Post-liver transplant antimicrobial utilization after the expansion of a pharmacist-led antimicrobial stewardship program

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Introduction

- In 2018, over 36,000 transplant procedures were performed in the United States[1]
- Transplant recipients are at high risk of developing infections due to[2]:
  - Invasive surgical procedures
  - Induced immunosuppression
  - Exposure to nosocomial pathogens
  - Diminished signs of infection
- Clinical data on the effect of antimicrobial stewardship programs (ASPs) on transplant recipients are sparse, but data from other immunocompromised populations suggest benefit from ASPs[3]
- In December 2016, Indiana University (IU) Health expanded their ASP from 1 to 3 infectious disease (ID) pharmacists
- More than 150 liver transplant procedures occur every year at IU Health University Hospital
- The effect of this expanded ASP on the liver transplant population is unknown

Objective

- To assess the impact of an expanded ASP on antimicrobial use within post-liver transplant patients

Methods

Design

- Retrospective cohort study that compared antimicrobial use and patient outcomes before and after the ASP expansion (2016 vs. 2018)

Subjects

- Patients ≥ 18 years old who were hospitalized and had received a liver transplant during that hospitalization

Inclusion Criteria

- Patients receiving antimicrobial therapy with one or more of the following agents:

Antimicrobials studied	
Amoxicillin-clavulanate (AMC)	Meropenem (MEM)
Ampicillin-sulbactam (SAM)	Micafungin
Cefepime (FEP)	Moxifloxacin (MXF), IV and PO
Ceftriaxone (CRO)	Piperacillin-tazobactam (TZP)
Ciprofloxacin (CIP), IV and PO	Vancomycin (VA), IV

Exclusion Criteria

- Multivisceral transplant patients
- Patients surviving < 72 hours after transplant
- Documented active infection prior to liver transplantation

Outcome Measures

Primary

- Number of patients that received ≥1 dose
- Difference in the aggregate days of therapy (DOT) in patients that received ≥1 dose

Secondary

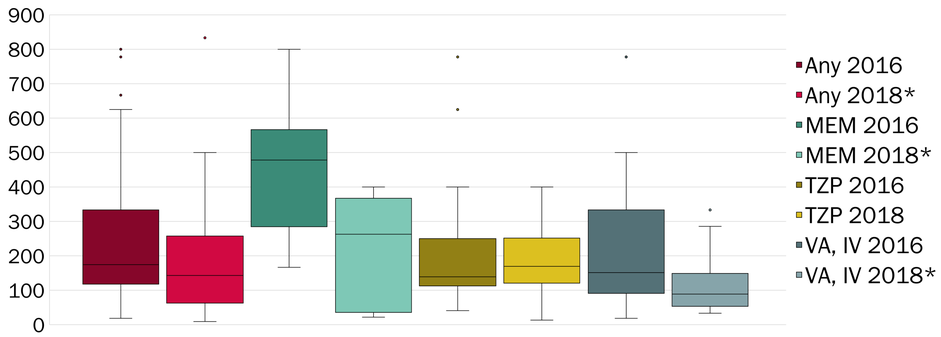
- Difference in the individual DOT
- Graft survival
- Patient survival
- Rates of ID consults
- Multidrug resistant organism (MDRO) rates

Results

Antimicrobial use, DOT/1000 patient-days

	2016	2018	Difference (95% CI)
Any antimicrobial, median (IQR)	174 (118 to 333)	143 (63 to 258)	49 (8 to 83)
MEM, median (IQR)	478 (285 to 567)	263 (36 to 367)	198 (66 to 452)
TZP, median (IQR)	139 (112 to 250)	170 (125 to 250)	-6 (-80 to 78)
VA, IV, median (IQR)	151 (91 to 333)	89 (53 to 149)	58 (2 to 132)

Antimicrobial use, DOT/1000 patient-days



*Indicates a significant difference compared to the respective 2016 cohort data

Secondary Outcomes

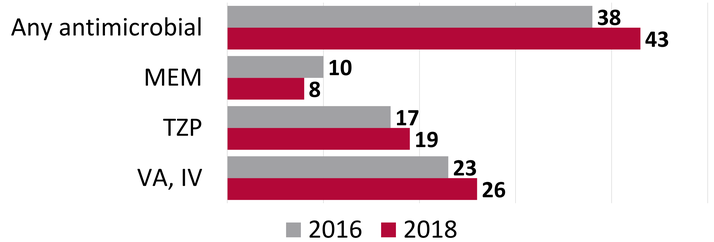
	2016 (n=134)	2018 (n=134)	p-value
1-year graft survival, n (%)	130 (97.0)	125 (93.2)	0.255
1-year patient survival, n (%)	130 (97.0)	127 (94.8)	0.540
ID consults, n (%)	2 (1.5)	12 (9.0)	0.011
Total MDROs, n (%)	21 (15.7)	11 (8.2)	0.089

Results (cont.)

Baseline Characteristics

	2016 (n=134)	2018 (n=134)	p-value
Age in years, median (IQR)	58 (49 to 64)	58 (51 to 64)	0.584
Male, n (%)	82 (61.1)	93 (69.4)	0.199
DCD organ donations, n (%)	17 (16.7)	30 (22.4)	0.037
Length of stay (days), median (IQR)	9.5 (8.0 to 15.0)	10.5 (8.0 to 19.0)	0.474
Indication for transplant, n (%)			0.603
NASH	46 (34.3)	42 (31.3)	
Ethanol	23 (17.2)	30 (22.4)	
Hepatitis C	32 (23.9)	26 (19.4)	
Other	33 (24.6)	36 (26.9)	
Use of rATG in induction, n (%)			<0.001
rATG ≥ 4.0 mg/kg	112 (83.6)	89 (66.4)	
rATG >0 and <4 mg/kg	22 (16.4)	25 (18.7)	
No rATG used	0	20 (14.9)	
MELD score, median (IQR)	20 (17 to 24)	22 (18 to 27)	0.010

Number of patients that received ≥1 dose



Discussion

- This study expands upon the current literature of antimicrobial use in immunocompromised populations
- In post-liver transplant patients, an expanded ASP contributed to shorter broad-spectrum antimicrobial durations in patients that received at least 1 dose
- There was less MEM and VA use in patients who received at least 1 dose in 2018
- There were more ID consults in 2018
- Similar rates of survival and length of stay
- Future studies should focus on transplanted patients up to 1-year post-operation and on other organ transplant patients

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I have no real or potential conflicts of interest to disclose regarding this poster.

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