بسم الله الرحمن الرحيم

"*In The Name of ALLAH The Entirely Merciful, The Especially Merciful*"

Liver regeneration after portal vein plus hepatic artery ligation performed heterochronously

(*Experimental Study in dogs*)

Thesis

Submitted by

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In the partial fulfillment for the requirement of the M.D. Degree
In General Surgery

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2006

بسم الله الرحمن الرحيم

وقل اعملوا فسيرى الله عملكم ورسوله والمؤمنون

سورة التوبة، آية "

105"

صدق الله العظيم

Dedicated TO,

My Mother & My Father,

Whom wished me to be a good successful surgeon.

My Wife, Mahynour,

Who gives too much and receives too little.

My Son, Mohamed,

Who gives me the most supportive smile in the world.

ACKNOWLEDGEMENTS

ALL the praise is due to ALLAH, who wanted life for this study.

Words are inadequate ,they are only a symbol of my deepest gratitude and appreciation to my great ***Prof. Sayed Ahmed Marei***, Professor of General and hepatobiliary Surgery, Cairo University ,for his mastery teaching, generous help, fatherly support, kindness and humanity not only in this study, but also in all aspects of the field of general surgery.

I am deeply grateful to ***Prof. Afkar Abdel-Ghany Badawy***, Professor of Pathology, Theodor Bilharz Research Institute (TBRI), for her stimulating suggestions, faithful supervision, valuable expert advises and continuous support.

I feel deeply indebted and much obliged to ***Ass. Prof. Hisham Mahmoud Amer***, Professor of General Surgery, Cairo University, for his help, effort and suggestions.

I am greatly indebted to ***Ass. Prof. Ayman Ihab Nafeh & Ass. Prof. Mohamed Magdy El-Essawy***, Assistant Professors of General and Hepatobiliary Surgery Theodor Bilharz Research Institute (TBRI), for their great help, cooperation and encouragement.

I feel much obliged to ***Ass. Prof. Olfat Ali Hamam***, Assistant Professor of Pathology, Theodor Bilharz Research Institute (TBRI), for her valuable help & support.

I wish to thank ***Dr. Mohamed Maher***, Ass. Lecturer of Anaethesia, Theodor Bilharz Research Institute (TBRI), for his valuable help in the anaethesia part of the work.

My profound gratitude is due to all my professors and colleagues in Surgical Department, Theodor Bilharz Research Institute (TBRI), for their encouragement, guidance and help.

List of Abbreviations

ALT	*Alanine Transaminase*
AST	*Aspartate Transaminase*
CTAP	*CT angiography*
CT	*Computerized Tomography Scan*
D.N.A	*Deoxyribonucleic acid*
ET-1	*Endothelin-1*
Fig.	*Figure*
gm	*Gram*
HAL	*Hepatic Artery ligation*
HCC	*Hepatocellular carcinoma*
HGF	*Hepatocyte growth factor*
HSC	*Hepatic Stellate Cells*
IHVR	*Intrahepatic Vascular Resistance*
IL	*Interleukins*
IM	*Intra Muscular Injection*
IU	*International unite*
IV	*Intravenous*
IVC	*Inferior Vena Cava*
IVFM	*In Vivo Fluorescent Microscopy*
ICG	*Indocyanine green*
MI	*Mitotic index*
BSA	*Body surface area*
ml	*Milliliter*
mmHg	*Millimeter Mercury*
MRI	*Magnetic Resonance Imaging*
NO	*Nitric Oxide*
PVL	*Portal vein ligation*
PE	*Portal vein embolization*
PTPE	***Percutaneous transhepac portal embolization***
PBL	*Portal branch ligation*
PVA	*polyvinyl alchol*
PH	*Partial hepatectomy*
PV	*Portal Vein*
RL	*Remnant liver*
TBRI	*Theodore Bilharz Research Institute*
USPB	*Ultrasound percutaneous liver biopsy*
TGF	*Transforming growth factor*
TNF	*Tumou necrosis factor*

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INTRODUCTION

Most hepatocellular carcinoma (HCC) occurs in cirrhotic liver, resection of the tumor by a partial hepatectomy remains the best treatment ***(Otto et al., 1998).***

Extensive liver resection can be performed with a low operative mortality in patients who have normal hepatic function even in those with large tumors occupying almost the entire right lobe ***(Makuuchi et al, 1991***). However, the risk of liver failure after extensive hepatectomy increases in patients with liver cirrhosis, antecedent obstructive jaundice, hepatic dysfunction or small central tumor, requiring major resection with a major loss of functioning parenchyma ***(Bradpiece et al, 1987, Bengmark et al, 1988 and Fan et al, 1995).***

One of the prerequisites for partial hepatic resection is the presence of enough remaining liver parenchyma to avoid life-threatening post-operative liver failure ***(Bismuth et al, 1982).***

The excessive parenchymal loss associated with hepatectomy is the leading risk factor for subsequent liver failure, especially in patients with impaired hepatic function. Portal vein branch ligation (PVL) or embolisation (PE) is aimed at inducing an atrophy of the embolised lobe to be resected with compensatory hypertrophy of the counter lobe to be preserved. Portal vein ligation (PVL) or embolization (PE) reduces the surgical risk &optimizes function of the remaining liver & can be recommended as an ancillary procedure for selected patients who may need extensive hepatectomy ***(Takayma et al, 1977).***

Rous and Larimore, (1920), demonstrated that ligation of a major branch of a portal vein in animals resulted in ipsilateral liver atrophy and hypertrophy of the contra lateral parenchyma.