Case Report

Felty's syndrome presenting with massive splenomegaly and pancytopenia: A diagnostic and management challenge

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ABSTRACT

Felty's syndrome (FS) is a rare, serious complication of long-standing seropositive rheumatoid arthritis (RA), classically characterized by the triad of RA, splenomegaly, and neutropenia. We report the case of a 62-year-old female with a history of RA since 2015, who presented with a 1-month history of fever, abdominal discomfort, profound weakness, and significant weight loss. Clinical examination revealed massive splenomegaly. Laboratory investigations confirmed severe pancytopenia with absolute neutropenia. An extensive workup, including bone marrow aspiration and biopsy showing reactive hyperplasia and an ^{18}Fluorodeoxyglucose positron emission tomography-computed tomography scan that ruled out malignancy, confirmed the diagnosis of FS. Management involved supportive care with granulocyte colony-stimulating factor to address life-threatening neutropenia and the initiation of low-dose methotrexate as foundational disease-modifying therapy. This case highlights the diagnostic challenge FS presents, the need to exclude malignancies and other causes of cytopenias. It highlights the structured, multidisciplinary therapeutic approach required, balancing immunomodulation against the risks of infection in a neutropenic patient.

Key words: Felty's syndrome, Neutropenia, Pancytopenia, Rheumatoid arthritis, Splenomegaly

Felty's syndrome (FS) is an uncommon but potentially severe extra-articular manifestation of long-standing, usually seropositive, rheumatoid arthritis (RA) [1]. First described in 1924, its classic diagnostic triad includes RA, splenomegaly, and neutropenia, often accompanied by systemic symptoms such as fever and weight loss [2]. The neutropenia is typically profound and places patients at significant risk for life-threatening bacterial infections. The pathophysiology is complex, involving immune-mediated peripheral destruction of neutrophils, splenic sequestration, and possibly bone marrow suppression [1-3]. Diagnosis is one of exclusion, requiring a meticulous workup to rule out other causes of cytopenias and splenomegaly, such as lymphoma, myelodysplastic syndrome, or drug-induced effects [3-5].

This case report illustrates the clinical presentation, diagnostic pathway, and contemporary management principles of this challenging condition.

CASE PRESENTATION

A 62-year-old female presented with a 1-month history of generalized weakness, easy fatigability, intermittent fever, abdominal discomfort, and significant unintentional weight loss. The patient is a known case of seropositive RA, diagnosed in 2015. She reported a recent exacerbation characterized by profound constitutional symptoms. Abdominal discomfort was persistent and dull in nature. There was no history of cough, chest pain, palpitations, jaundice, or melena. The patient reported a history of alcohol use. There was no reported family history of autoimmune disorders, hematological malignancies, or splenomegaly.

On examination, the patient appeared pale and cachectic, consistent with chronic illness, and reported weight loss. Abdominal examination revealed massive splenomegaly, with the spleen palpable approximately 14 cm below the costal margin. The liver was not palpably enlarged, and there was no ascites. Musculoskeletal examination revealed changes consistent with chronic and deforming RA (Fig. 1). No significant peripheral lymphadenopathy was detected. Serial complete blood counts revealed a progressive and profound pancytopenia. Leukocyte counts were markedly depressed ($0.6 \times 10^3/\mu L$ and $0.77 \times 10^3/\mu L$), with absolute neutropenia as the predominant feature. She had normocytic, normochromic anemia and persistent thrombocytopenia (Platelets: 70–105 ×

Access this article online

Received - 11 June 2026
Initial Review - 30 June 2026
Accepted - 03 August 2026

DOI: 10.32677/ijcr.v12i9.8333

Quick Response code

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Figure 1: Bilateral hand deformities consistent with long-standing rheumatoid arthritis demonstrating swan neck flexion deformity in the left middle finger and ulnar deviation

$10^3/\mu L$). Peripheral blood smear examination confirmed leukopenia and thrombocytopenia without immature or atypical cells. Renal function tests and liver enzymes were within normal limits, though mild hypoalbuminemia (2.8 g/dL) was noted. Serologically, anti-cyclic citrullinated peptide (anti-CCP) antibodies were elevated at 46 U/mL. Rheumatoid factor (RF) was strongly positive at 127 IU/mL, supporting the diagnosis of seropositive RA. The patient had long-standing deforming RA with clinical evidence of active disease, including bilateral hand deformities, persistent constitutional symptoms, and elevated inflammatory markers. Serum free light chain analysis showed a polyclonal increase (Kappa: 89.3 mg/L, Lambda: 111 mg/L) with a normal ratio (0.80), arguing against a clonal plasma cell disorder. Trephine biopsy and aspirate studies demonstrated a normocellular to mildly hypercellular marrow (cellularity up to 70%) with reactive morphology. Erythropoiesis was normoblastic with occasional micronormoblastic forms. Myelopoiesis showed orderly maturation without dysplasia. Megakaryocytes were normal in number and morphology. There was a mild increase in polyclonal plasma cells (5–8%) and lymphocytes. Reticulin staining showed no fibrosis. These findings were interpreted as a reactive marrow hyperplasia, with hypersplenism considered the likely etiology for the peripheral cytopenias. No evidence of primary hematological malignancy, myelodysplasia, or granulomatous disease was found.

An ^{18}Fluorodeoxyglucose positron emission tomography-computed tomography (^{18}F-FDG PET-CT) scan was performed to evaluate for underlying lymphoma or malignancy, given the presentation with massive splenomegaly and pancytopenia. The scan confirmed massive splenomegaly (spanning approximately 14.2 cm) with diffuse, mild-to-moderate FDG uptake. Crucially, it revealed diffusely increased FDG uptake throughout the bone marrow, consistent with the reactive hyperplasia seen on biopsy. No focal hypermetabolic splenic or hepatic lesions were identified. A few small retroperitoneal and mesenteric lymph nodes demonstrated only low-grade, non-bulky FDG uptake, characteristic of a reactive etiology. There was no evidence of pathological lymphadenopathy or extra-nodal disease to suggest lymphoma.

Management proceeded in a staged approach. Immediate intervention addressed neutropenia with daily subcutaneous granulocyte colony-stimulating factor (G-CSF) (Filgrastim 300 mcg), yielding gradual neutrophil recovery. Concurrently, definitive immunomodulation was initiated with cautious, low-dose weekly methotrexate (7.5 mg), supplemented by folic acid, with a plan for slow titration under weekly hematological monitoring. Prophylactic antibiotics were considered, and splenectomy was deferred due to its significant long-term risks. The emphasis was placed on patient education regarding infection signs and medication adherence.

The patient was followed for 4 weeks after initiation of treatment through combined rheumatology and hematology outpatient services. Daily administration of G-CSF (Filgrastim 300 μg) resulted in progressive recovery of neutrophil counts. Platelet counts also showed gradual improvement, and hemoglobin remained stable without requiring blood transfusion. Clinically, the patient became afebrile within several days of treatment, with marked improvement in generalized weakness, abdominal discomfort, appetite, and overall functional status. No infectious complications or adverse effects related to methotrexate were observed during follow-up. She was discharged in stable condition on weekly low-dose methotrexate (7.5 mg), folic acid supplementation, and scheduled hematological monitoring, with plans for gradual dose escalation depending on hematologic recovery and RA disease control.

DISCUSSION

FS is an uncommon but potentially life-threatening extra-articular manifestation of RA, occurring in <1% of patients with long-standing seropositive disease [1,6]. It is classically characterized by the triad of RA, neutropenia, and splenomegaly, although all three features may not be present simultaneously during the disease course [2,3]. The syndrome typically develops after several years of active RA and is associated with high titers of RF and anti-CCP antibodies, reflecting an aggressive autoimmune phenotype. Patients are particularly vulnerable to recurrent bacterial infections because of profound neutropenia, making early diagnosis and prompt treatment essential [4,5].

Diagnosing FS remains challenging because its clinical presentation overlaps with several hematological and autoimmune disorders [6,7]. Massive splenomegaly accompanied by pancytopenia frequently raises suspicion

for lymphoma, leukemia, myelodysplastic syndrome, hypersplenism, or other infiltrative disorders [1,3]. Consequently, diagnosis is largely one of exclusion. In the present case, bone marrow aspiration and trephine biopsy demonstrated reactive hyperplasia with preserved maturation of hematopoietic cell lines and no evidence of dysplasia or malignant infiltration. Furthermore, ^{18}F-FDG PET-CT showed diffuse marrow uptake without focal hypermetabolic lesions or significant pathological lymphadenopathy, effectively excluding lymphoma and supporting the diagnosis of reactive marrow secondary to FS.

The pathogenesis of FS is multifactorial and incompletely understood. Current evidence suggests that neutropenia results from a combination of immune-mediated peripheral destruction of neutrophils, impaired granulopoiesis, and excessive splenic sequestration [1-3]. Autoantibodies directed against G-CSF and neutrophil precursors have also been implicated. Splenomegaly contributes to hypersplenism and accelerated destruction of circulating blood cells, explaining the pancytopenia observed in some patients [3]. The markedly elevated anti-CCP antibody levels and positive RF in our patient further support the autoimmune basis of the disease.

Management of FS requires simultaneous treatment of acute neutropenia and long-term control of RA. G-CSF provides rapid improvement in neutrophil counts and substantially reduces the immediate risk of severe bacterial infection [6,8]. However, its effect is usually transient, and definitive treatment depends on suppressing the underlying autoimmune process. Low-dose methotrexate remains the preferred first-line disease-modifying antirheumatic drug, with several studies demonstrating improvements in neutrophil counts, reduced infection frequency, and better control of RA activity [6,7]. Our patient demonstrated favorable hematologic recovery following G-CSF administration, allowing safe initiation of methotrexate under close monitoring. Biological therapies have emerged as effective options for patients with refractory disease or intolerance to conventional DMARDs [5,8,9]. Rituximab, through B-cell depletion, has shown encouraging results in improving neutrophil counts and reducing recurrent infections in patients unresponsive to methotrexate. Other biologic agents have been evaluated in isolated reports, although the evidence remains limited due to the rarity of the condition. Splenectomy, once considered the standard treatment, is now reserved for carefully selected patients with persistent neutropenia, recurrent infections, or symptomatic hypersplenism despite optimized medical therapy because of its association with overwhelming post-splenectomy infection and thromboembolic complications [1,3].

Our case is consistent with previously reported cases of FS, which predominantly occur in patients with long-standing seropositive RA presenting with neutropenia and splenomegaly [7-11]. Rodrigues *et al*., and Gupta *et al*., similarly described severe neutropenia requiring G-CSF followed by subsequent disease control with methotrexate. In contrast, Iqbal *et al*. reported successful treatment with rituximab in refractory disease [7,8,11]. In contrast to the atypical presentations described by Chavalitdhamrong *et al*., in which FS preceded the diagnosis of RA, and by Rattray *et al*., in which ocular manifestations predominated, our patient presented with massive splenomegaly and pancytopenia, necessitating extensive evaluation to exclude hematological malignancy [9,10]. The combination of reactive bone marrow findings, PET-CT exclusion of lymphoma, and favorable hematologic response to G-CSF followed by methotrexate highlights the importance of a structured diagnostic approach and individualized management in this rare but potentially life-threatening condition.

CONCLUSION

FS is a rare but potentially life-threatening complication of long-standing seropositive RA. The diagnosis requires careful exclusion of hematological malignancies and other causes of cytopenias using bone marrow examination and appropriate imaging modalities. Prompt correction of severe neutropenia with G-CSF, followed by disease-modifying therapy such as methotrexate, forms the cornerstone of management. Early recognition and a multidisciplinary approach are crucial for preventing infectious complications and improving long-term outcomes.

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Funding: Nil; Conflicts of interest: Nil.

How to cite this article: Kunta D, Rangari G, Gatla SR, Parthireddy SP, Kola A. Felty's syndrome presenting with massive splenomegaly and pancytopenia: A diagnostic and management challenge. Indian J Case Reports. 2026;12(9):576-578.