2657. Clinical Prediction Tool for Multidrug-Resistant Organisms Among Deceased Donors at the Time of Donor Evaluation

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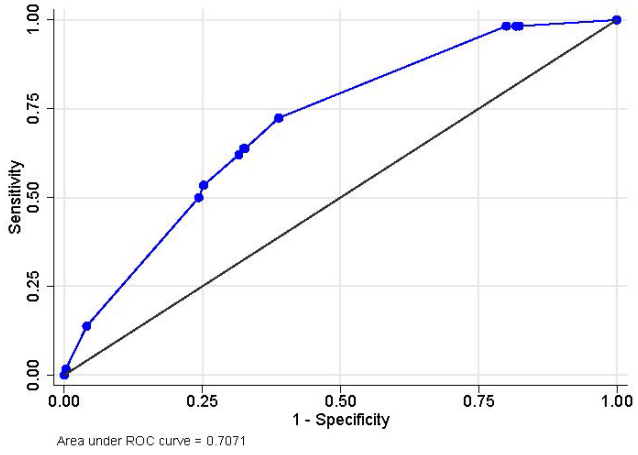
Background: Transplant guidelines recommend exercising caution when considering organs that may be infected or colonized with multidrug-resistant organisms (MDROs) and treating the organ recipient with perioperative antibiotics active against the donor MDRO. Unfortunately, donor MDROs are often identified only after transplantation. We developed a clinical prediction tool to stratify donors' MDRO risk at the time of donor evaluation.

Methods: A retrospective cohort study was conducted at four transplant centers in Philadelphia between January1, 2015 and June 30, 2016. All deceased organ donors who donated ≥1 organ to one of the centers were included. Multivariate logistic regression was used to determine predictors of donor MDROs, including methicillin-resistant *S. aureus* (MRSA), vancomycin-resistant enterococci, extended-spectrum cephalosporin-resistant (ESC-R) or carbapenem-resistant Enterobacteriaceae, multidrug-resistant (MDR) *P. aeruginosa*, or MDR *Acinetobacter* species. Manual forward selection was utilized to maximize the area under the receiver operating characteristic curve (AUC). A scoring system was developed based on the odds ratios for each covariate. Internal validity was assessed using the Hosmer–Lemeshow statistic, specificity, and negative predictive value (NPV).

Results: Of 440 total donors, 62 (14%) grew MDROs on culture. The majority were MRSA (40) or ESC-R Enterobacteriaceae (20). The most parsimonious model that predicted donor MDROs included: a terminal hospitalization ≥ 7 days (1 point), ≥ 2 antibiotics administered during the terminal hospitalization (1 point), receipt of extracorporeal membrane oxygenation (ECMO) (1 point), and presence of opacities on donor chest imaging concerning for lower respiratory tract infection (2 points). With this scoring system, the maximum attainable score is 5; any donor with a score of ≥ 2 points would be considered high risk for an MDRO, with an AUC of 0.71, specificity of 99%, and NPV of 86%. The Hosmer–Lemeshow $P = 0.68$.

Conclusion: The risk of an MDRO among deceased organ donors can be predicted using the above scoring system. This tool will inform decisions about organ utilization and perioperative prophylaxis for solid-organ transplant recipients.



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2658. Meningitis in Kidney Transplant Recipients: *TransMéninges*, a French Multicentric Retrospective Cohort Study

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Background: The management of meningitis requires the prompt introduction of high-dose probabilistic anti-infectious therapy. The literature reporting on meningitis in kidney transplant recipients (KTR) is scarce and no recommendation exists for this specific population.

Methods: We retrospectively included all adult KTRs diagnosed with meningitis (cerebro-spinal fluid (CSF) cell count >10/mm^3 or positive fungal antigen or direct examination) between 2007 and 2018 in 16 French hospitals. Clinical, biological, and therapeutic data, and 1-year kidney and patient survival were collected.

Results: Meningitis occurred in 134 KTRs (mean age 57+/11.8 years, 56% male), after a median time of 27 months (IQR 8–65); 25% of patients received an immunosuppressive treatment before kidney transplantation, induction treatment included lymphocyte-depleting antibodies in 63%, and 53% presented diabetes (34% before and 19% after the transplantation). The etiologies included *Cryptococcus neoformans* (30%), Herpesviridae (22%, including Varicella-Zoster Virus 15%), idiopathic forms (11%), Gram-negative bacilli (8% of which 20% produced an extended spectrum β-lactamase), %), infusion of intravenous immunoglobulins (6%), post-transplant lymphoproliferative disorders (5%), *Aspergillus fumigatus* (4%), *Listeria monocytogenes* (4%), Enterovirus (4%), and *Mycobacterium tuberculosis* (3%).

The most common symptoms were fever (82.5%), headaches (75%), encephalitis (55%), and convulsion (22.5%). CSF hypercellularity (found in 92% of the cases) was lymphocytic in 65% of the cases and neutrophilic in 35%. Initial anti-infectious therapy was inappropriate in 27% of the cases. One-year patient, graft, and death-censored graft survival rates were 84%, 76%, and 89%, respectively.

Conclusion: Meningitis after kidney transplantation encompasses a wide range of causes, with *C. neoformans* and VZV explaining more than 50% of the cases. Gram-negative bacilli are the most represented bacteria with a high rate of antimicrobial resistance. Treatment guidelines should be reconsidered in the specific population of KTRs as the etiology greatly differs from what is observed in the general population.

Disclosures. **All authors:** No reported disclosures.

2659. Retrospective Review of Biopsy Proven Acute Graft Pyelonephritis in Renal Transplant Patients

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Background: There are few studies of histologic acute graft pyelonephritis (HAGPN) following kidney transplant (KT). The goals of this study are to determine incidence, identify potential risk factors and describe outcomes of HAGPN in a large cohort of KT recipients.

Methods: Renal allograft biopsies of all patients undergoing first KT at our medical center between 2008 and 2017 were reviewed. HAGPN was defined as the presence of neutrophils within the interstitium and tubules (casts). Medical charts of patients with HAGPN were reviewed. Episodes of bacteriuria (≥10:5 cfu/mL growth in culture) were classified as urinary tract infection (UTI) or asymptomatic bacteruria (ASB) based upon documented symptoms. An episode of acute rejection was defined as pulse parenteral immunosuppressive therapy for histologic evidence of rejection.

Results: HAGPN was identified in 43 of 1,391 (3.1%) KT recipients at a median of 298 days post-transplant. There were no significant differences between recipient age or gender, donor age or transplant type (deceased, living related, living unrelated) between recipients with and without HAGPN. Urologic malformation was diagnosed in 14 (33%) by day 30 post-transplant. Twenty-five (58%), 17 (40%), and 13 (30%) sustained one or more episodes of acute rejection, UTI and ASB, respectively, prior to HAGPN. At diagnosis of HAGPN, 28 (65%), 7 (16%), and 16 (37%) had histologic evidence of rejection, UTI and ASB, respectively. Twenty-two (51%) and 37 (86%) were treated with pulse immunosuppression and antibiotics, respectively. Median nadir serum creatinine before HAGPN was 1.1 mg/day while median serum creatinine at 6 and 12 months after HAGPN were 1.5 and 1.6. Three patients (7%) developed graft failure within 1 year after HAGPN.

Conclusion: HAGPN is an infrequent complication of KT. A majority of patients with HAGPN have histologic evidence of rejection and either UTI or ASB at diagnosis, though over 40% have neither UTI nor ASB. When rejection accompanying HAGPN is routinely treated with pulse immunosuppression and antibiotic therapy is administered, graft function is preserved for most patients but a minority (7%) loses graft function within 1 year. Potential risk factors to be assessed in further study include post-transplant urologic dysfunction, acute rejection and UTI.

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2660. Infection Complications Following Mismatched Allogeneic Hematopoietic Cell Transplantation

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Background: The use of haploidentitical or HLA mismatched unrelated donors permits allogeneic hematopoietic cell transplantation (HCT) in individuals with otherwise no donors available. Post-transplantcyclophosphamide(PTCy) is used for prevention graft-vs.-host disease (GVHD) in recipients of mismatched donors. We hypothesized that type and incidence of infectious complications following allogeneic HCT would vary according to the type of transplant.

Methods: We systematically assessed viral kinetics and reactivation rates for cytomegalovirus (CMV) in a prospective cohort of mismatched unrelated donor (MMUD) HCT recipients who had PTCy at our center (April 2017–March 2019). In addition, we evaluated the incidence of invasive aspergillosis (IA), invasive candidiasis (IC), bloodstream infection (BSI), pneumonia, *Clostridium difficile* (CDI), and community-acquired respiratory virus. Haploidentical donor and anti-thymocyte globulin (ATG) treated MMUD recipients were served as historical control groups.

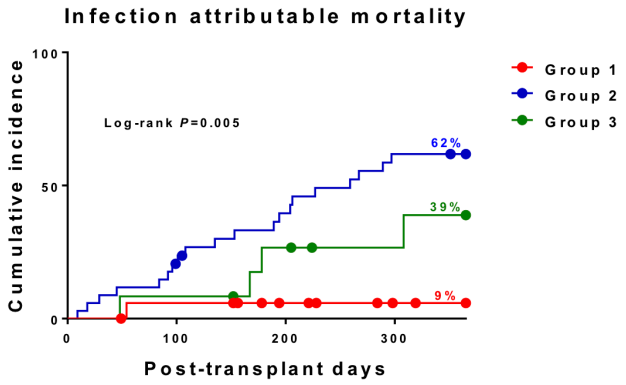
Results: A total of 81 patients were analyzed in 3 groups (Table 1): PTCy MMUD (group 1; $n = 22$), ATG MMUD (group 2; $n = 40$) and haploidentical (group 3; $n = 19$). Whereas the 1 year incidence of CMV viremia was similar across groups, the rate of clinically significant (requiring preemptive therapy) CMV viremia was lower in group 1, compared with groups 2 and 3 (18 vs 53%; $P = 0.02$). The 1 year incidence of CDI was 47% in group 3 vs. 18% in groups 1 and 2 ($P = 0.01$). There was no significant difference in the incidence of IA (5–18%), pneumonia (30–42%), BSI (32–55%) and CARVs (28–53%) between groups. There were no cases of IC in this cohort. 1 year infection attributable mortality was lower in group 1 (figure), compared with groups 2 and 3, (9%, 62% and 39%, respectively; $P = 0.005$).

Conclusion: Compared with ATG MMUD and haploidentical donor, PTCy MMUD HCT was associated with lower incidence of clinically significant CMV and lower infection attributable mortality. These findings might be related to the contemporary prophylactic strategies used in this patient population. Larger studies are needed.

Table 1.

Variable	All patients (n=81)	Group 1 (n=22)	Group 2 (n=40)	Group 3 (n=19)	P value†
Age, yr, median (IQR)	55(43-63)	60 (51-65)	55 (41-63)	48 (46-57)	0.26
Male Sex, n(%)	35 (43)	9 (41)	16 (40)	10 (53)	0.64
Ethnicity					
Hispanic/Latino	51 (63)	15 (68)	23 (58)	13 (68)	0.68
Non-Hispanic/Latino	13(16)	7 (32)	17 (43)	6 (32)	0.69
Race					
White	64 (79)	18 (82)	30 (75)	16 (84)	0.78
Follow-up, Post-HCT d, median (IQR)	224 (134-411)	228 (153-357)	243 (101-455)	217 (150-357)	0.96
Underlying diagnosis n(%)					
Acute myeloid leukemia	30 (37)	9 (41)	14 (35)	7 (37)	0.69
Acute lymphoblastic leukemia	8 (10)	6 (27)	5 (13)	2 (11)	0.28
Myelodysplastic syndrome/MPN	5 (6)	3 (14)	11 (28)	0 (0)	0.02
Non Hodgkin lymphoma	6 (7)	2 (9)	4 (10)	4 (21)	0.51
Others	32 (40)	2 (9)	6 (15)	6 (32)	0.16
Conditioning regimen					
Bu/Cy/ATG	3 (4)	0 (0)	3 (8)	0 (0)	0.43
Cy/TBI/Post Tx Cy	3 (4)	3 (14)	0 (0)	0 (0)	0.03
Flu/Bu/ATG	17 (21)	0 (0)	17 (43)	0 (0)	< 0.01
Flu/Bu/Post Tx Cy	18 (22)	11 (50)	0 (0)	7 (37)	< 0.01
Flu/Cy/TBI/ATG	1 (1)	0 (0)	1 (3)	1 (5)	0.49
Flu/Cy/TBI/Post Tx Cy	8 (10)	7 (32)	0 (0)	0 (0)	< 0.01
Ful/Mel/ATG	12 (15)	0 (0)	12 (30)	0 (0)	< 0.01
Ful/Mel/Post tx Cy	4 (5)	1 (5)	0 (0)	3 (16)	0.02
Ful/Me/Tt/Post tx Cy	1 (1)	0 (0)	0 (0)	1 (5)	0.23
Flu/Mel/TBI/Post tx Cy	5 (6)	0 (0)	0 (0)	5 (26)	< 0.01
R/Flu/Mel/ATG	2 (2)	0 (0)	2 (5)	0 (0)	0.73
TBI/Cy/ATG	1 (1)	0 (0)	1 (3)	0 (0)	1.0
TBI/Etoposide/ATG	4 (5)	0 (0)	4 (10)	0 (0)	0.18
TBI/Flu/Post tx Cy	1 (1)	0 (0)	0 (0)	1 (5)	0.23
Others	1 (1)	0 (0)	0 (0)	1 (5)	0.23
Stem cell source					
PBSC	49 (60)	2 (9)	30 (75)	17 (89)	< 0.01

Figure 1. Infection attributable mortality



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2661. Sarcopenia Increases Risk of Post-Surgical Infections in Kidney Transplant Recipients

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Background: Sarcopenia (reduced skeletal muscle mass) has been associated with serious infection in liver transplant recipients. We analyzed the association of sarcopenia and early post-surgical infections in kidney transplant recipients.

Methods: Retrospective cohort study of 125 patients underwent kidney transplantation from 2010 to 2014 at University of Kentucky Medical Center. Sarcopenia was diagnosed by measuring the skeletal muscle mass on computed tomography imaging obtained during the pre-transplant evaluation using SliceOmatic 5.0 software at L3 level (≤ 52.4 cm^2/m^2 in males and ≤ 38.5 cm^2/m^2 in females). Early post-transplant infections were confirmed by positive culture from blood, urine, and/or peritoneal fluid within 30 days after kidney transplantation. A generalized linear model (GLM) was used to identify variables predictive of post- surgical infection and Risk Ratio (RR) was obtained, with a P-value of < 0.05. The statistical analysis was performed with STATA version 12.0 (College Station, Texas).

Results: Among 125 patients, 52 (41.6%) were identified with sarcopenia, 110 (88.0%) patients were white, 76 (60.8%) male, with a median age of 56 (range 20–72) at the time of transplant. Diabetes was reported in 50 (40.0%) patients, obesity in 64 (51.6%) patients and smoking in 43 (34.6%) patients. Six (4.8%) patients had graft failure. Infections were identified in 22 (17.6%) patients, more than one source of infection was reported in 4 (3.2%) cases. The most common infections were urinary tract infection in 13 (10.4%) patients and bacteremia in 5 (4.0%) patients. The median time to development of infection was 9 days (range 1–27). In the bivariate analysis, sarcopenia was associated with high risk of post-surgical infections (RR 2.45; 95% CI 1.10–5.44). In multivariable analysis, sarcopenia was a significant independent predictor of infection (RR 2.58; 95% CI 1.20–5.52). None associations were found with other variables; age over 40 years, male sex, smoking, obesity and diabetes.

Conclusion: Our study suggested that sarcopenia was associated with an increased risk of early post-surgical infection in kidney transplant recipients.

Table 1: Factors associated with early post-surgical infections in kidney transplant recipients

	Infection	Non-infection		Bivariate Analysis			Multivariate Analysis		
	(n=22)	(n=103)	p-value	RR	95% CI	p	RR	95% CI	p
Age < 40 years old	20 (90.9%)	83(80.5%)	0.360	2.13	0.53-8.52	0.283	1.52	0.36-6.42	**0.568**
Male	14(63.6%)	62 (60.1%)	0.814	1.12	0.50-2.49	0.766	0.90	0.41-1.96	**0.802**
Race, white	20 (90.9%)	90 (87.3%)	1.000	0.733	0.18-2.84	0.654			
Smoking	7 (31.8%)	36 (35.2%)	0.810	0.87	0.38-1.99	0.758	0.90	0.40-2.02	**0.816**
Diabetes	9 (40.9%)	41 (339.8%)	1.000	1.03	0.47-2.25	0.924	1.01	0.47-2.15	**0.970**
Obesity	11 (50.0%)	53 (51.9%)	1.000	0.93	0.43-2.00	0.868	1.20	0.53-2.70	0.650
Sarcopenia	14 (63.6%)	38 (36.8.4%)	0.031	2.45	1.10-5.44	0.027	2.58	1.20-5.52	**0.014**
Deceased-donor	18 (81.8%)	77 (74.7%)	0.590	0.70	0.25-1.92	0.494			
Hypoalbuminemia	13(59.0%)	61 (59.2%)	1.000	0.99	0.45-2.15	0.991			

Table 2: Microorganisms associated with infections among patients undergoing kidney transplantation

Bloodstream infection	**N=8**
Candida parapsilosis	1
Escherichia coli	1
Enterococcus faecalis	1
Enterococcus faecium	1
Staphylococcus epidermidis	3
Pseudomonas aeruginosa	1
Urinary tract infections	**N=17**
Candida krusei	1
Candida glabrata	3
Escherichia coli	3
Enterobacter aerogenes	1
Enterobacter hormaechei	1
Enterococcus faecalis	2
Enterococcus faecium	1
Klebsiella pneumoniae	1
Pseudomonas aeruginosas	1
Staphylococcus epidermidis	2
Staphylococcus spp	1
Peritonitis	**N= 3**
Escherichia coli	1
Group B streptococcus	1
Enterococcus faecalis	1

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2662. Methenamine Hippurate Decreases the Incidence of Urinary Tract Infections in Adult Renal Transplant Recipients

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Background: Urinary tract infections (UTIs) are a common complication of renal transplantation. Methenamine hippurate is a non-antibiotic alternative that reduces