Incidence and outcomes of infections in liver transplant recipients during the first year post-transplant

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Introduction

Despite use of antimicrobial prophylaxis in liver transplant recipients (LTR), infection remains the most likely cause of death in LTR accounting for 18.94% of deaths in the first year. There is limited data describing the characteristics, infections, and potential risk factors of LTR while hospitalized in the first year following transplantation.

Methods

We performed a single center retrospective cohort study at The University of Rochester. Electronic medical records of 298 first time adult LTR between 03/5/2011 and 04/01/2020 were reviewed. Demographic and comorbidity data was obtained at time of transplant. Microbiologic data and outcomes were obtained during the first year post-transplant. We compared mortality between those with infection and those without using log-rank survival analysis.

Results

160 (53.7%) patients suffered at least 1 infection while hospitalized in the first year post-transplant. There were 178 bacterial infections in 130 patients of which 115 were intra-abdominal (table 1). The most common organism was *Enterococcus sp.* (n=102), 65 were vancomycin resistant (VRE). The most common site of fungal infection was abdominal (n=13) and the most common organism was *C. glabrata* (n=9). The most common viral infection was CMV at 7-12 months although other viral infections occurred between 1-6 months (graph 2).
In a univariate chi-square model, bacterial infection at any time was associated with all-cause mortality in the first year (CI 1.7-8.9 p-adj= 0.002). Fungal infection between 2-6 months was also associated with increased mortality (CI 2.7-12.2 p-adj= 0.0005).

Figure 1. Timing of Infection, as evidenced by the number of cultures obtained vs type of organism and interval of time for culture growth.

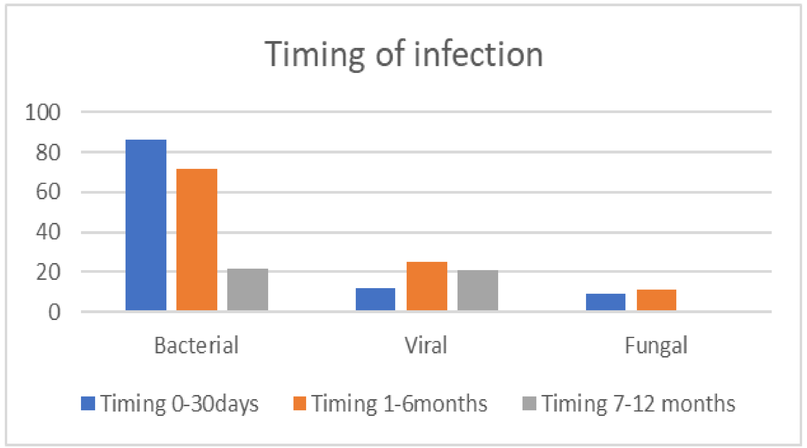

Table 1. Site of Bacterial Infections

System	30 days	1-6 months	7-12 months	Total
Blood Stream Infection	16	26	6	48
Abdominal	62	43	10	115
Pneumonia	8	13	6	27
Central Nervous System	0	0	0	0
Urinary	9	8	4	21
Incision Cite	11	12	0	23
Soft tissue infection	4	4	3	11
Endocarditis	0	0	0	0
Total	110	106	29	

Table 2. Patient Characteristics

Patient Characteristics	Not Infected	Infected	95%CI of RR	CI	P value	q value
Total	138.00	160.00				
Gender						
Female	34.00	60.00	0.77	0.62-0.94	0.02	0.12
Male	104.00	100.00				
Age (mean)	56.65	56.31			0.71	0.80
Race						
Black	18.00	13.00	1.59	0.85-2.96	0.19	0.42
Asian	3.00	6.00	1.30	0.85-2.00	0.18	0.42
White	115.00	138.00				
Hispanic	34.00	60.00	0.77	0.62-0.94	0.02	0.10
BMI (mean)	29.04	28.44			0.36	0.51
Meld score (average)	23.99	26.16			0.14	0.42
Comorbilities						
ESRD prior to txp	8.00	19.00	1.35	1.03-1.77	0.07	0.25
COPD	15.00	17.00	1.01	0.72-1.43	0.94	0.96
Return to the OR	0.43	0.86			0.01	0.07
DM2	39.00	49.00	1.04	0.83-1.31	0.72	0.80
Outcomes						
Length of hospitalization	4.96	8.89			0.01	0.08
Length of ICU stay	0.79	1.83			0.07	0.31
Mortality at one year	2.00	24.00	1.85	1.57-2.17	0.00003	0.0004
Graft Rejection	13.00	21.00	1.18	0.88-1.57	0.31	0.51

Conclusions

Bacterial infections are the most common type of infection in LTR and occur more frequently during the first 6 months in hospitalized patients. Bacterial infection at any point was independently associated with increased mortality in the first-year post-transplant. The most common organism was Enterococcus with a high rate of VRE which should be taken into consideration for empiric coverage at our institution. Fungal infection between 2 to 6 months was associated with increased mortality. There was a non-statistically significant trend toward increased mortality in the first 30 days. We observed that early bacterial and fungal infections are markers of poor prognosis.