Evaluation of Voriconazole Use in a 528-bed Community Teaching Hospital: *a retrospective cohort study*

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Background and Objective

- Voriconazole is the treatment of choice for many invasive fungal infections including those that are fluconazole resistant[1]
- Voriconazole has unpredictable, nonlinear pharmacokinetics with extensive inter- and intrapatient variations
- Inappropriate use of voriconazole is associated with dangerous adverse effects including hepatic and renal toxicity, visual disturbances, QT prolongation, and drug-drug interactions[2,3]
- This study aims to evaluate voriconazole utilization at a 528-bed community teaching hospital

Study Design

- Retrospective, single-center, chart review
- Patients ≥18 years who received voriconazole between July 1st, 2018 and June 30th, 2020 were included in the analysis
- Patients who died within one day of therapy were excluded

Results

Table 1. Summary of Demographics and Clinical Characteristics

Variable	Value
Total no. of encounters	47
Female sex, n (%)	23/47 (48.9)
Age in years (IQR)	69 (60 - 74)
Weight in kg (IQR)	68 (55 - 95)
BMI in kg/m² (IQR)	25 (20.6 - 31)
Top services, n (%)	
Internal Medicine	33 (70)
Pulmonology	4 (8.5)
TPN order, n (%)	5 (11)
Immunocompromised*, n (%)	17 (36)
ID or Heme/Oncology approval, n(%)	47 (100)
Category X DDI*, n (%)	11 (23)
ADR requiring discontinuation, n (%)	
QTc prolongation	1 (2)
LFT elevation	1 (2)
Length of stay in days (IQR)	15 (7 - 32)
Scr, mg/dL, day 1 (IQR)	0.8 (0.6 - 0.95)
Scr, mg/dL, max (IQR)	0.84 (0.6 - 1)
AST, units/L, day 1 (IQR)	25 (19 - 40)
AST, units/L, max (IQR)	26 (20 - 49)
ALT, units/L, day 1 (IQR)	22.5 (14 - 37)
ALT, units/L, max (IQR)	27 (17 - 44)

*IQR: interquartile range. Max: maximum values during therapy. Day 1: value on first day of therapy. Scr: serum creatinine. AST: aspartate aminotransferase. ALT: alanine transaminase. Immunocompromised: malignancy. DDI: drug-drug interaction; category X: tamsulosin, azithromycin, amiodarone, carbamazepine. ADR: adverse drug reaction; LFT, liver function tests

Nearly half of voriconazole troughs were drawn incorrectly

There is opportunity for IV to PO conversion, which may be associated with cost savings

Clinician education is necessary to promote IV to PO conversion and improve therapeutic monitoring

Figure 1. Summary of Voriconazole Indications and Culture Organisms

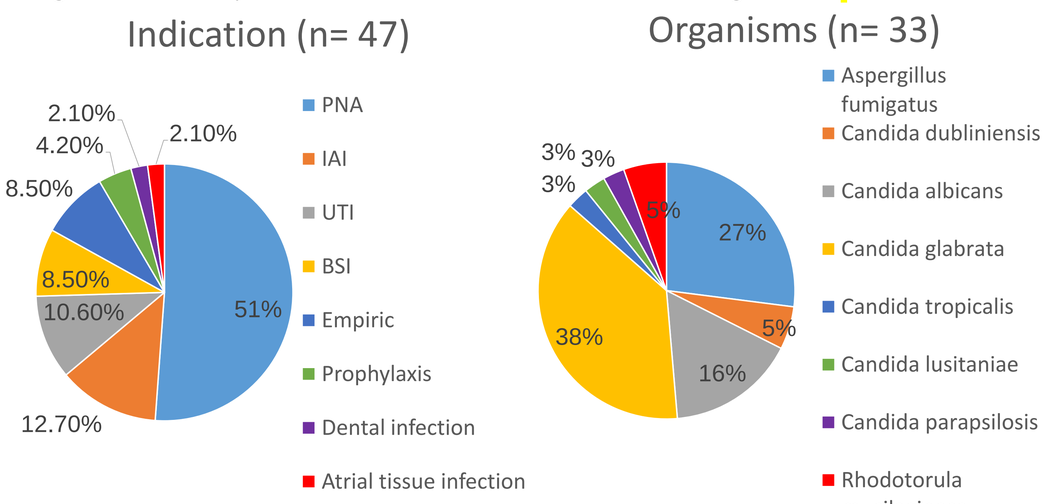

Table 2. Summary of Voriconazole Trough Levels

Therapeutic Drug Monitoring	
Encounters with trough concentrations, n (%)	16 (34)
Total trough concentrations, n	25
Concentrations taken incorrectly*, n (%)	11 (44)

*Correct timing for trough concentration defined as 1-2 hours before the steady state dose

Table 3. Summary of Cost Analysis

Cost	
Total IV doses given while on PO medications, n	173
Total voriconazole 200mg vials used, n	305
Total cost of voriconazole vials, US $	~$55,000
Total cost of PO voriconazole alternative, US $	~$2,200
Total potential cost savings for study period, US $	$52,800
Total potential annual cost savings, US $	~26,400

Average wholesale price: $183.43/200 mg vial

Discussion

- All voriconazole courses were approved by the ID or Heme/Oncology
- Only two patients experienced side effects that required therapy discontinuation including: QTc prolongation and LFT elevation
- Several category X DDIs were identified including tamsulosin, azithromycin, amiodarone, and carbamazepine
- Suboptimal therapeutic drug monitoring occurred in 44% of patients requiring monitoring
- Twelve patients received IV voriconazole during their admission despite qualifying for PO therapy, which resulted in unnecessary costs
- Further education is required for nursing and pharmacy staff to ensure effective voriconazole administration

Contact

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ASHP Midyear 2020, December 6th – 10th

References

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