, delaying the definitive diagnosis.

The association between multiple myeloma and plasma cell leukemia represents a rare but clinically significant progression. Recent studies show that the presence of circulating plasma cells in peripheral blood correlates with a worse prognosis and resistance to conventional treatment. In a Korean multicenter analysis, Kim et al. (2016) observed a median survival of 7.4 months in cases of PCL, even with bortezomib-based therapies.

Therapeutic advances, including the combination of proteasome inhibitors, immunomodulators (lenalidomide, pomalidomide), and monoclonal antibodies (daratumumab), have improved the prognosis for some patients with multiple myeloma, but with limited results in leukemic forms. Autologous bone marrow transplantation, when feasible, remains the main consolidation strategy, but rapid progression often makes it unfeasible, as observed in this case.

The Brazilian literature is still scarce in clinical reports of plasma cell leukemia, reinforcing the relevance of publications that address the reality of regional services. In addition, the case highlights the importance of interdisciplinary work between clinicians, infectious disease specialists, and hematologists for early diagnosis and rapid initiation of treatment.

## Conclusion

Multiple myeloma associated with plasma cell leukemia is a rare and highly lethal entity that challenges diagnosis and therapeutic management. This report highlights how recurrent infectious conditions can mask serious hematologic diseases, requiring detailed laboratory and imaging investigations.

Early recognition of warning signs—unexplained anemia, hypercalcemia, bone lesions, and renal failure—is essential for diagnosis and referral to specialized centers. The case described also highlights the need to strengthen training and integration policies between emergency services and hematology, allowing for more timely diagnosis and intervention.

Even with modern therapies, the unfavorable outcome reinforces the aggressive nature of plasma cell leukemia and the urgency of multicenter studies exploring new therapeutic strategies. This report con-

tributes to expanding clinical and scientific knowledge about this condition and reinforces the importance of early diagnostic suspicion.

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