# Nephrotoxicity Associated with Intravenous Vancomycin and Extended-infusion Piperacillin/Tazobactam (NAÏVE-2)

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## INTRODUCTION

- Nephrotoxicity and the incidence of acute kidney injury (AKI) with the combination of intravenous (IV) vancomycin (VAN) and intermittent piperacillin/tazobactam (PTZ) is well documented.
  - It is reported to have at least a 20% occurrence rate.
- Nephrotoxicity associated with extended-infusion (EI) PTZ is not well documented and current literature consists predominately of retrospective reviews.
- A previous prospective study (NAÏVE) at Hunterdon Medical Center identified the occurrence of AKI in 1 out of 17 patients from February to March 2019, but was limited by its sample size and duration of study.
- This study, NAÏVE-2, further assessed the rates of AKI with combination IV VAN and EI PTZ at our institution.

## METHODS

**STUDY DESIGN**

- Single-center, prospective study of patients admitted from:
  - February to March and September to November 2019
- Report of patients on IV VAN and EI PTZ was generated utilizing the inpatient electronic health record (EHR)
- Approved by the Investigational Review Board

**PRIMARY OUTCOME**

- Incidence of AKI
  - AKI is defined by RIFLE (Risk, Injury, Failure, Loss of kidney function, and End-stage kidney disease) classification and Acute Kidney Injury Network (AKIN) criteria

**SECONDARY OUTCOMES**

- Number of patients requiring dose adjustment
- Number of recommendations made by pharmacy for dose adjustment
- Percent of pharmacy recommendations accepted
- Onset of AKI following administration and incidence of AKI resolution after discontinuation of study therapy

**INCLUSION CRITERIA**

- Received at least 3 doses of IV VAN and EI PTZ concomitantly

**EXCLUSION CRITERIA**

- End-stage renal disease (ESRD)
- Receiving renal replacement therapy at initiation of study regimen

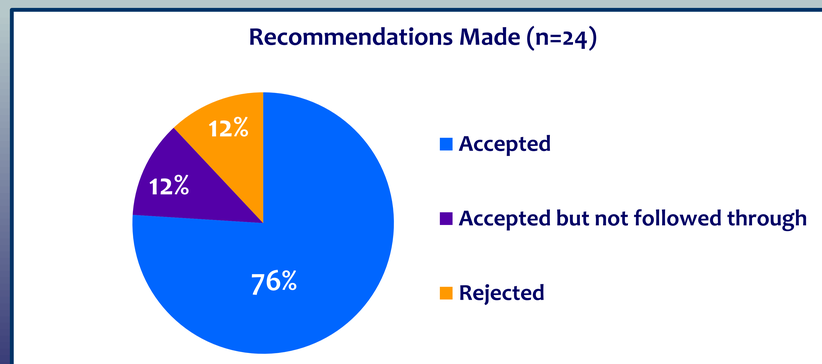
## RESULTS

**BASELINE DEMOGRAPHICS (n=34)**

| Characteristics | | Results (+ SD) |
|---|---|---|
| Average Age (years) | | 64 (± 15.2) |
| Gender | Female | 15 |
| | Male | 19 |
| Average Body Mass Index | | 28.1 (± 6.4) |
| Average Creatinine Clearance (mL/min) at initiation | | 100.15 (± 52.2) |
| Patients with Chronic Kidney Disease | | 5 |
| Average Days of Therapy | | 6.3 (± 3.0) |
| Patients with AKI prior to initiation | | 2 |
| Patients Receiving Concomitant Nephrotoxic Drugs | | |
| ▪ Loop diuretic | | 6 |
| ▪ ACE-Inhibitor | | 6 |
| ▪ ARB | | 1 |

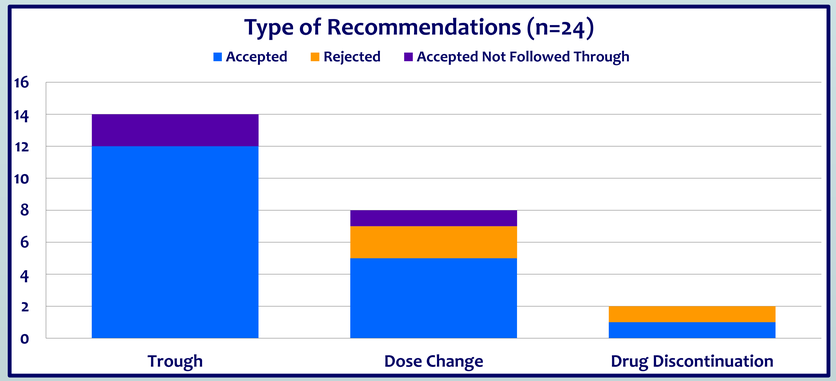
| PRIMARY OUTCOME | RESULTS |
|---|---|
| Incidence of AKI (%) | 11.8 |

| SECONDARY OUTCOMES | RESULTS |
|---|---|
| Patients requiring adjustment (n) | 24 |
| Recommendations made (n) | 24 |
| Recommendations accepted (%) | 88 |
| Average time to AKI onset (days) | 4.5 (± 1.7) |




## RESULTS (cont.)

**PHARMACIST INTERVENTIONS**




## DISCUSSION

- When combined with IV VAN, a lower incidence of AKI with EI PTZ was identified in this study compared to intermittent infusion reported in literature.
- CKD as past medical history and concomitant nephrotoxic agents did not show an immediate concern, as those patients did not develop AKI during our review.
- One patient who previously developed an AKI from the study regimen developed it again when re-exposed on a separate admission.
- While 88% of pharmacist recommendations were verbally accepted by prescribers, only 75% followed through with a change.
- Limitations of the study include small sample size and short study duration.

## CONCLUSION

- While AKI was observed with the combination IV VAN and EI PTZ, the incidence was lower than that reported in literature with intermittent infusion.

**DISCLOSURE**

Authors of this presentation have the following to disclose concerning possible financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject matter of this presentation:, John Choi, Andy Chang, Ashmi A. Philips, Rani P. Madduri, Michael S. Casias: Nothing to disclose.