Anesthetic Considerations in Liver Transplantation for Adult Recipients

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Abstract

The discipline of liver transplantation has been developed over the past decades, and it is now considered the gold standard for the treatment of patients with end-stage liver disease. Increasing success rates has led to broader indications and increased number of potential recipients.

The patient selected for transplant should suffer from irreversible, progressive disease for which there is no acceptable, alternative therapy. Recipients are broadly defined as having an intolerable quality of life because of liver disease or having an anticipated length of life of less than 1 year because of liver failure. Recipients are priority ranked by application of the Model of End- Stage Liver Disease (MELD) scoring system. This system ranks patients by expected mortality based on the severity of their liver disease.

Candidates for liver transplantation are subjected to thorough evaluation and assessment of all body systems to figure out all possible complications of end stage liver disease as hepatorenal syndrome, hepatopulmonary syndrome and hepatic encephalopathy. Liver function is also assessed through all available laboratory and radiological methods. Finally they are subjected to routine preanesthetic evaluation.

Key Words :

Amino-caproic acid - Blood urea nitrogen - Epstien Barr Virus

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Nahla Nasraldin Shehab, 2011

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ACA	Amino-caproic acid
ALI	Acute lung injury
ALT	Alanine aminotransferase
AP	Alkaline phosphstase
aPPT	Activated partial thromboplastin
ARDS	Acute respiratory distress syndrome
AST	Aspartate aminotransferase
ATN	Acute tubular necrosis
BEE	Basal energy expenditure
BSP/ICG	Bromosulphalein/indocyanine green
BUN	Blood urea nitrogen
CMV	Cytomegalovirus
CT	Computed tomography
CTP	Child–turcotte–pugh score
DDAVVP	Desmopressin acetate
EACA	ε- aminocaproic acid
EBV	Epstien Barr Virus

ECG	Electrocardiogram
EHE	Epithelioid haemangioendotheliomas
ERCP	Endoscopic retrograde cholangio-pancreatography
ESLD	End stage liver disease
FHF	Fulminant hepatic failure
FFP	Fresh frozen plasma
FLC	Fibrolamellar carcinoma
FMS	Fluid management system
GABA	γ-aminobutyric acid
GVHD	Graft-Versus-Host Disease
HDLs	High-density lipoproteins
HE	Hepatic encephalopathy
HLA	Human leucocyte antigen
HRS	Hepato-renal syndrome
ICP	Intracranial pressure
ICU	Intensive care unit
INR	International normalized ratio
KIU	Kallikrein inactivator units
LDLs	Low density lipoproteins

LDH	Lactate dehydrogenase
LFT	Liver function tests
MELD	Model of end- stage liver disease
MRI	Magnetic resonance imaging
NASH	Nonalcoholic steatohepatitis
OLT	Orthotopic liver transplantation
PEEP	Positive end expiratory pressure
PNF	Primary non function of the graft
PRS	Postreperfusion syndrome
PT	Prothrombin time
PTT	Partial thromboplastin time
rFVIIa	Recombinant factor VIIa
SBP	Spontaneous bacterial peritonitis
SD	Standard deviation
SGOT	Serum gtutamic oxalacetic transaminase
SGPT	Serum glutamic pyruvic transaminase
TEE	Transesophageal echocardiography
TEG	Thromboelastography

tPA	Tissue plasminogen activator
THAM	Tromethamine
THC	Transhepatic cholangiography
TRALI	Transfusion-related lung injury
UDP-Glucose	Uridine diphosphate glucose
UNOS	United network for organ sharing
Vd	Volume of disribution
VLDLs	Very low density lipoproteins
VVB	Veno-venous bypass
vWF	Von-Willebrand factor
γ-GT	Gamma-glutamyl transpeptidase

Introduction

Introduction

A significant progress has been made in the last two decades in the field of orthotopic liver transplantation since it was first performed. The first successful liver transplant took place in 1967 and since then with continued improvements in organ preservation, surgical technique, the advent of better immunosuppressive agents, the management of coagulopathy, prevention of ischemia-reperfusion injury of the graft, in addition to quality care anesthesia and the treatment of infections, it has resulted in a great expansion of this procedure worldwide[1].

It must be remembered that liver transplantation is the sole life saving procedure in patients with end stage liver disease and acute liver failure when all treatment options have been exhausted.

The disease process and the transplant operation cause major physiological changes. All transplant team members must participate in the selection and preoperative assessment of the recipient so that potential responses to intraoperative stresses can be anticipated and unsuitable candidates rejected[2]. The ramifications of liver disease may affect all major organ systems, creating a major challenge for the anesthesiologist and making perioperative complications more likely.

Excellent progress has been made in the understanding of the various complex physiological issues that are integral to the successful management of patients undergoing liver transplantation. As a result, many of the changes that occur during the 3 phases of the procedure (preanhepatic phase, anhepatic phase, neohepatic phase) are predictable and safely managed[3-4]. This includes the management of severe coagulopathy, metabolic derangements, massive fluid shifts, blood loss, temperature derangement, hemodynamic instability and renal dysfunction.

Varied responses to drug administration must be expected in patients with liver disease therefore, careful monitoring of drug actions is necessary, with titration of the dose of the drug to achieve the desired clinical effect is required[5].

Anesthesia considerations for liver transplantation include the management of severely deranged physiology, pharmacology, and biochemistry, as all organ systems may be affected adversely by the failing liver. A close working relationship between all members of the operating team is necessary for the success of the program. The challenge facing all members of the team, including the anesthesiologist, is to reduce the morbidity and mortality of this procedure.

Chapter 1

Anatomical and Physiological Considerations of The Liver

Anatomy of the Liver

The liver is a wedge shaped, reddish brown, vital organ necessary for survival. It is the largest organ in the body which normally weighs 1.4-1.6 kg[6]. It is also considered the largest gland in the human body.

Position and surfaces of the liver

It is located in the right hypochondrium extending to the epigastric region and up to the left hypochondrium. It has a superior dome shaped surface which is directly related to the diaphragm separating it from the right pleura and lung. . Its postero-inferior (visceral) surface is related to the abdominal oesophagus, stomach, duodenum, hepatic flexure of the colon, right kidney and suprarenal and gall bladder[7].(Figure 1&2)

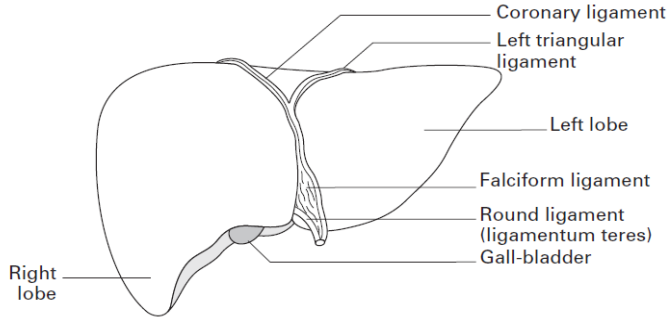

Fig.(1) Anterior view of the liver[7]