

## AMIKACIN INDUCED PANCYTOPENIA: CASE REPORT

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**ABSTRACT**

Amikacin is one of the most commonly used antibacterial agent, which has action against gram negative organism. Several adverse effects are reported with Amikacin. In this report, we discuss one of the rare adverse effects of Amikacin - pancytopenia. Cases on Amikacin induced pancytopenia are rarely reported. The use of Amikacin is increasing worldwide, hence these life-threatening adverse effects of Amikacin should be borne in mind.

**KEYWORDS:** Amikacin. Pancytopenia. Gram negative organism.

**INTRODUCTION**

Amikacin is a parenterally administered, broad spectrum semisynthetic aminoglycoside antibiotic. It was approved for use in the United States in 1981. It has gram-negative bacterial coverage of infections resistant to gentamicin and tobramycin. It is most commonly used for septicaemia, bacterial endocarditis, peritonitis, meningitis, pelvic inflammatory disease and pneumonia. It is also used in therapy of tuberculosis in combination with other antitubercular drugs.<sup>[1]</sup> When used parenterally, it primarily distributes into extracellular fluid due to its high lipophilicity. Adequate drug concentrations are typically found in bone, synovial fluid and peritoneal fluid. Penetration of biologic membranes is poor because of the drug's polar structure, and intracellular concentrations are usually low, with the exception of the proximal renal tubule. Nephrotoxicity and ototoxicity are the most persistent and pertinent adverse reaction of aminoglycoside.<sup>[2]</sup> Pancytopenia is a rare adverse effect of amikacin that can be life threatening. Pancytopenia refers to a decrease in  $\geq 2$  blood lineages using the following criteria.

•**Haemoglobin (Hb)** – Men <13 g/dL; non-pregnant women <12 g/dL.

•**Absolute neutrophil count (ANC)** – ANC <1800/microL.

•**Platelets** – Platelets <150,000/microL.

Drug induced pancytopenia is usually due to bone marrow hypoplasia. Here we report a case of amikacin induced pancytopenia.<sup>[3]</sup>

**CASE REPORT**

A 53-year-old male patient with history of typhoid fever (14/10/2022) and UTI was presented to the emergency department of our hospital with large ischio-rectal abscess extending to right thigh, for which incision and drainage along with haemorrhoidectomy, right thigh fasciotomy and debridement were done on 05/11/2022. Following surgery, patient was started on Inj. Piperacillin Tazobactam TID. His blood culture reports showed MDR E. coli, presence of atypical Mycobacterium was suspected, not confirmed. He was started on Inj. Amikacin 500 mg BD and Inj. Meropenem 1g TID. His laboratory parameters which were normal before initiating these antibiotics showed decreasing trend of Hb, Total Leukocyte Count, and platelets after initiating them (Table 1). Despite blood transfusion (4-pint RDP and 1-pint PRBC), the blood counts were decreasing. Haematology consultation was sought and they advised to send Vitamin B<sub>12</sub> and folate which were within normal range (Vitamin B<sub>12</sub>: 908 pg/ml; Folate: 7.1 ng/ml). Amikacin was suspected to be the cause of pancytopenia. Decision was made to stop the drug therapy following which his laboratory parameters started to increase gradually and was finally restored to normal range.

PARAMETERS	BEFORE INITIATING	AFTER INITIATING	NORMAL RANGE
HAEMOGLOBIN	10.3 g/dl	8.70 g/dl	14 to 16 g/dl
TOTAL LEUKOCYTE COUNT	6640 cells/ $\mu$ l of blood	3070 cells/ $\mu$ l of blood	6000 to 11,000 cells/ $\mu$ l of blood
PLATELET	1.88 L/ $\mu$ l of blood	0.91 L/ $\mu$ l of blood	1 to 2 L/ $\mu$ l of blood

## DISCUSSION

Amikacin is an aminoglycoside, used for the treatment of bacterial infection. It binds to bacterial 30S ribosomal subunits and interferes with mRNA binding and tRNA acceptor sites, interfering with bacterial growth. This leads to disruption of normal protein synthesis and production of non-functional or toxic peptides.

Pancytopenia is a rare life-threatening adverse effect of Amikacin. There are only 60 reports of Amikacin induced pancytopenia in VigAccess till date. The typical underlying mechanism of drug induced pancytopenia is bone marrow suppression.

When a particular medication is suspected as a cause of pancytopenia, it should be discontinued promptly. This decision will be influenced by the severity of pancytopenia, trajectory of the blood counts, clinical symptoms, and the necessity of medication.

## CONCLUSION

This case presents a unique incidence of pancytopenia caused by Amikacin. Thus, if a patient on Amikacin therapy develops pancytopenia, the drug can be suspected as the possible offending agent after ruling out other possible causes of pancytopenia in the patient. Blood transfusion can be performed as part of supportive therapy.

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## CONFLICTS OF INTEREST

There are no conflicts of interest.

## ABBREVIATIONS

ADR: Adverse Drug Reaction  
BD: Twice daily  
MDR: Multi-Drug Resistant  
PRBC: Packed red blood cells  
RDP: Random donor platelets  
TID: Three times a day

## REFERENCES

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