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# When Dapsone Turns Dangerous: A Case of Life Threatening Agranulocytosis in Leprosy Treatment

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## ABSTRACT

Dapsone-induced agranulocytosis is a rare but potentially life-threatening complication in patients receiving multidrug therapy for leprosy. In individuals receiving dapsone therapy, a prevalence of 0.2-0.4% has been reported. A 32-year-old leprosy patient developed dapsone-induced agranulocytosis with fever, pancytopenia, and splenomegaly. Dapsone was stopped; he was treated with antibiotics, antipyretics, antifungals, antivirals, antimalarials, and supportive care. A 32-year-old male with leprosy on multidrug therapy presented with 8 days of high-grade fever, throat pain, and vomiting. Examination revealed pallor, tachycardia (132 bpm), and hypotension (80/60 mmHg). Labs showed severe pancytopenia with agranulocytosis (TLC 280/mm³), anemia (Hb 5.8 g/dL), thrombocytopenia, elevated CRP (266.54 mg/L), and mild splenomegaly. Dapsone-induced agranulocytosis was diagnosed. He was treated with broad-spectrum antibiotics (Cefoperazone-sulbactam, Piperacillin-tazobactam), and dapsone was discontinued. MDT continued with rifampicin and clofazimine. Supportive care included analgesics, antipyretics, antifungals, antimalarials, antivirals, and a single dose of pheniramine to manage suspected allergic reactions. This case highlights that early recognition and drug withdrawal are crucial for effective management and patient recovery.

***Keywords:*** Dapsone-induced agranulocytosis, Leprosy, Pancytopenia, Multidrug therapy (MDT), Broad-spectrum antibiotics.

## INTRODUCTION

An absolute neutrophil count of less than 0.5 × 109/L is indicative of a serious hematological condition called agranulocytosis. The health of the patient is seriously threatened by this disease, which dramatically increases the risk of dangerous infections. [6] The initial sulfone is dapsone. In addition to treating a number of inflammatory dermatoses, including dermatitis herpetiformis, erythema elevatum diutinum, acne conglobata, bullous lesions in lupus erythematosus, and infections, including actinomycetoma, P. carinii pneumonia, and falciparum malaria, it is used as a major medication for leprosy.[1] Hemolysis and methemoglobinemia are among the side effects of dapsone that are often pharmacologic at dosages greater than 50 mg per day. Peripheral neuropathy, hepatitis, sulfone syndrome, and infrequently, hypoalbuminemia and psychosis, are other adverse effects.[3] A rare but extremely dangerous side effect of sulfones is agranulocytosis. According to reports, 0.2-0.4% of people receiving dapsone experience it.[4] Multidrug therapy (MDT) is a potent and successful treatment for leprosy, particularly when patients present early and begin treatment right

away. [4,5] The multidrug treatment (MDT) used to treat leprosy includes DDS. Clofazimine (supervised monthly dose of 300 mg and 50 mg/daily) is added for multibacillar patients, whereas rifampicin (supervised monthly dose of 600 mg) and dapsone (supervised monthly dose of 100 mg and 100 mg/daily) are the combination for paucibacillary patients. [2,7] The purpose of this case report is to describe and bring into sharp focus the unusual phenomenon of dapsone-induced agranulocytosis culminating in febrile neutropenia in a patient on multidrug therapy for leprosy, and how clinical presentation, investigation results, and multidisciplinary approach to management feature prominently.

## CASE STUDY

Here is a 32-year-old male patient a known history of leprosy and currently on multidrug therapy (MDT), presented to the hospital with chief complaints of fever and chills for 8 days, throat pain for one week, and multiple episodes of vomiting. The symptoms were described as insidious in onset and progressively worsening. On admission, he was tachycardic (pulse 132 bpm), hypotensive (BP 80/60 mmHg), and appeared pale. Physical examination revealed no significant findings beyond the above.

Initial laboratory investigations demonstrated severe pancytopenia with haemoglobin of (8.2 g/dL), Neutrophils (2%), TLC of (400 cells/cumm), and platelets at (1.33 lakhs/cumm), which further dropped during hospital stay. There was mild hypoalbuminemia, elevated urea (51.7 mg/dL), and a significantly raised C-reactive protein (CRP 266.54), along with mild proteinuria and microscopic hematuria. Infectious screening for HIV, HBsAg, and HCV was negative.

The clinical course was notable for febrile neutropenia and progressive agranulocytosis, which was attributed to dapsone toxicity from the MDT regimen for leprosy. The patient also had features suggestive of rickettsial fever and acute pharyngotonsillitis, managed with intensive care support. Treatment included broad-spectrum antibiotics, Antiprotozoal, antifungal, antihistamine, antiviral, Corticosteroids, Analgesics, Anti-inflammatory, such as cefoperazone with sulbactam, MDT MB (Rifampicin, Clofazimine, Dapsone), but Dapsone was stopped after reaction, Piperacillin with Tazobactam, Metronidazole, Fluconazole, Pheniramine, Oseltamivir, Methylprednisolone, Tramadol, Chymotrypsin, along with Trypsin respectively. In addition to this regimen, vitamin supplements, blood transfusions, and several supportive measures such as intravenous fluids and noradrenaline for persistent hypotension were included.

## DISCUSSION

This case report discusses a 32-year-old Male who is a known case of Leprosy presented with symptoms of fever, throat pain, and chills. This patient, currently on MDT therapy, developed dapsone induced febrile agranulocytosis. When treating leprosy, dapsone is bacteriostatic against *Mycobacterium leprae* at 1 to 10 mg/L. Dapsone inhibits the folic acid pathway by preventing the bacteria from utilizing para-aminobenzoic acid (PABA) to synthesize folic acid by competitively antagonising PABA. Dapsone is also a competitive inhibitor of dihydropteroate synthase.[9] A possible side effect of dapsone is agranulocytosis, which is characterised by bone marrow suppression. This could happen because antibodies that target neutrophil progenitor cells grow, which lowers the generation of granulocytes. A further theory that has been put up is drug hypersensitivity, in which dapsone is converted into the poisonous substance hydroxylamine, which causes haemolysis and methemoglobinemia.[2] Laboratory investigations revealed severe neutropenia, with a neutrophil count of 2%, which confirms Agranulocytosis. The laboratory findings in this case report are consistent with those previously documented by S. *Veeranna et al.* [8] This also demonstrated markedly reduced neutrophil counts in cases

of dapsone induced agranulocytosis. The treatment of dapsone-induced agranulocytosis involves stopping treatment immediately and starting broad-spectrum antibiotics, following the standard regimen for treating febrile neutropenia.[1] Additionally, the patient experienced symptoms of acute pharyngotonsillitis and rickettsial fever, which were treated with critical care support. Broad-spectrum antibiotics, antiprotozoal, antifungal, antihistamine, antiviral, corticosteroids, analgesics, and anti-inflammatory drugs, including cefoperazone with sulbactam, MDT MB (rifampicin, clofazimine, and dapsone) with dapsone being discontinued after reaction, piperacillin with tazobactam, metronidazole, fluconazole, pheniramine, oseltamivir, methylprednisolone, tramadol, chymotrypsin, and trypsin in that order. Only a few case reports of dapsone induced agranulocytosis have been reported, and its prevalence remains low, at 0.2-0.4 %. [4]

## CONCLUSION

This case highlights the need for prompt recognition and treatment of dapsone agranulocytosis, even though it is an uncommon and life-threatening adverse effect of using multiple drugs to treat leprosy. Discontinuation of dapsone, administration of broad-spectrum antibiotics, and supportive treatment are the cornerstones of the patient's recovery. Despite its rarity, agranulocytosis should be suspected, and workup initiated, in patients with febrile neutropenia undergoing treatment with dapsone. Continuous evaluation of blood parameters, coupled with a holistic treatment plan, is crucial to diminish the outcomes of the complication.

***Declaration by Authors***

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