Case Report

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Plasma cell leukemia in a 34-year-old male: rare scenario case report

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Introduction: Plasma cell leukaemia is an uncommon plasma cell dyscrasia with a very poor prognosis. It is more common among males and usually presents between 55 and 65 years of age.

Case presentation: A 34-year-old male presented to Al-Assad hospital with unremitting back pain. He was given analgesics but his pain was unresponsive to treatment, and due to the COVID-19 pandemic, he refused a computed tomography scan in the hospital. Later that year, he presented again with weight loss, nausea, abdominal pain, melena, and ascites. He was pale with a moderately distended abdomen. Laboratory tests revealed anaemia, thrombocytopenia, hypercalcemia, increased total proteins, and elevated lactate dehydrogenase. Flow cytometry findings of the bone marrow aspirate showed the presence of 30% of plasma cells, positive for CD38, CD56, and kappa light chains. He was diagnosed with secondary plasma cell leukaemia and started on chemotherapy; however, he could not continue his treatment due to myeloid inhibition. He passed away 5 months later.

Clinical discussion: Multiple myeloma was not suspected in the patient due to his young age. The diagnosis was delayed even further due to the COVID-19 pandemic. His multiple myeloma progressed into secondary plasma cell leukaemia and had uncommon features like small intestinal polyps. Even though there has been groundbreaking advancements in chemotherapy, plasma cell leukaemia still possesses a fatal prognosis.

Conclusion: This report showcases a rare age presentation with unique manifestations of secondary plasma cell leukaemia. Multiple myeloma should be a differential diagnosis for cases with unexplained back pain despite an unclassical age.

Keywords: ascites, back pain, case report, duodenal polyps, multiple myeloma, plasma cell leukaemia

Introduction

Plasma cell leukaemia (PCL) is a rare and aggressive variant of multiple myeloma (MM) characterized by plasmacytosis greater than 20% or at least 2×10^9/l plasma cells in the peripheral blood[1]. PCL is classified into primary (pPCL) when there is no previous history of MM or as secondary (sPCL) when there is leukaemic transformation of a preexisting MM. Usually, pPCL presents a decade earlier than sPCL (54.7 vs. 65.3 years) and is associated with longer median overall survival[2]. Untreated MM can lead to sPCL within 20–22 months, which occurs as a terminal stage in 1–4% of all MM cases[1]. Representing up to 60% of PCL, pPCL demonstrates an aggressive course with rapid progression if left untreated, as the mortality rate within the first month amounts to as high as 15%[3]. pPCL presents with anaemia, increased serum beta-2 microglobulin, elevated lactate dehydrogenase, hypercalcaemia, renal impairment, and hypoalbuminaemia, whereas sPCL presents with a MM prodrome and renal insufficiency[3]. We present a case of a 34-year-old male diagnosed with PCL, most likely secondary, which clinically presented as back pain, ascites, and duodenal polyps.

HIGHLIGHTS

- Plasma cell leukaemia is an aggressive form of plasma cell dyscrasias that is more common among older adults.
- Untreated multiple myeloma can progress into secondary plasma cell leukaemia.
- A 34-year-old patient presented with unremitting back pain, weight loss, abdominal pain, melena, and ascites.
- He was diagnosed with plasma cell leukaemia secondary to multiple myeloma and started on chemotherapy, but he passed away 5 months later.

Case report

A 34-year-old Syrian male presented to the outpatient department in Al-Assad Hospital in 2019 with back pain. The doctors did not find a cause for his back pain and he was treated symptomatically. One year later, during the peak of the COVID-19 epidemic, he presented again with increased back pain. His doctors ordered a

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computed tomography scan but he refused because the computed tomography scanner was also used for imaging COVID-19 patients due to limited resources, and thus our patient was afraid of contracting COVID-19. By the end of 2020, his condition worsened and he presented back to the hospital with weight loss, sweating, nausea, and abdominal pain. His pain increased with food consumption and was accompanied by melena. His family history includes hypertension and diabetes mellitus II.

Physical examination revealed a pallid man with a moderately distended abdomen and no palpable organomegaly. Other systemic examinations revealed signs of fatigue, dyspnoea, and palpitations.

Initial laboratory investigations revealed anaemia and thrombocytopenia. Further testing showed hypercalcemia (1.74 mmol/l), high levels of urea (14.4 mmol/l), creatinine (202 mmol/l), and uric acid (779 mmol/l), along with increased aspartate aminotransferase (66.6 U/l), and elevated total proteins (90.9 g/l). Other prominent lab results included increased lactate dehydrogenase (858 U/l), and elevated erythrocyte sedimentation rate (165 mm/h).

Microscopic inspection of the bloody aspirated ascites revealed massive amounts of mature and immature looking mono-nucleated and multi-nucleated plasma cells [Figure 1]. Endoscopy showed gastrointestinal ulcers along with duodenal polyps. Multiple biopsies taken from the duodenal epithelium initially revealed polypoid mucosal projections composed of infiltrating, monomorphic, and discohesive cells of medium size and plasmcytoid appearance, accompanied by lymphocytes [Figure 2]. Immunohistochemical staining confirmed abnormal plasma cell infiltration. These cells were positive for CD38 [Figure 3] and CD 138 and negative for CD 20 and CD 3 [Figure 4]. The gastric tissue biopsy was unremarkable.

Protein capillary electrophoresis revealed a gamma-migrating paraprotein with IgA levels reaching 4960 mg/dl. Flow cytometry findings of the bone marrow aspirate showed the presence of 30% of plasma cells, with characteristic clusters of differentiation (CD38, and CD56) and kappa light chains.

The patient was diagnosed with secondary plasma cell leukaemia and was started on chemotherapy (velcade + cyclophosphamide), but the treatment was complicated by myeloid inhibition which prompted blood and platelets transfusion. The patient suffered from excruciating pain which was not relieved by morphine, and 5 months later he passed away.

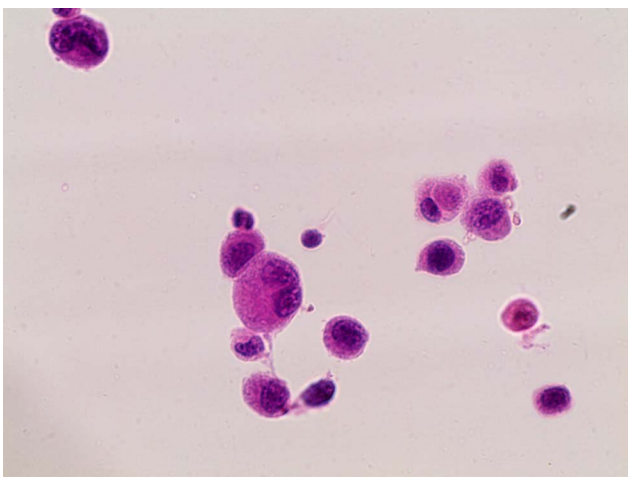

Figure 1. Ascites rich in atypical plasma cells (hematoxylin and eosin, ×20).

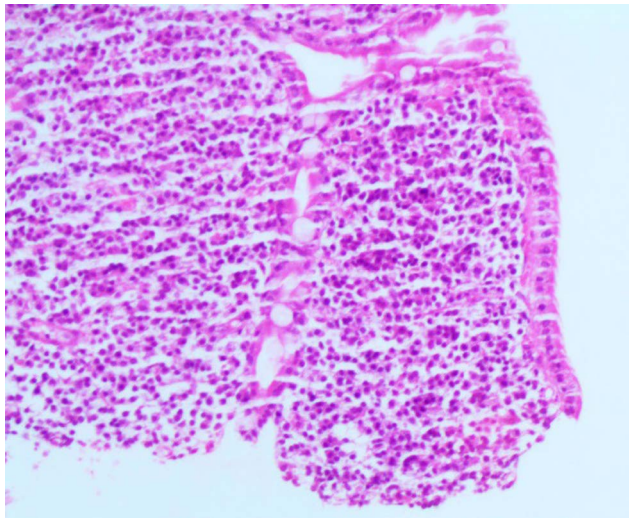

Figure 2. Polypoid structures with partial to total effacement of the duodenal villi (hematoxylin and eosin, 10×10).

Discussion

PCL is one of the most aggressive plasma cell dyscrasias and is characterized by plasma cells comprising more than 20% of leucocytes in peripheral blood or an absolute clonal plasma cell count greater than 2.0×10^9/l[4]. PCL is divided into primary PCL when there is no history of multiple myeloma and into secondary when it occurs as a leukaemic transformation of an already existing, or refractory MM. The typical age of manifestation of pPCl is 54.7, whereas it is 65.3 in sPCL. In addition, both pPCL and sPCL have a 3:2 male to female ratio[1]. The histological features of plasma cells differ depending on their maturity. Immature plasma cells have dispersed nuclear chromatin, prominent nucloeli, and high nucleus to cytoplasma ratio, while mature cells possess a characteristic "cartwheel" appearance due to the unique arrangement of chromatin in the nucleus[1]. Plasma cells in pPCL and sPCL are morphologically identical and they share a similar immunophenotype except for CD28, which is expressed with greater frequency in sPCL[5]. To classify the disease into primary or secondary, a history of MM is essential[6]. We were not able to specify if the PCL in our patient is primary or secondary, but due to the insidious onset of his back pain and the progressive deterioration of his condition over 3 years, we were inclined to diagnose him with PCL secondary to an undiscovered multiple myeloma. Previous doctors did not suspect MM as a cause for the patient's back pain due to his young age, which camouflaged his condition.

The reason for the leukaemic transformation of MM is still unknown; however, different studies suggest that downregulation of some surface antigens, including CD11a/b, CD18 and CD56, might facilitate the escape of plasma cells from bone marrow and also from immunological surveillance[7]. Negative expression of CD56 has been associated with extra-medullary MM[1]. CD28 is a poor prognostic factor in MM and is associated with plasma cell proliferation, disease progression, and chemotherapy resistance[5]. Several genetic factors have also been implicated in the transformation to PCL. Eleven percent of pPCL and 33% of sPCL

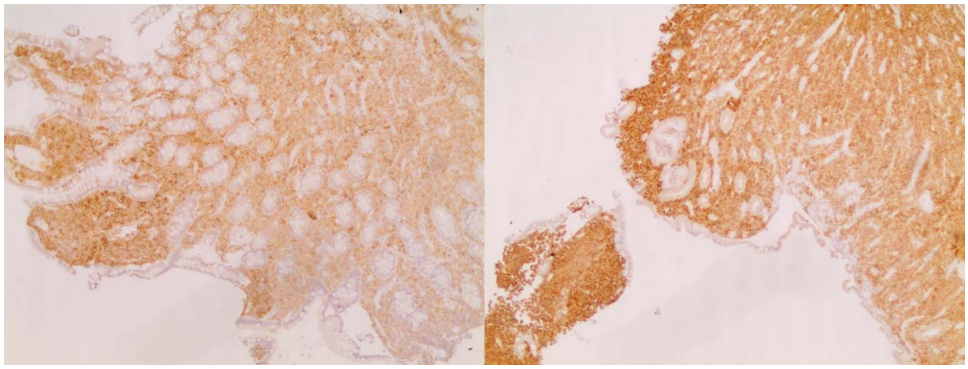

Figure 3. Tumour cells positive for CD38 in duodenal mucosa (CD38, 10 × 10).

tumours showed biallelic *TP53* inactivation with simultaneous allelic deletion and mutation[2]. In addition, deletion of *PTEN*, which causes *Akt* activation, was found in 33% of sPCL tumours and in 8% of pPCL ($P = 0.24$) suggesting that *PTEN* loss may also occur in the transition from myeloma to sPCL[2].

PCL has a very aggressive course and a poor prognosis which prompts immediate initiation of treatment upon diagnosis[8]. Since it is a rare disease and not many studies have explored the efficacy of different treatment options, there is still no unanimous treatment of choice. The introduction of autologous stem cell transplantation, the proteasome inhibitor bortezomib and the immuno-regulatory drugs thalidomide and lenalidomide has improved the prognosis compared to treatment with traditional cytostatic chemotherapy[8].

Conclusion

Our case presents a rare diagnosis of secondary plasma cell leukaemia in a 34-year-old patient, which is outside the classical age presentation. Multiple myeloma should be one of the differential diagnoses when a patient has unexplained, unremitting back pain regardless of the age of the patient. In addition to the traditional presentation of PCL, late presentation can include ascites and duodenal polyps with infiltrating abnormal plasma cells.

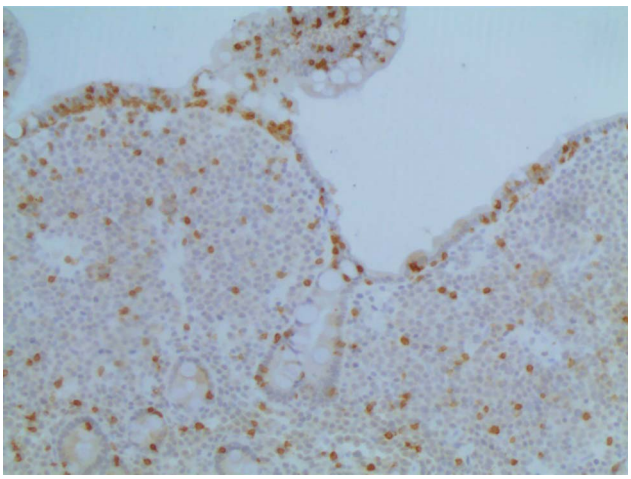

Figure 4. Tumour cells negative for CD3 (CD3).

Ethics approval and consent to participate

Not applicable.

Consent

Written informed consent was obtained from the patient's family for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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Author contribution

M.I., Z.H., and Z.A. participated in writing the original draft, reviewing, and editing. R.I. participated in supervision, provided pathology figures, and performed final review and editing. H.F. participated in supervision, provided patient's care, and reviewed the manuscript. All authors read and approved the final manuscript.

Conflicts of interest disclosure

The authors declare no conflicts of interest.

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References

[1] Albarracin F, Fonseca R. Plasma cell leukemia. Blood Rev 2011;25: 107–12.
[2] Tiedemann RE, Gonzalez-Paz N, Kyle RA, *et al*. Genetic aberrations and survival in plasma cell leukemia. Leukemia 2008;22:1044–52.
[3] Kasinathan G. Primary plasma cell leukaemia in a 39-year-old man. BMJ Case Rep 2020;13:e235543.
[4] Ngu S, Asti D, Valecha G, *et al*. Primary plasma cell leukemia: a case report and review of the literature. Clin Case Rep 2019;7:1702–8.
[5] Swaminathan N, Varadi G. Secondary plasma cell leukemia: a case report. Cureus 2020;12:e8693.
[6] Inamdar AA, Loo A, Mikhail N, *et al*. Secondary plasma cell leukemia in a recurrent multiple myeloma: rare case scenario. Cureus 2020;12: e8456.
[7] Zatula A, Dikic A, Mulder C, *et al*. Proteome alterations associated with transformation of multiple myeloma to secondary plasma cell leukemia. Oncotarget 2017;8:19427–42.
[8] Gundesen MT, Lund T, Moeller HEH, *et al*. Plasma cell leukemia: definition, presentation, and treatment. Curr Oncol Rep 2019;21:8.