Teicoplanin and Colistin Induced Nephrotoxicity in A Patient of Septicaemia
A Case Report With Emphasis on Morbidity

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Abstract: Teicoplanin is a glycopeptides antibiotic active against a broad spectrum of gram positive bacteria with negligible action on Gram negative bacilli. Colistin is polymixin which is active against Gram negative organisms only. Nephrotoxicity has been reported with both Teicoplanin and Colistin. A 52 year old patient diagnosed with septic shock following fecal peritonitis was prescribed Teicoplanin, Meropenem and Colistin. Meropenem was omitted after results of culture sensitivity and other two drugs were continued. This patient had a rise in creatinine levels after 10 days of therapy. Teicoplanin was discontinued on 13th of therapy with improvement in patients condition. Hence physicians need to be aware of this interaction of added nephrotoxicity when combining these two antimicrobials. [Shikha S NJIRM 2017; 8(4):106-108]

Key Words: Adverse Drug Reaction, Colistin, Nephrotoxicity, Teicoplanin.

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Introduction: Teicoplanin is a glycopeptides antibiotic with excellent activity against a broad spectrum of gram positive bacteria. Essentially all species of Gram negative bacilli and Mycobacteria are resistant to it.[1] It is commonly used for the treatment of severe gram positive infections. One of the major adverse drug reaction (ADR) associated with Teicoplanin is nephrotoxicity.[1,7] The route of elimination of this drug is primarily renal. Colistin is usually selected for treatment of multidrug resistant Gram negative bacteria[1,2]. No studies of added nephrotoxicity have been reported with a combination of Teicoplanin and Colistin.

Faecal peritonitis and subsequent septic shock is a fairly common condition encountered in emergency medicine. Early identification and appropriate management in the initial hours of sepsis improves outcome. Choice of antibiotics is very crucial in patients of septic shock when there is threat of multiorgan failure.[3] At the time of presentation, broad spectrum empirical coverage for gram positive and gram negative bacteria as well as anaerobes becomes mandatory. One should keep in mind the cost benefit ratio, toxicity of drugs, synergistic combinations and drug interactions.

In patients who have been treated with proper source control and prompt surgical intervention, antibacterial therapy is given for 5-6 days but the regimen may need to be extended depending upon clinical status.[4] When patients present at tertiary care centers they have already been exposed to multiple antibiotics and are hemodynamically unstable. “To hit hard and hit fast” stays the only option. So Teicoplanin when combined with other nephrotoxic drugs as part of empirical treatment regimen invites side effects of added nephrotoxicity as seen in this case below.

Case Report: A 52 year old male patient was transferred to Tertiary care centre with septic shock and abdominal drains insitu, was diagnosed as having jejunal perforation with faecal peritonitis for which drain was put in a hospital at his native place almost 25 days prior to shifting him to a higher centre for further management.

He was suffering with this condition for more than a month before admission to our centre. Exploratory laprotomy and jejunojejunostomy was done in a private hospital 15 days before admission to our centre.

At the time of admission he was in septic shock with rise in total counts and hypotensive status requiring vasopressors for maintaining blood pressure. There was drainage of biliary contents from the abdominal drains. Abdominal sepsis was suspected that was secondary to initial faecal peritonitis. He was started on Meropenem, Teicoplanin and colistin as broad spectrum empirical coverage looking at a very poor general condition. Patient gradually improved, blood pressure and sensorium improved and his vasopressor support was tapered down and he maintained urine output.

His drain swab culture taken at the time of laparotomy, showed Klebsiella resistant to meropenem. So it was omitted and colistin and teicoplanin were continued after the 9th day. His blood and urine cultures were negative for any growth. At this stage, though no gram positive organism was isolated in cultures, teicoplanin was continued empirically as a safeguard for secondary catheter related sepsis. After 12th day of admission his urine output started reducing and he required haemodialysis. There was a steady rise in serum creatinine starting from 10th day of admission as can be seen in Figure1. Teicoplanin was stopped on the 13th day when S. Creatinine started rising. His condition improved after Teicoplanin was discontinued.

This ADR of Teicoplanin and Colistin induced nephrotoxicity was reported to the ADR monitoring centre with Report ID No : 2017-03210

Discussion: Our focus in this case report is the additive nephrotoxic potential when two or more nephrotoxic antibiotics are administered to a patient.

The earlier the I.V. antimicrobials are started in a patient of sepsis and septic shock, the greater is the benefit achieved. Each hour of delay in administration of appropriate antimicrobials leads to increase in mortality.[5] At this time empirical selection is done as culture and sensitivity reports are not available. This exposes the patient to high cost and high chances of drug interactions which need to be weighed against the life of the patient.

This patient was empirically put on Meropenem, Teicoplanin and Colistin. Meropenem has broad spectrum activity against gram positive and gram negative organisms including Extended spectrum betalactamase (ESBL) and AmpC producing enterobacteriaceae.[6]

This combination provides a broad antimicrobial coverage. Meropenem and colistin combination promises synergistic bactericidal effect against almost all gram negative bacteria.

Meropenem requires dose modification in renal dysfunction as it is primarily excreted unchanged by the kidneys. So though it is not primarily nephrotoxic it does produce a strain on the kidneys.[6]

Colistin is also cleared renally and modification of dose is required in patients with impaired renal function. Colistin is nephrotoxic and administration with aminoglycosides or other nephrotoxic drugs should be avoided if possible.[1,2] So a combination of Teicoplanin and colistin would have a greater nephrotoxic potential than either drug alone.[7]

It is recommended that empirical antibiotic therapy be narrowed once pathogen identification and sensivities are established and/or adequate clinical improvement is noted.[8] In this particular case Meropenem was discontinued as the organisms were not sensitive but teicoplanin was continued inspite of culture not showing presence of Gram positive organisms. This is because the clinician is worried about secondary infections related to central lines, abdominal drains and foley"s catheter. So physician is careful and vigilant about omitting gram positive coverage.

There is altered haemodynamics in patients with sepsis and septic shock so dosing in these patients is affected. Increased predisposition to hepatic and renal dysfunction and a increased chances of unrecognized immune dysfunction and infection with resistant organisms all create problems.[9] There is generally a increase in volume of distribution of most antimicrobial agents as extracellular fluid volume expands as a result of therapy with fluids. This leads to suboptimal drug levels. So antimicrobial therapy in these patients should be initiated with full, high end loading doses of each agent used.[9,10] Due to factors listed above chances of toxicity with antimicrobials are also increased in these patients.

In this particular patient renal injury was probably initiated due to septic shock and aggravated with the use of Teicoplanin and Colistin.

As per WHO Causality assessment the causality is put as possible in this case because the condition of the patient can also be explained by his underlying disease condition.

Conclusion: The clinician should be watchful of this disease drug interaction and prescribe broad spectrum antibiotics cautiously opting for timely de-escalation to narrow spectrum antibiotics as the situation demands.

Acknowledgement: The authors are grateful to the Department of Emergency Medicine, Seth V S Hospital for providing data of this case report.

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Conflict of interest: None

Funding: None

Cite this Article as: Shikha S, Sapna G, Supriya M, Pankaj P. Teicoplanin and Colistin Induced Nephrotoxicity in A Patient of Septicaemia. Natl J Integr Res Med 2017; 8(4):106-108