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A Very Hairy Case: Marked Leukocytosis in Hairy Cell Leukaemia

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A 72-year-old woman presented with symptomatic anaemia. On clinical examination, she had massive splenomegaly without lymphadenopathy. Her full blood count (FBC) revealed a leukocytosis (white cell count [WCC]: 58.02×10^9/L) with neutropenia (0.93×10^9/L), monocytosis (42.82×10^9/L), haemoglobin of 2.9 g/dL and platelet count of 97×10^9/L.

Neutrophils and monocytes were virtually absent on peripheral blood microscopy. However, abnormal 'villous' lymphocytes were increased (78%). These cells were intermediate in size with abundant pale blue cytoplasm and circumferential villi. Their nuclei had a ground-glass chromatin pattern with inconspicuous nucleoli and were oval or kidney-shaped, with some eccentrically located nuclei (Figure 1).

Multiparameter flow cytometry demonstrated a population of large cells with moderate complexity and bright CD45 expression extending into the 'monocyte window'. Their immunophenotype was characteristic of hairy cell leukaemia (HCL) with bright expression of pan-B-cell markers CD19, CD20, CD22, CD79b and sIgM, with surface kappa light chain restriction, and 'villous markers' CD11c, CD25, CD103 and CD123, as well as CD200 expression.

The patient was referred to a tertiary hospital where further workup confirmed a diagnosis of HCL with detection of the *BRAFV600E* mutation. The bone marrow trephine biopsy also demonstrated the typical 'fried-egg' appearance. Unfortunately, the patient developed fulminant *Clostridioses difficile* infection and demised shortly after admission.

HCL accounts for less than 2% of lymphoid leukaemias [1, 2]. Leukaemic 'hairy cells', although usually sparse, are characteristic (85%) [1, 2]. In contrast with the other splenic B-cell lymphomas/leukaemias, also referred to as HCL-like disorders, leukocytosis is uncommon, with 65% of classical HCL cases presenting with a WCC of $<5 \times 10^9$/L [1–3].

On the initial peripheral smear review, HCL was not the first on our differential diagnosis for villous lymphocytes. The profound leukocytosis favoured a HCL-like disorder, which includes HCL-variant (HCL-v)/splenic B-cell lymphoma/leukaemia with prominent nucleoli (SBLPN), splenic diffuse red pulp lymphoma (SDRPL) and splenic marginal zone lymphoma (SMZL) [1]. Furthermore, the initial automated differential WCC demonstrated a monocytosis instead of monocytopenia, which is almost always present in HCL (98%) but not in HCL-like disorders [1, 2]. A repeat differential WCC count on another FBC haematology analyser revealed a monocytopenia of 0.93×10^9/L, which was in keeping with the manual differential and multiparameter flow cytometry counts. Some automated FBC haematology analysers may spuriously count 'hairy cells' as monocytes [1]. We discussed these observations in depth in a different publication of this case [4].

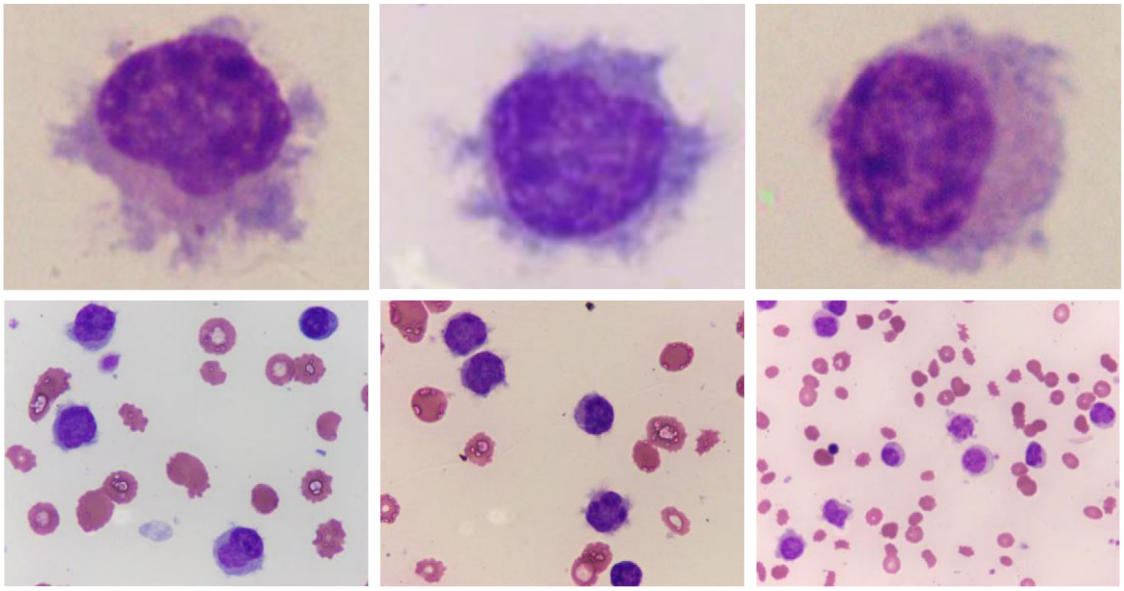

FIGURE 1 | Wright-stained peripheral blood smear showing numerous circulating 'hairy cells' in hairy cell leukaemia (top row 100× objective, bottom row 50× objective).

Although the unusual leukocytosis and artefactual monocytosis could easily have introduced diagnostic bias, a holistic approach with careful consideration of all laboratory and clinical features led to the correct diagnosis of this case. Despite being unusually high in number, the 'hairy cells' had typical morphologic features. Their long, well-defined circumferential villi, together with their mature but homogenous chromatin with inconspicuous nucleoli, distinguished them from the lymphocytes that are seen in HCL-like disorders, which usually have polar villi and condensed nuclear chromatin (SMZL/SDRPL) or prominent nucleoli (SBLPN/HCL-v) [1]. The clinical presentation of an elderly person with splenomegaly and pancytopenia is also classic of HCL, albeit four times more common in men than women [1, 2]. Finally, the immunophenotype, histology and molecular findings left no doubt about the diagnosis of HCL, a unique but heterogeneous lymphoma.

Author Contributions

S.J.K. photographed the images, conceptualised and drafted the manuscript. A.-C.v.M. contributed to writing and editing the manuscript. Both authors approved the final manuscript.

Disclosure

A separate report concerning the same patient has been published (Kennedy SJ, van Marle A-C. Pseudomonocytosis on a Sysmex XN haematology analyser masking the monocytopenia of hairy cell leukaemia in a South African woman. *Afr J Lab Med*. 2025;14(1):a2617. doi:10.4102/ajlm.v14i1.2617.) That report focuses on the spurious monocytosis generated by the Sysmex XN series, which counted 'hairy cells' as monocytes. It emphasises the inherent limitations of FBC analysers and highlights the importance of a manual differential count in the era of automation. In the current report, we emphasise the unusually high white cell count and abundance of circulating 'hairy cells' that the patient presented with; features that are not typically associated with HCL. Different images of the 'hairy cells' are shown.

Ethics Statement

Ethics approval for this case study was obtained from the Health Science Research Ethics Committee of the University of the Free State (UFS-HSD2024/1295).

Consent

Attempts to locate the patient or their next of kin to obtain permission to publish this report were unsuccessful. No patient identifying information are provided. The Health Science Research Ethics Committee of the University of the Free State acknowledged our efforts to obtain consent and granted a waiver.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this case study are available from the corresponding author upon reasonable request.

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