Optimizing Vancomycin Prescribing Through a Pharmacist Driven Monitoring Intervention at a Children's Hospital

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Poster 1924

BACKGROUND

- Therapeutic drug monitoring of vancomycin is essential to optimize therapeutic efficacy and to monitor risk of nephrotoxicity
- Area under the curve (AUC24) is the pharmacodynamic target for vancomycin
- Trough concentrations between 15 and 20 mcg/ml are often used as surrogate for serious MRSA infections, but does not accurately predict AUC24 in pediatric patients
- The majority of patients receiving vancomycin have treatment discontinued prior to 72 hours of therapy, therefore obtaining drug levels for all patients is unnecessary
- We designed a pharmacy driven vancomycin dosing intervention to accomplish the following objectives:

1) Optimize AUC24 ≥ 400 attainment
2) Minimize unnecessary vancomycin levels
3) Reduce the number of levels ordered among children treated for < 72 hours

METHODS

- This was a retrospective study that evaluated vancomycin use at a 290 bed, freestanding children's hospital
- During the pre-intervention period 6/2012 – 5/2014 physicians were responsible for vancomycin dosing
- Troughs were routinely obtained prior to the 4th dose with a targeted trough of 15-20 for most indications
- During the intervention period (6/2014-5/2016), pharmacists ordered and modified vancomycin dosing regimens to target an AUC24 ≥400
- Level obtainment could be deferred for up to 72 hours in patients with estimated GFR greater than 49 ml/min/1.73 m^2
- Renal function was also routinely monitored by the pharmacist

Primary Outcomes

- The percentage of patients receiving <72 hours of therapy with ≥1 vancomycin concentration
- Average number of vancomycin levels/course
- Attainment of AUC24 ≥400 after the first dose regimen (estimated using a midpoint and a trough)

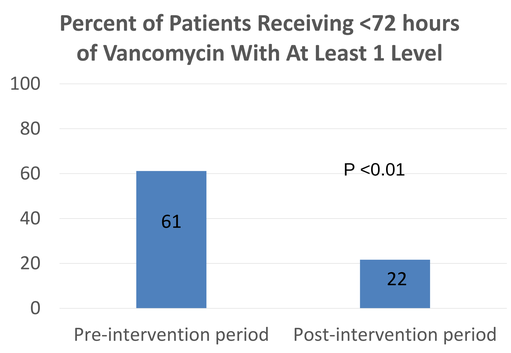
Balance Measure

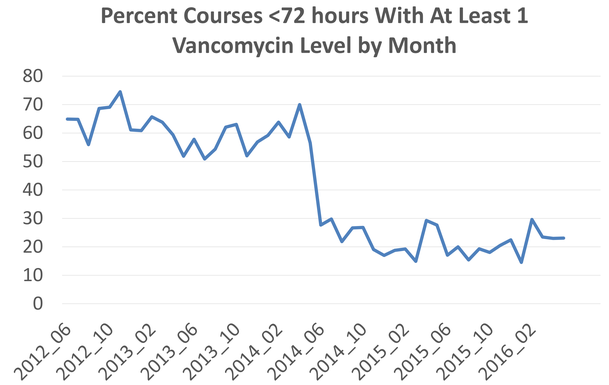
- The percentage of patients that experienced acute kidney injury (defined as doubling serum creatinine up to 72 hours after receiving vancomycin)

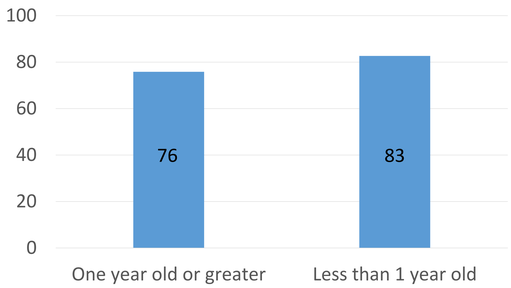
RESULTS

All Courses of Vancomycin

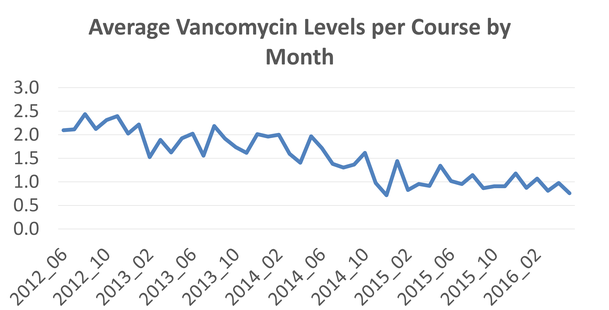
	Pre-intervention N = 1996	Post-Intervention N = 1716	P-value
Received < 72 hours of vancomycin	1334 (67%)	1243 (72%)	<0.01
Average vancomycin levels per course	2.0	1.1	<0.01
Average dose adjustments	1.8	1.4	<0.01
Patients experiencing nephrotoxicity	45 (2.3%)	56 (3.3%)	0.07
≥ 1 serum creatinine measured	1590 (80%)	1472 (86%)	<0.01







Average starting dose for patients 1 year of age or greater was 56 mg/kg/day
Average starting dose for patients less than 1 year of age was 49 mg/kg/day



CONCLUSIONS

- A pharmacist driven intervention that redesigned vancomycin dosing and monitoring:
  - was successful in achieving the target AUC24 for the majority of patients
  - reduced unnecessary vancomycin monitoring primarily by avoiding unnecessary levels in patients with early discontinuation
  - and did not increase risk for nephrotoxicity

LIMITATIONS

- Insufficient data to calculate AUC24 during pre-intervention period for comparison
- This is a pre/post study design with no control group

NEXT STEPS

- Evaluate impact of intervention on costs and dosing errors
- Evaluate provider satisfaction

In memory of Chris Stockmann PhD 1988-2016

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