Clinical Outcome after Elective Cardiac Surgery in Patients with Liver Cirrhosis

Thesis
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By
Ahmad Azmy Algebaly
M.B.B.ch,M.Sc

Supervised by

Prof.Dr. Ahmed Abd-Elrahman Hassouna
Professor of Cardiothoracic Surgery
Ain Shams University

Prof.Dr. Mohsen Mohammed Abd-Elkareem
Professor of Cardiothoracic Surgery
Ain Shams University

Prof.Dr. Hesham Abd-Elrahman Zaki
Professor of Cardiothoracic Surgery
Ain Shams University

Doctor. Hatem Yazeed El-Bawab
Ass. Professor of Cardiothoracic Surgery
Ain Shams University

Ain Shams University
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DEDICATION

TO MY Family

Who always blessed my life,

Acknowledgments

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List of Abbreviations

ACT	Activated clotting time
AFP	α -Fetoprotein
ALT	Alanine Transaminase
ANOVA	Analysis of variance
AST	Aspartate Transaminase
ATP	Adenosine Tri Phosphate
AVR	Aortic Valve Replacement
Ca_morb	Cardiac morbidity
CABG	Conventional Coronary Artery Bypass Grafting.
CABG_V	Coronary + valve replacement
CBC	Complete Blood Count
CCK	Cholecystokinin
CHP-Cls	Child-Pugh class
CHP-Sc	Child-Pugh Score
CO	Cardiac Output
CHD	Congenital heart disease
CPB	Cardiopulmonary Bypass.
CT scan	Computed tomography
CTP	Child-Turcotte-Pugh system
DVR	Double Valve Replacement
EF	Ejection fraction
ERCP	Endoscopic Retrograde Cholangiopancreatography.
ESRD	End stage renal disease
EuroSCORE	European System for Cardiac Operative Risk Evaluation.
FHF	Fulminant hepatic failure.
GI	Gastrointestinal
HB	Hemoglobin
HBV	Hepatitis B virus
HCV	Hepatitis C virus
Hep_imp	Hepatic impairment
HPS	Hepatopulmonary syndrome
HTN	Systemic hypertension
HVPG	Hepatic venous pressure gradient
ICG	Indo-Cyanine Green clearance test

IHD	Ischemic Heart Disease
INR	International Normalized Ratio
IV	Intra Venous
LV	Left Ventricle
LVEDD	Left Ventricular End Diastolic Dimension
LVEF	Left Ventricular Ejection Fraction
LVESD	Left Ventricular End Systolic Dimension
LVFS	Left Ventricular Fraction Shortening
MAC	Minimal alveolar concentration
MELD	Mayo End-Stage Liver Disease
Morbid	Morbidity
Mort	Mortality
MR	Mitral regurgitation
MRI	Magnetic Resonance Imaging
MI	Myocardial infarction
MSOF	Multi system organ failure
MVR	Mitral Valve Replacement
MVr	Mitral Valve repair
NAD	Nicotine Amide Dinuclutitde
NHI	National Heart Institute
NPV	Negative Predictive value
NSAIDs	Nonsteroidal anti-inflammatory drugs
NYHA	New York Heart Association
OPCAB	Off pump Coronary Artery Bypass Grafting.
P.A.P.R	Pulmonary artery pressure
P02	Pressure of oxygen
PDR	Percentage disappearance rate
Per. ef	Pericardial effusion
PH	Power of hydrogen ion
Pl. ef	Pleural effusion
PLS	plasma
PLT	Platelets
Postop	Postoperative
PPV	Positive Predictive value
Preop	Preoperative

PT	Prothrombin Time
PTT	Activated Partial Thromboplastin Time
QT	QT Interval
Resp. comp	Respiratory complication
RHD	Rheumatic Heart Disease
ROC curve	Receiver Operating Characteristic curve analysis
RVD	Right ventricle diameter
SD	Standard Deviation
Sens	Sensitivity
SLD	Schistosomal liver disease
SLE	Systemic lupus erythematosis
Spec	Specificity
SPSS	Statistical Package for Social Science
TEE	Transoesophageal Echocardiography
TFPI	Tissue factor pathway inhibitor
TGF-beta1	Transforming growth factor beta1
TNF-alpha	Tumor necrosis factor-alpha
tPA	tissue Plasminogen Activator
Tr	Tricuspid Valve repair
TTE	Transthoracic Echocardiography
uPA	Urokinase Plasminogen activator
US	Ultrasound
Vent. time	Ventilation time
VLDL	Very Low Density Lipoprotein
VWF	Von Willebrand factor
WBCs	White Blood Cells
X. C	Cross clamp
PBC	Primary biliary cirrhosis
PSC	Primary sclerosing cholangitis

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INTRODUCTION

Over time, the spectrum of surgical procedures available to patients with cardiac and great vessels disease continues to diversify and to mature. In parallel, our ability to match a widening range of surgical procedures with the individual needs of the patient has evolved as well. The relationships among preoperative patient-related risk factors and procedure-related perioperative care form the basis of the ongoing process of surgical care [1].

As techniques of operation and postoperative patient care improve, with resulting satisfactory clinical outcome, the number of patients with preoperative comorbidities who undergo major surgery is increasing. Currently, however, clinical outcomes after major surgery in patients with more advanced liver dysfunction, i.e., cirrhosis, are still unsatisfactory [2].

Schistosomal liver disease (SLD) in Egypt is significantly associated with HCV infection, with the predominance of genotype 4. Concurrent HCV infection and SLD result in much more severe liver disease than that seen with either disease alone. However, the activity of HCV infection seems to be partially suppressed in patients with SLD [3].

Congestive heart failure owing to myocardial infarction, cardiomyopathy, rheumatic heart disease, or constrictive pericarditis increases hepatic venous pressure and decreases hepatic blood flow, with resulting congestive liver fibrosis and cirrhosis. Multiple medications for cardiac disorders and blood transfusion during prior cardiac surgery may also compromise liver function. Accordingly, a close association between cardiac and liver disorders exists, and we occasionally encounter patients with the pathognomonic features. Despite the circumstances, patients with cirrhosis are less frequently referred for elective open heart surgery because of their considerably compromised health status and decreased life expectancy [2].

Because the number of patients reported about this issue is small, and morbidity and mortality rates after cardiac surgery using CPB in patients with this comorbidity are considerably high, definitive recommendations and indications for operation have not been conclusively shown. Recent studies demonstrated that although the incidence of postoperative complications was high, patients with mild cirrhosis tolerated open heart surgery well [4, 5].

The aim of the work

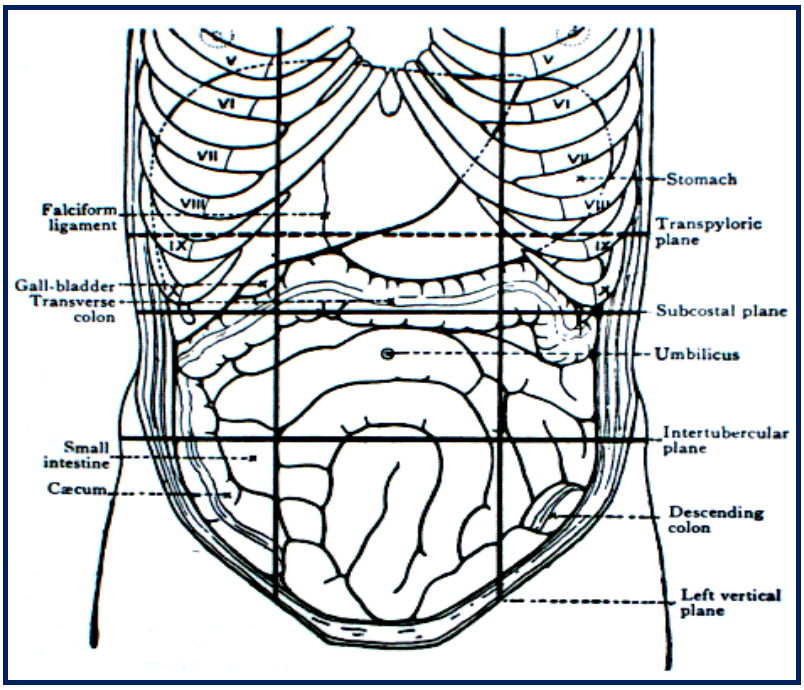
This prospective, case-controlled clinical study was designed to increase the chance of patients with liver cirrhosis who had a correctable cardiac lesion for a good outcome and good quality of life.

REVIEW OF LITERATURE

ANATOMICAL CONSIDERATION

Gross and Surface Anatomy of the Liver

The liver lies in the right upper quadrant of the abdominal cavity. Beneath and attached to the diaphragm. It is the largest gland in the human body, weighing approximately 1500g in the adult. The relatively large size of the liver (especially the left lobe) at birth accounts for, in part, the bulging prominence of the infant's abdomen. In the adult, the normal liver extends from approximately the right fifth intercostal space along the midclavicular line down to or slightly below the costal margin, thus lying essentially under the protection of the rib cage (Fig. 1).



(Fig.1): Abdominal viscera as related to the subdivision of the abdominal cavity [6].

The anterior border of the liver lies on the transpyloric plane, about a hand's breadth below the xiphisternal joint. The gallbladder is usually found on the transpyloric plane along the midclavicular line [6].

On a visual basis, the liver is divided into a left half and a right half by the peritoneal fold (falciform ligament) which connects the liver to the diaphragm and the anterior abdominal wall. Functionally, however, the

division of the liver is not based on the falciform ligament but rather on a plane that passes through the gallbladder and inferior vena cava [7].

- *Lobes:*

The liver is divided into four lobes. They are supplied by right and left branches of the portal veins and hepatic artery proper, and their bile drains into the right and left hepatic ducts. As noted above, the left and right lobes are divided anatomically at the line of attachment of the falciform ligament. The right lobe, however, is further subdivided on its inferior-posterior surfaces into two smaller lobes; the quadrate and caudate lobes. The quadrate lobe is on the inferior surface, rectangular, bounded on the left by the fissure for the ligamentum teres, posteriorly by the porta hepatis, and on the right by the fossa of the gallbladder. The caudate lobe is situated on the posterior liver surface, bounded on the left by the fissure for the ligamentum venosum and on the right by the groove for the inferior vena cava .Occasionally, the lower border of the right hepatic lobe may project downward for a considerable distance as a broad tongue-like process (Riedel's lobe) [7].

- *Ligaments:*

As the falciform ligament reaches the liver, its two layers separate, exposing an area on the superior surface of the liver that is devoid of peritoneum. The left layer of the falciform ligament then becomes continuous with the anterior layer of the left triangular ligament, and the right layer becomes continuous with the upper layer of the coronary ligament. The coronary ligament is formed by a reflection of the peritoneum from the diaphragm to the superior and posterior surfaces in the right lobe. (Fig. 2) It consists of an upper layer and a lower layer continuous at the right extremities with the right triangular ligament of