



# VANCOMYCIN-INDUCED REVERSIBLE PANCYTOPENIA

Gift Echefu MD, Ifeoluwa Stowe MD, Breanna Campbell MD.



## Introduction

Vancomycin is highly effective at treating Gram-positive bacterial infections, such as methicillin-resistant *Staphylococcus aureus* (MRSA). Despite being considered relatively safe, the drug can cause phlebitis, nephrotoxicity, ototoxicity, and red man syndrome. Hematological adverse events are rare and often manifest as cytopenia. The manifestation of pancytopenia is extremely rare, with very few reported cases.

## Case Description

A 52-year-old woman with severe osteoarthritis of the right knee underwent elective knee replacement surgery. During her outpatient follow-up 2 weeks after the procedure, she had a fever, right knee pain, and swelling. There was significant effusion of the right knee joint, which raised concerns about periprosthetic septic arthritis. The patient underwent irrigation and debridement [I&D] and was started on empiric vancomycin. The complete blood counts preoperatively and during I&D were normal. She presented to the hospital with fever and chills two weeks after starting vancomycin. Right knee examination was unremarkable. The initial work-up revealed new-onset pancytopenia (Table 1). No other explanation for pancytopenia was found after a thorough work up. There were no atypical or hematological abnormalities found in peripheral blood smears. Clinically, she had no signs of sequestration such as hepatomegaly, splenomegaly, or peripheral destruction. No growth was detected in joint aspirates, blood cultures, or urine cultures. The right knee X-rays showed normal surgical changes (figures 1 and 2). She underwent transfusion with one unit of packed red blood cells. The pancytopenia improved after vancomycin was discontinued.

## Results

Table 1: Trend of cell counts through the course of therapy

Parameters	Before vancomycin initiation	At admission (Two weeks post initiation of vancomycin)	At discharge (after discontinuation of vancomycin)
White cell count (K/uL)	7.8	1.84	5.1
Hemoglobin (g/dL)	13.7	6.8	8.5
Hematocrit (%)	40.7	22.2	26.0
Platelet count (K/uL)	293	101	132

Figures 1 and 2: Anteroposterior and lateral views of right knee x-ray showing the right knee status post arthroplasty with a surgical drain in place, mild joint effusion and post-surgical changes of the soft tissues.



## Discussion/Conclusion

Pancytopenia is a rare adverse effect of vancomycin. Several mechanisms have been proposed to explain the pathophysiology of the disease, including immune-mediated destruction, peripheral destruction, sequestration, or marrow suppression. The diagnosis is one of exclusion, as other potentially fatal and reversible causes should be investigated and treated. There are no heralding signs or symptoms. In most cases, it does not present with any symptoms that may suggest this diagnosis. The Naranjo adverse drug reaction probability scale can be used, but it is not specific. Teicoplanin and Daptomycin are therapeutic alternatives to vancomycin that can be safely used in patients experiencing these events. To hasten bone marrow recovery, concomitant administration of G-CSF could be attempted in patients with severe neutropenia. A transfusion may be necessary for patients with life-threatening thrombocytopenia or bleeding. Often, pancytopenia or cytopenia can be resolved by discontinuing the medication. It is important for physicians to be alert to this adverse effect and to monitor blood counts regularly, especially in patients treated with long-term intravenous vancomycin or who have had a history of adverse reactions to vancomycin. Following a diagnosis, vancomycin should be discontinued.

## References

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