

Incidence, timing and aetiology of bloodstream infections following orthotopic liver transplantation or haematopoietic stem cell transplantation – a single center experience

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BACKGROUND AND OBJECTIVES

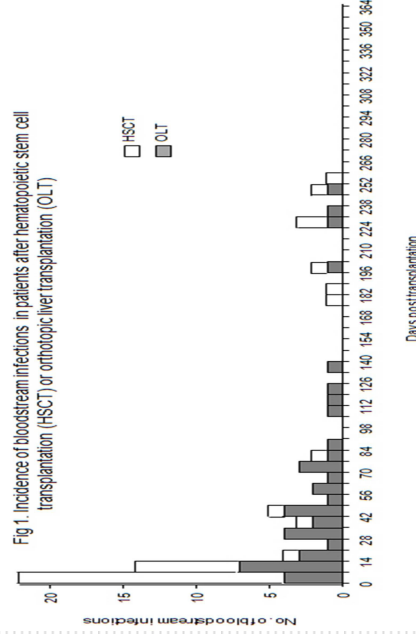
Bloodstream infections (BSI) are important cause of morbidity and mortality and major complications of both orthotopic liver transplantation (OLT) and haematopoietic stem cell transplantation (HSCT). Bacteremias have been documented in 24-35% OLT patients, and in those patients mortality ranges between 24-36%¹. Incidence of BSI in HSCT patients has been observed to be 13-60%, with mortality rates associated with BSI from 10-27%². Appropriate empirical antimicrobial therapy has been shown to reduce mortality, especially among patients with Gram-negative bacteremia.³ Knowing characteristic timing of bacteremia occurrence enables anticipation of these infections and their earlier detection, and knowing the pattern of causative microorganisms is a prerequisite for determining suitable empirical therapy. The objective of this study was to evaluate and compare incidence, timing and aetiology of BSI post transplantation (TX) in two groups (OLT and HSCT) of patients in order to characterize epidemiology of bacteraemias occurring in a single institution.

RESULTS

78 BSI were identified (OLT: n=42, HSCT: n=36) at a median of 18 (range 1-256; SD 75) days post TX (OLT: median 42, range 1-248 SD 65 days; HSCT: median 8, range 1-256, SD 85 days, Mann Whitney p=0.004). In both groups, the majority of BSI were observed in the first trimester following TX, in HSCT patients mostly (69.4% of all BSI in HSCT) during the first two weeks (Fig. 1). Gram-negative (GN) organisms were the prevalent cause (52.6%) of BSI in both groups, with *Pseudomonas aeruginosa* accounting for 16.7% of all BSI and 31.7% of all GN BSI. Gram-positive (GP) pathogens were responsible for 37.2% of BSI, with coagulase-negative staphylococci being the most prevalent in this group (17.9% of all pathogens, 48.3% of all GP organisms). Mixed BSI represented 3.8% and fungaemias (candidaemias) 6.4% of all BSI. No statistically significant differences in aetiology of BSI (GN, GP fungal) were found between OLT and HSCT patients, neither during the whole period of observation (1 year), nor in any of the 4 trimesters. A trend towards higher incidence of fungaemia in OLT and allogeneic HSCT compared to autologous HSCT patients was observed (Chi square, p=0.09).

CONCLUSIONS

During the last decade Gram-positive bacteria emerged as major pathogens causing bloodstream infections after liver transplantation and hematopoietic stem cell transplantation. However recent studies have reported a reemergence of Gram-negative bacteria in both OLT and HSCT patients^{4,5}. In our study, most BSI were caused by GN organisms in both groups. Significant differences in aetiology of BSI between OLT and HSCT patients were not found. BSI occurred mostly during the first trimester post TX, in HSCT patients significantly earlier than in OLT patients, usually during the first 2 weeks. Due to high incidence of *Pseudomonas* bacteremias observed in our institution, initial empirical therapy should inevitably include agents with strong antipseudomonal activity.



PATIENTS AND METHODS

280 consecutive TXs (in 262 patients) performed from January 2005 to October 2008 have been evaluated. OLT patients: n=136; mean age 49 (range 16-75, SD 12); HSCT patients: n=126; mean age 45 (range 19-70, SD 14); autologous TX 80.2%, allogeneic 19.8%. Patients were followed up 1 year after TX; blood culture dates and isolates were recorded.

PATIENTS (n=262)	HSCT (n=126)	OLT (n=36)
Age	mean 45 range 19-70, SD 14	mean 49 range 16-75, SD 19
Underlying disease	Acute lymphoblastic leukemia 10.3% Acute myeloid leukemia 15.1% Non-Hodgkin's lymphoma 49.2% Hodgkin's lymphoma 7.9% Multiple myeloma 7.5%	Alcohol 19.6% Hepatitis C 12.5% Hepatitis B 1.5% Cryptogenic cirrhosis 9.6% Hepatocellular carcinoma 5.1% Primary biliary cirrhosis 5.1% Primary sclerosing cholangitis 1.5% Metabolic 3.7% Intoxication 3.7% PCLD 6.6% Other 14.7%
Type of transplantation	Autologous 80.2% Allogeneic 19.8%	Whole Liver 82% Left kidney+Whole Liver 7.9% Right kidney+Whole Liver 4.4% Split liver 3.8% Split liver 1.4% Pancreas+Whole liver 0.7%

MICROORGANISM	N=36 HSCT %	N=42 OLT %
<i>Staphylococcus epidermidis</i>	22.2	14.3
<i>Streptococcus viridans</i>	2.8	11.9
<i>Enterococcus sp.</i>	13.9	16.7
<i>Streptococcus mitis</i>	5.6	2.4
<i>Gemella morbillorum</i>	2.4	2.4
TOTAL GRAM POSITIVE	44.5	35.8

MICROORGANISM	N=36 HSCT %	N=42 OLT %
<i>Pseudomonas aeruginosa</i>	25	11.9
<i>Escherichia coli</i>	13.9	11.9
<i>Fusobacterium sp.</i>	8.3	2.8
<i>Enterobacter sp.</i>	2.8	2.8
<i>Bacteroides sp.</i>	2.8	2.4
<i>Proteus sp.</i>	2.8	2.4
<i>Klebsiella pneumoniae</i>	16.7	9.5
<i>Acinetobacter sp.</i>	9.5	2.4
<i>Aeromonas hydrophila</i>	2.4	2.4
TOTAL GRAM NEGATIVE	52.8	54.8

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