Post Operative Infections after Liver Transplantation

Essay

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in Intensive Care

By

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(M.B.B.ch.)

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بِسْمِ اللّهِ الرّحمَنِ الرّحيمِ

[...رَبِّ اَوزِعنِي اَن اَشكُرَ نِعمَتَكَ
الّتِي اَنعَمْتَ عَلَيَّ و عَلى والِدَيَّ
و اَنْ اَعْمَلَ صَالِحاً تَرْضَاهُ و اَدْخِلْنِي
بِرَحْمَتِكَ فِي عِبَادِكَ الصَّالِحِينَ]

صدق الله العظيم

النمل.. اية رقم ١٩

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Ibrahim Mohamed El-Tokhy

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List of Abbreviations

ADH : Alcohol dehydrogenase
AIDS : Acquired immunodeficiency syndrome
ALF : Acute liver failure
ALT : Alanine aminotransferase
ARDS : Acute Respiratory Distress Syndrome
ARF : Acute renal failure
ASTS : American Society for Transplant Surgeons
AVT : Anti-viral therapy
BCAA : Branched chain aminoacids
BCM : Body cell mass
BG : b-glucan
CBD : Common bile duct
CLD : Chronic liver disease
CMV : Cytomegalovirus
CNS : Central nervous system
CRF : Chronic renal failure
CRI : Catheter related infections
CSF : Cerebrospinal fluid
CTP : Child-Turcotte-Pugh
CYP : Cytochrome p
DAAs : Direct antiviral agents
EBV : Epstein bar virus
ELISA : Enzyme linked immunosorbent assay
ESBL : Extended spectrum beta lactamase
ESLD : End stage liver disease
ETR : End of treatment response
GM : Aspergillus galactomannan
HAT : Hepatic artery thrombosis

List of Abbreviations *(Cont...)*

HBF : Hepatic blood flow
HCC : Hepatocellular carcinoma
HCV : Hepatitis c virus
ICG : Indocyanine green
ICU : Intensive care unit
IFI : Invasive fungal infections
IL : Interleukin
ILTS : International Liver Transplantation Society
IVC : Inferior vena cava
LDL : Low density lipoprotein
LT : Liver transplantation
LTBI : Latent tuberculosis infection
MASP2 : MBL-associated serine protease 2
MBL : Mannan-binding lectin
MDR : Multidrug resistant
MEGX : Monoethylglycinxylidide metabolite
MELD : Model for end stage liver disease
MEOS : Microsomal ethanol oxidizing system
MMF : Mycophenolate mofetil
MRSA : Methicilline resistant staph aureus
NAS : Non-anastomotic biliary strictures
P.Is : Protease inhibitors
PAMPs : Pathogen-associated molecular patterns
PBC : Primary biliary cirrhosis
PCR : Polymerase chain reaction
Peg-IFN : Pegylated interferon
PH : Partial hepatectomy
POL I : Polymerase inhibitor

List of Abbreviations *(Cont...)*

PRRs : Recognition receptors
PSC : Primary sclerosing cholangitis
PVT : Portal vein thrombosis
RBV : Ribavirin
SDD : Selective digestive decontamination
SNPs : Single nucleotide polymorphisms
SOT : Solid organ transplantation
SVR : Sustained virologic response
TB : Tuberulosis
TEG : Thrombelastography
TLR : Toll-like receptor
TRALI : Transfusion related acute lung injury
VAP : Ventilator associated pneumonia
VLDL : Very low density lipoprotein
VRSA : Vancomycin resistant staph aureus

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Introduction

Orthotopic Liver Transplantation (OLT) has become a widely accepted treatment for a variety of liver diseases such as viral and alcoholic cirrhosis, liver malignancy, acute liver failure, and many metabolic abnormalities ***(Feltracco et al., 2011).***

As a result of improvement in anesthesiological and surgical skill, organ support device adoption, advanced understanding of transplant immunology, and better critical care management of complications, liver transplanted patients survive longer. Patient survival in one- and five-year is around 90% and 80% respectively ***(van Hoek et al., 2012).***

According to many reports, infections in the early period after OLT remain important causes of morbidity and mortality, despite advanced medical care. The infection-related mortality rate in nearly 50% when accompanied by septic shock. It is estimated that up to 80% of liver recipients will develop at least one infection during the first year after transplantation, and, while most are successfully treated, some will result in death ***(Xu et al., 2012).***

Bacterial infections are most frequent (70%), followed by viral (20%) and fungal infections (8%).The diagnosis is difficult among this group of patients because of the usually mild or often absent signs and symptoms of infection. Nevertheless even mild infections in immunocompromised patients may produce catastrophic effects ***(Romero and Razonable, 2011).***

Both donor and recipient factors as well as aspects related to the transplant operation contribute to the risk of infection after OLT. Recently genetic polymorphisms in the innate immune system, from both donor and recipient, have been identified as important risk factors for infection after OLT ***(Vera et al., 2011).***

Infection control strategies should be an integral component of liver transplant programs in order to reduce its incidence and transmission. With surveillance, cohorting, contact isolation, and nasal decolonization ***(Russell et al., 2008).***

Treatment of bloodstream infections should be directed towards the elimination of the predisposing factor, combined with pathogen-directed antimicrobial therapy that is guided by antimicrobial susceptibility testing. For persistent bloodstream infections like endocarditis should be evaluated by means of a transesophageal echocardiogram. Indwelling vascular and urinary catheters should be removed, intra-abdominal abscesses should be drained, and other potential nidus of infection should be surgically corrected, if feasible ***(Mathers et al., 2009).***

Aim of the Study

The aim of the work is to review infections as a post-operative complication after liver transplantation in the intensive care unit and the strategies to deal with to achieve the most favourable outcome.

Anatomy and Physiology of the Liver

Anatomy of the liver

The liver is the largest gland in the body and, after the skin, the largest single organ. It weighs approximately 1500g and accounts for approximately 2.5% of the adult body weight ***(Moore and Dalley, 2006).***

The liver is a solid gastrointestinal organ that largely occupies the upper quadrant of the abdomen. The costal margin coincides with the lower margin and the superior surface is draped over by the diaphragm. Most of the right liver and most of the left liver is covered by the thoracic cage. The liver extends superiorly to the height of the fifth rib on the right and the sixth rib on the left ***(Townsend et al., 2004)***.

The posterior surface straddles the inferior vena cava (IVC). A wedge of liver extends to the left half of the abdomen across the epigastrium to lie above the anterior surface of the stomach and under the central and left diaphragm. The superior surface of the liver is convex and is molded to the diaphragm, whereas the inferior surface is mildly concave and extends to a sharp anterior border ***(Townsend et al., 2004)***.

Surfaces of the liver

The diaphragmatic surface is smooth and dome shaped where it is related to the concavity of the inferior surface of the diaphragm. Subphrenic recesses exist between diaphragm and anterior and superior aspects of diaphragmatic surface of the liver. The hepatorenal recess is a posteriosuperior extension of the subhepatic space that is a gravity-dependant part of the peritoneal cavity in the supine position ***(Moore and Dalley, 2006)***.

The visceral surface is covered with perioteneum except at the fossa for gallbladder and the portahepatis. The visceral surface bears multiple fissures and impressions from contact with other organs ***(Moore and Dalley, 2006)***.

Ligaments of the liver

The liver is attached to the anterior abdominal wall by the falciform ligament and, except for a small area of the liver against the diaphragm (the bare area), the liver is almost completely surrounded by visceral peritoneum. Additional folds of peritoneum connect the liver to the stomach (hypogastric ligament), the duodenum (hepatodudenal ligament), and the diaphragm (right and left triangular ligaments and anterior and posterior coronary ligaments) ***(Darke et al., 2005)***.

Important relations

Anteriorly, the liver is related to the diaphragm, right and left costal margins, right and left pleura, and lower margins of both lungs, xiphoid process and anterior abdominal wall in the subcostal angle.

Posteriorly, the liver is related to diaphragm, right kidney, hepatic flexure of the colon, duodenum, gallbladder, IVC, esophagus, and fundus of the stomach ***(Snell, 2004)***.

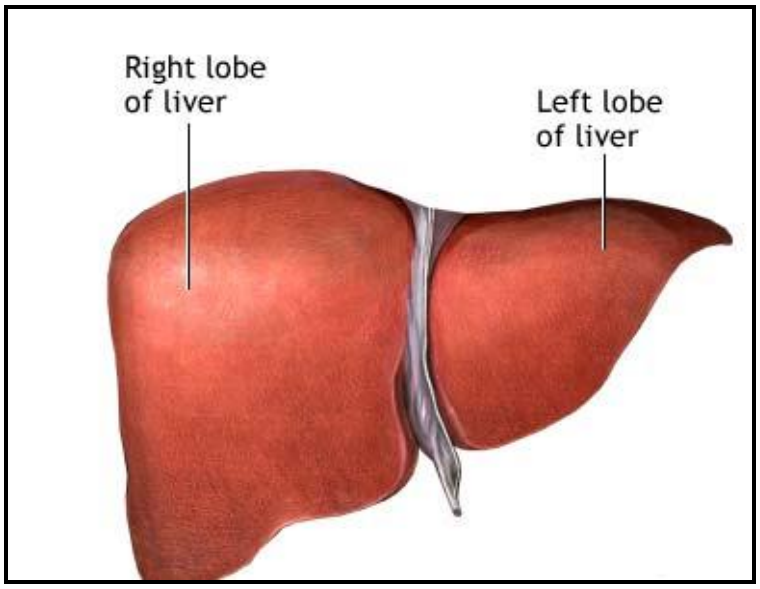

Figure (1): Anterior surface of the liver. ***Sherlock and Dooley (2002).***

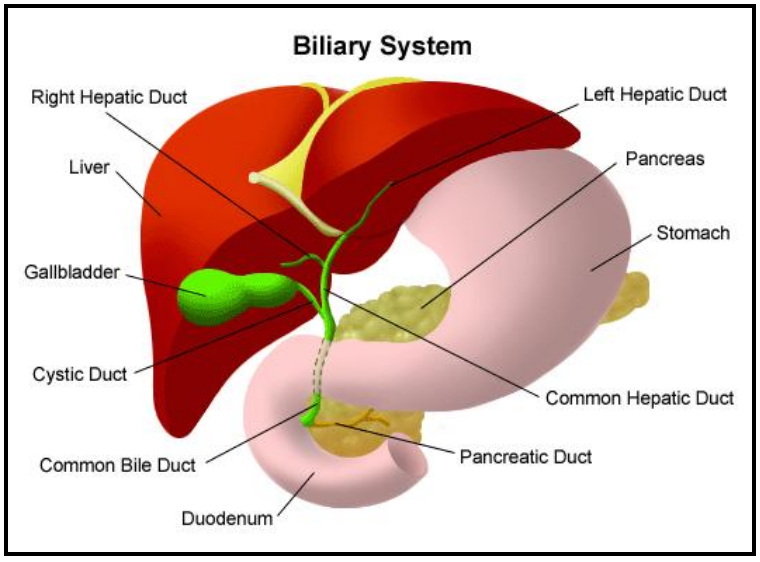

Figure (2): Visceral surface of the liver. ***Sherlock and Dooley (2002).***