



# A RARE CASE OF T- CELL LGL LEUKEMIA (T-LGL)

Maheen Zaidi MD, Mehnaz Nadeem MD

Baptist Memorial Hospital- North Mississippi



• CASE REPORT: A RARE CASE OF T CELL LGL LEUKEMIA

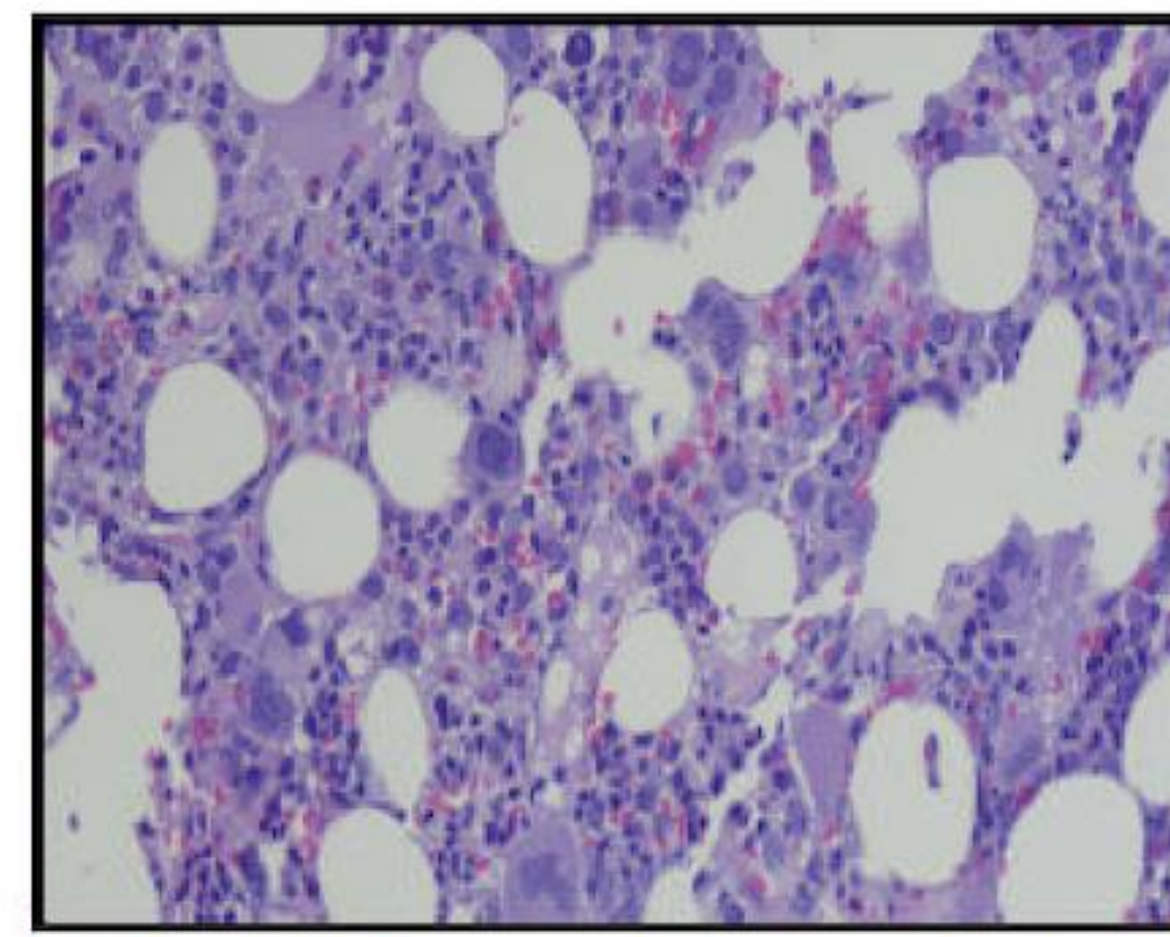
## CASE

- A 44-year-old male with recurrent infections presented for hematology-oncology evaluation in May 2025 after developing severe pancytopenia, sepsis, and pneumonia. His symptoms began in January with sinusitis and progressive infections, including mononucleosis and COVID-19. Despite antibiotics and steroids, his condition worsened, prompting hospitalization.
- Labs showed pancytopenia, and infectious workup was negative. Bone marrow biopsy revealed T-cell large granular lymphocytic (T-LGL) leukemia with increased histiocytes, CD8+ T cells, and rare hemophagocytosis. Flow cytometry showed CD8+ T-cell expansion (62.6% of T cells; 55% of WBCs).
- Clonality and STAT3 mutation confirmed diagnosis.
- He improved after high-dose dexamethasone and weekly methotrexate.

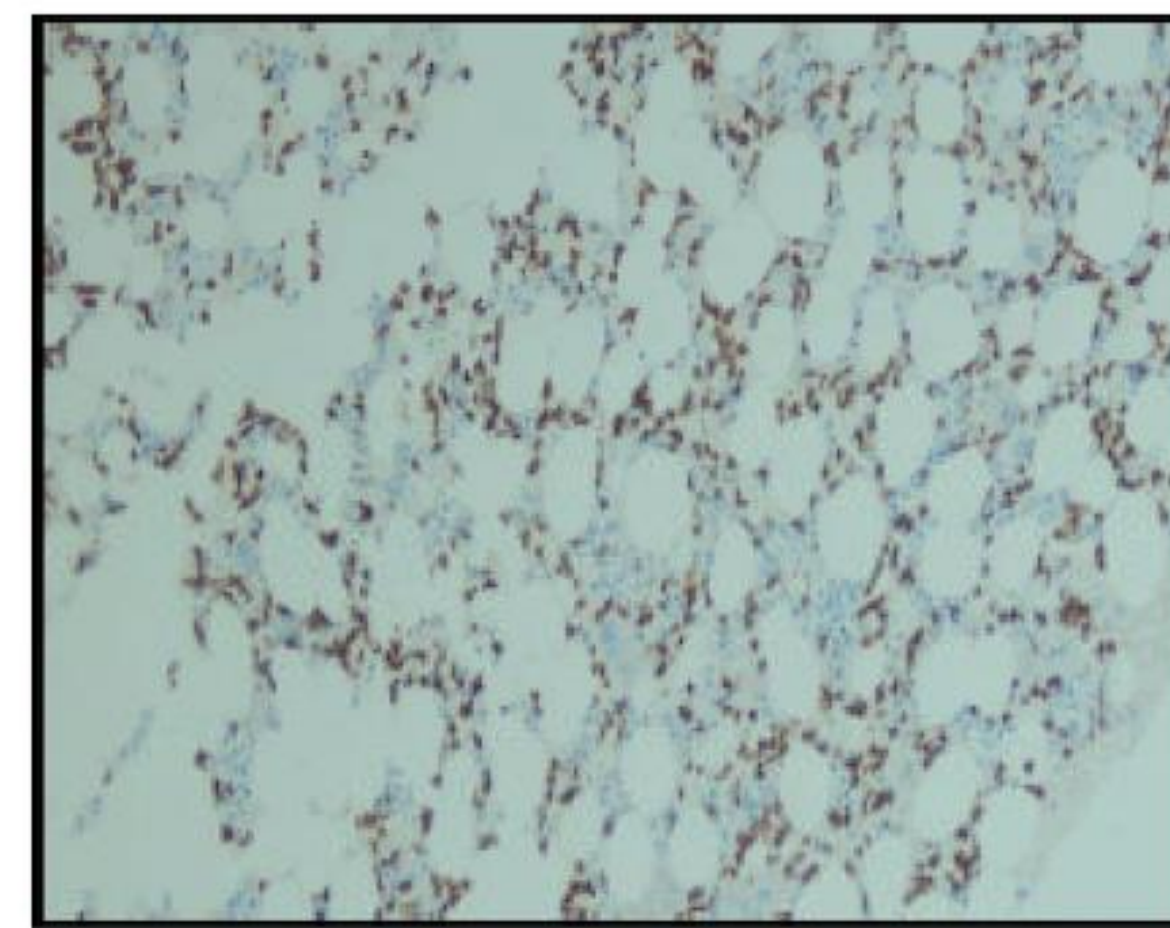
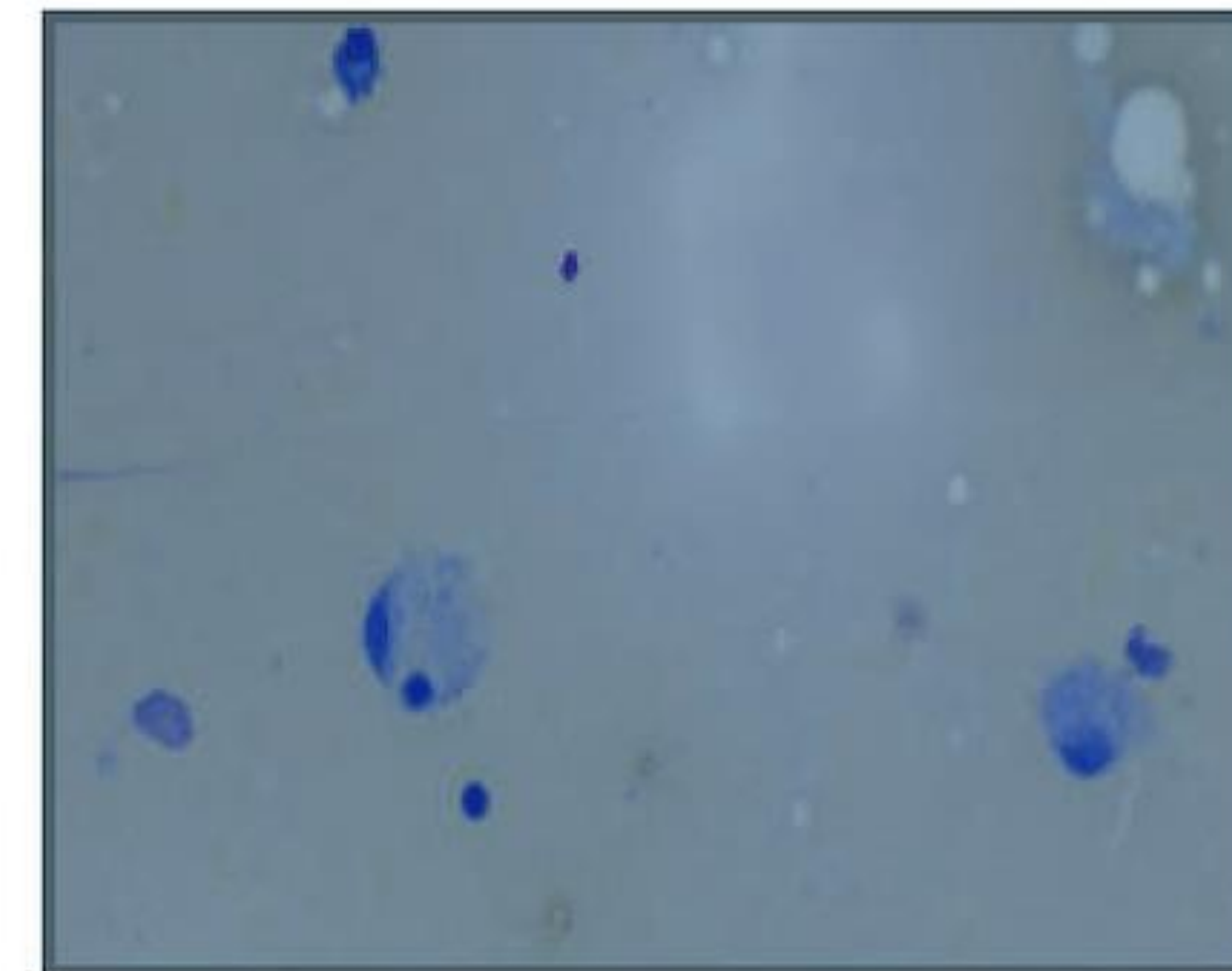
## INTRODUCTION

- T cell large granular lymphocytic leukemia (T-LGLL) is a rare and chronic lymphoproliferative disorder. Main features include clonal expansion of cytotoxic T cells, most commonly CD8+ T cells, with a persistent increase in large granular lymphocytes in the peripheral blood for more than six months.
- It is frequently associated with autoimmune conditions, particularly rheumatoid arthritis, as well as cytopenias such as neutropenia and anemia.
- Pathogenesis involves chronic antigenic stimulation, leading to dysregulation of apoptosis and survival pathways, notably constitutive activation of the JAK/STAT pathway. Somatic activating mutations in STAT3 are present in over half of cases, with additional mutations in STAT5b, TET2, and other epigenetic regulators also described. Proinflammatory cytokines, particularly interleukin-15, play a central role in disease maintenance and the link to autoimmunity.
- Diagnosis is based on clinical features, flow cytometry (demonstrating clonal CD3+CD8+CD57+ T cells), and confirmation of T cell receptor gene rearrangement.
- The disease course is usually indolent, but about half of patients eventually require therapy for symptomatic cytopenias or severe autoimmune manifestations. First-line treatment is immunosuppressive therapy, most commonly with low-dose methotrexate, cyclophosphamide, or cyclosporine. Refractory cases may be considered for agents such as alemtuzumab, pentostatin, or investigational targeted therapies, including JAK/STAT inhibitors and cytokine-targeted approaches. There is no curative therapy, and management is focused on disease control and symptom relief.

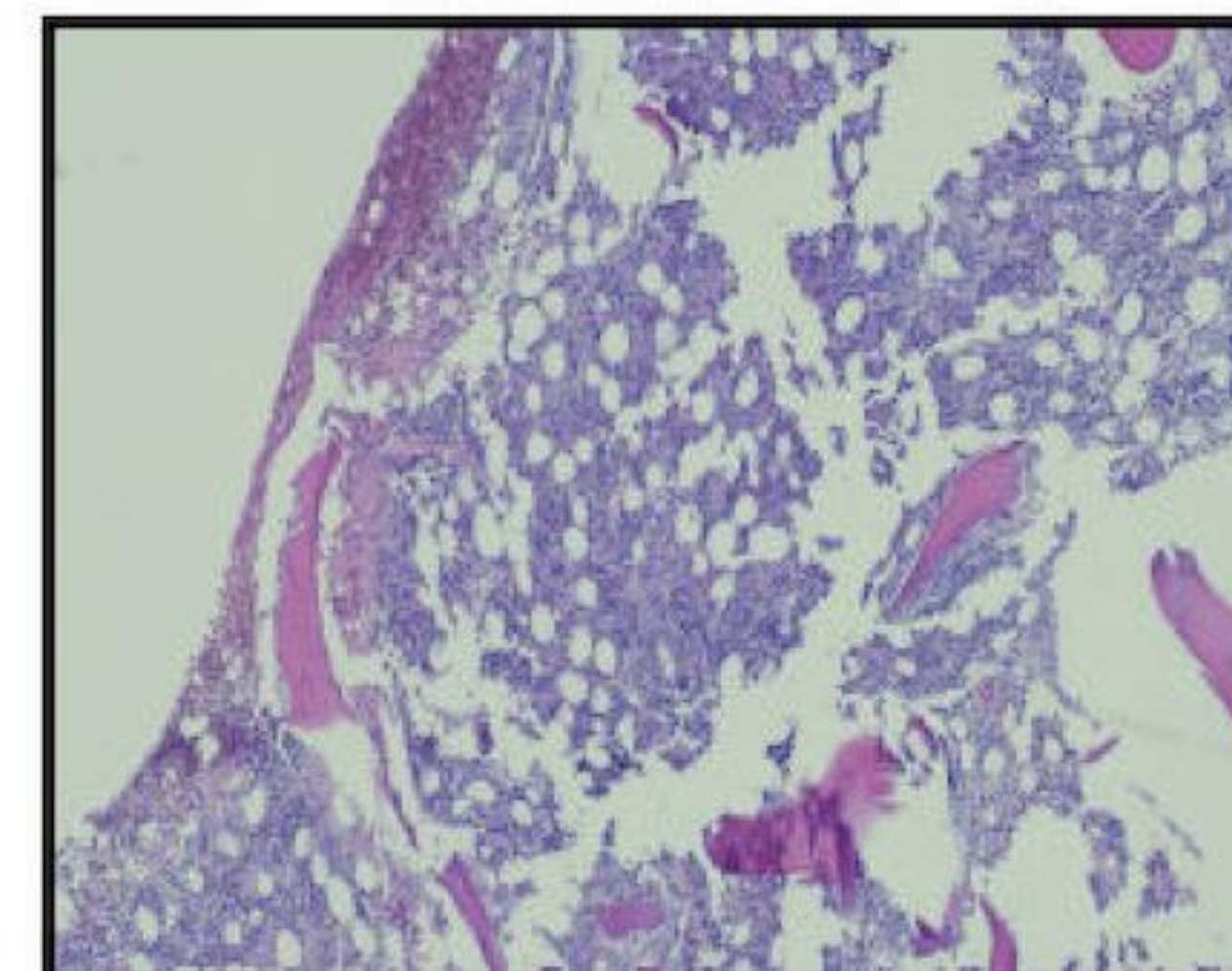
## BONE MARROW FINDINGS



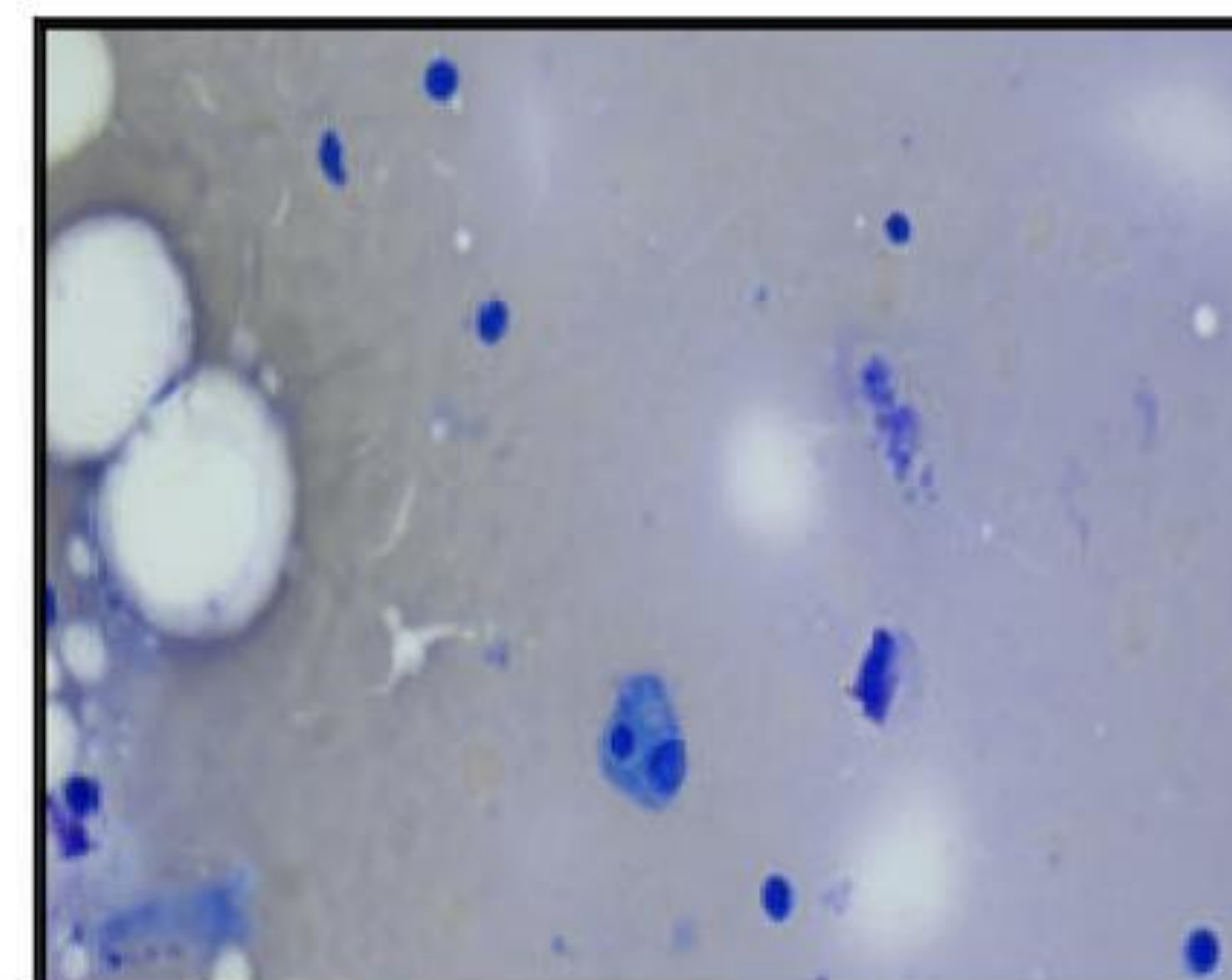
Marked left shift & megakaryocytic hyperplasia



CD3+ T-cells



Low-normocellular marrow



Rare hemophagocytosis

## UNIQUE ASPECT

- T-cell large granular lymphocytic (T-LGL) leukemia is a rare chronic lymphoproliferative disorder, accounting for about 2% of mature lymphocytic leukemias involving B cells, T cells, and NK cells. Diagnosing T-LGL can be particularly challenging, especially when it presents alongside other immune-mediated complications.
- In this case, the patient came in with severe pancytopenia and recurrent infections, eventually showing features that met 5 out of 8 criteria for hemophagocytic lymphohistiocytosis (HLH). Further workup revealed a clonal expansion of CD8+ T cells, confirming T-LGL leukemia. The case highlights the diagnostic challenge posed by overlapping HLH-like symptoms and the need for detailed immunophenotyping.
- What makes this case especially complex is the overlap of HLH-like symptoms, autoimmune activity, and a rare T-cell malignancy—an unusual and diagnostically difficult scenario. It underscores the importance of thorough immunophenotyping and molecular testing in patients with unexplained cytopenia.

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