HUMAN LIVER REGENERATION FOLLOWING HEPATIC RESECTION

Thesis
Submitted for Partial Fulfilment
of M.D. Degree in General Surgery

BY

ASER MOSTAFA MOHAMED EL AFIFY
M.B.B.Ch., M.Sc. General Surgery
Ain Shams University

Supervised BY

PROF. DR. MOHAMED SAMEH ZAKI
Prof. of General Surgery
Ain Shams University.

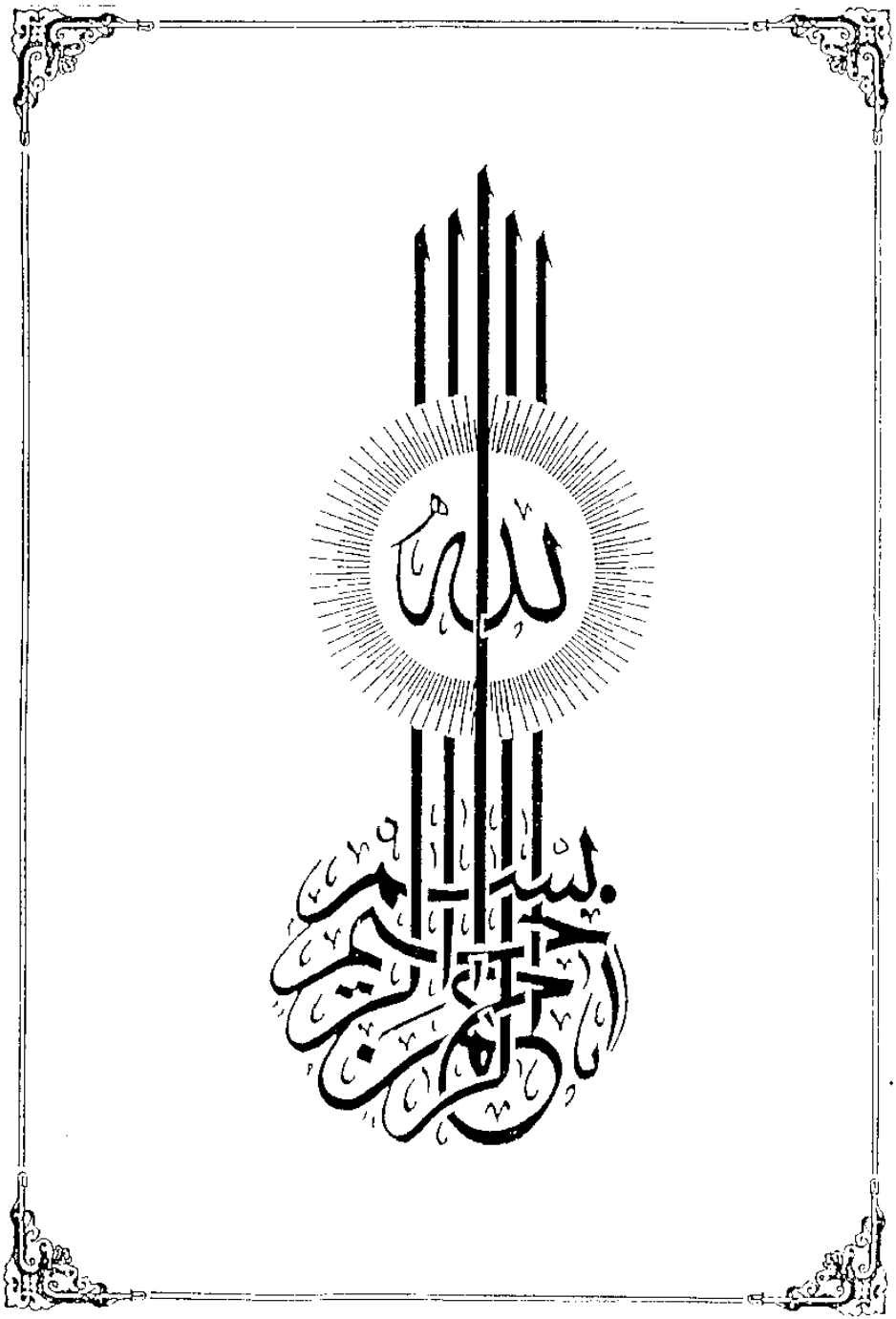
PROF. DR. ALAA ABDALLA
Prof. of General Surgery
Ain Shams University.

DR. NABIL SAYED SABER
Ass. Prof. of General Surgery
Ain Shams University.

DR. AHMAD KAMAL EL DORY
Ass. Prof. of Radiodiagnosis
Ain Shams University.

DR. USAMA ALI EL ATRASH
Ass. Prof. of General Surgery
Ain Shams University.

Faculty of Medicine,
Ain Shams University
***** 1996 *****



بسم الله الرحمن الرحيم

قالوا سبحانك لا علم لنا إلا ما علمتنا إنك أنت العليم الحكيم

سورة البقرة – الآية ٣٢

Acknowledgement

I would like to express my grateful acknowledgment and deepest gratitude to *Prof. Dr. Mohamed Sameh Zaki*, Professor of General Surgery, Ain Shams University, for his helpful guidance, directions and energetic encouragement throughout this work. His constructive criticism, valuable efforts and kind supervision are highly appreciated.

I am also deeply indebted to *Prof. Dr. Alaa Abdalla*, Professor of General Surgery, Faculty of Medicine, Ain Shams University, for his guidance, sincere help, fatherly encouragement and supervision throughout the course of this work.

No words can figure my deepest gratitude to *Prof. Dr. Nabil Sayed Saber*, Assistant Professor of General Surgery, Ain Shams University, for his great cooperation and expert advice during this work and for giving me patiently a lot of his time, help and criticism.

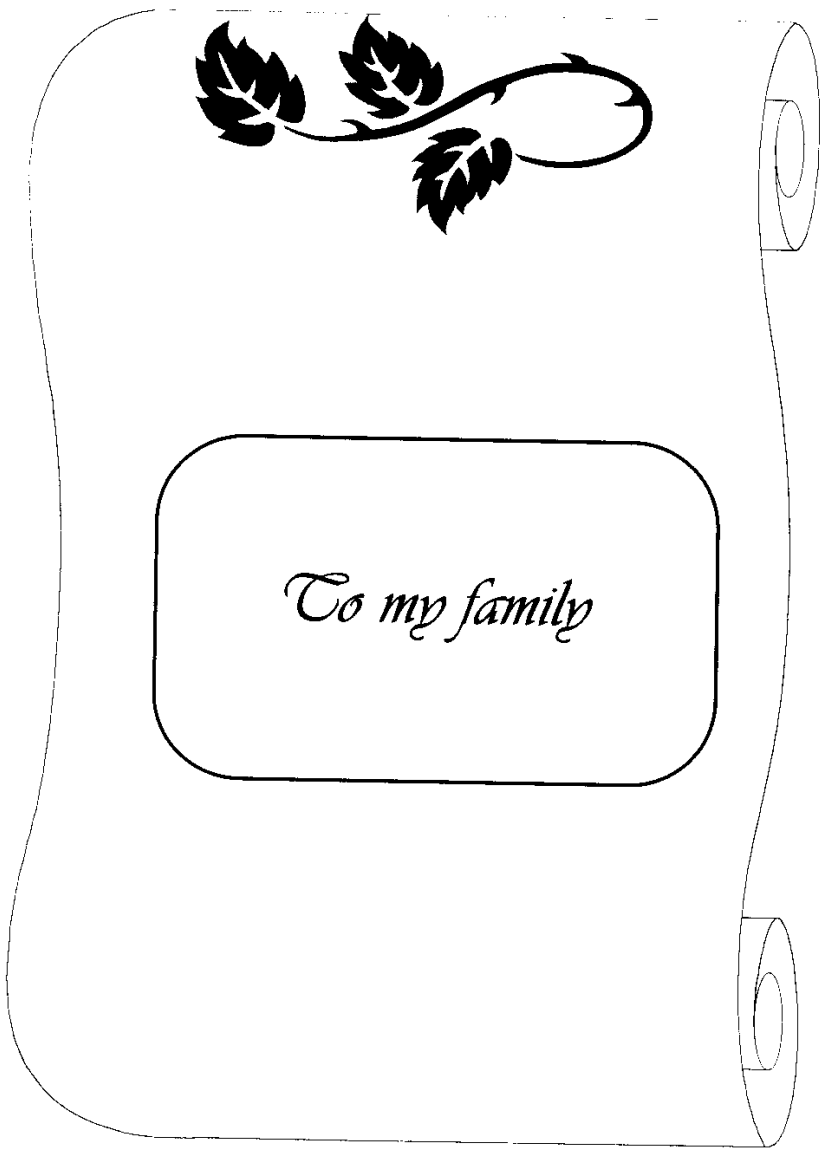
My deepest appreciation and grateful thanks are due to *Prof. Dr. Ahmed El Dory*, Assistant Professor of Radiodiagnosis, Ain Shams University, for his sincere and valuable assistance.

To *Prof. Dr. Usama El Atrash*, Assistant Professor of General Surgery, Ain Shams University, for his kind help and guidance in this work.

Gratefully acknowledge *Dr. Usama Seif*, Lecturer of General Surgery, Ain Shams University, for his sincere guidance and his continuous encouragement.

I wish to express my thanks and appreciation to *Prof. Dr. Alaa Ismail*, Professor of General Surgery, Ain Shams University and *Dr. Mahmod El Meteny*, Lecturer of General Surgery, Ain Shams University, they were kind enough to give me all possible facilities and guidance to accomplish this study.

Aser Mostafa El Afifi



List of Contents

List of Abbreviations

I.V.C.	Inferior Vena Cava .
H.C.C.	Hepatocellular carcinoma.
R.E.S.	Reticuloendothelial system.
α .F.P.	Alpha Feto protein.
C.T.	Computed Tomography.
P.T.T.	Partial Thromboplastine time.
P.T.T_C.	Partial Thromboplastine time.
PHRR	Parenchymal hepatic resection rate.
198 AU.	198 Gold- colloid.
ICG	Indocyanine green dye.
ICG_{R15}	Indocyanine green 15 minutes retention rate.
UGT	Upper gastro intestinal tract.
ICG_K	Indocyanine green disappearance rate.
HGF	Hepatocyte growth factor.
EGF	Epidermal growth factor.
$NSILA_S$	Non suppressible insulin-like activites.
PGE_2	Prostaglandin E_2
$^{99}{}_m T_C$	^{99} m Technetium.
^{131} I.	^{131} Iodine Rose Bengal.
ECG	Electrocardiography.
SGOT	Serum glutamic oxatoacetic transaminase.
SGPT	Serum glutamic pyruvic transaminase.
Alk.Phos.	Alkaline phesphatase.
PT	Prothrombin time.
ERCP	Endoscopic retrograde cholangiopancreato-graphy.
SPSS	Statistical package for social science.
F.N.H.	Focal nodular hyrerplesia.
L.C.F.	Liver cell failure.
S.D.	Standard deviation.
Min.	Minimum.
Max.	Maximum.
Postop.	Postoperative.
Preop.	Preoperative.
F.H.	Formal hepatectomy.
P.H.	Partial hepatectomy.
HBV	Hepatitis B virus.
ICG_{Rmax}	Maximal removal of Indocyanine green dye.
U/S	Ultrasound.
CUSA	Cavitron Ultrasonic Accelerator.

INTRODUCTION

Introduction and Aim of the Work

The liver exhibits a remarkable regenerative capacity after major resection provided it is normal. It is commonly assumed that a normal liver tolerates 70 - 80 percent resection safely. On the other hand, it is well Known that cirrhotic livers are less able to regenerate and accordingly that major resection is contraindicated in the presence of liver cirrhosis *(Nagasue et al., 1987)*.

Major hepatic resection could be done for some of the patients with well compensated cirrhosis. However for most of the patients with compensated cirrhosis, limited resections particularly segmentectomy are safe, well tolerated by the patients and provide satisfactory long term survival rates *(Suenaga et al., 1992)*.

Thus, cirrhosis considered to be a limiting factor to massive resection and extensive surgery may be unduly hazardous and life threatening in such patients *(Kanematsu et al., 1984)*.

In conclusion, regeneration of human liver is influenced by the massiveness of resection and severity of coexisting liver disease. So, those cirrhotic livers generally have poor restoration of liver volume and concomitant poor recovery in liver function. However, Few well compensated cirrhotic livers regained approximately 80% of initial liver size with return to preoperative liver function, but with some delay compared with normal liver *(Yamanaka et al., 1993)*.

Lin et al. (1979) did not detect any change in the size of the cirrhotic remnant on repeated scanning after hepatic lobectomy.

The aim of this study is to evaluate the regeneration process of the liver after hepatic resection in terms of liver volume and liver function with evaluation of the regeneration of biliary system.