

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

*“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

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

وَقُلْ أَعْمَلُوا فَسِيرَی اللَّهِ عَمَلَكُمْ وَرَسُولِهِ وَالْمُؤْمِنُونَ

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صَدَقَ اللَّهُ الْعَظِيمُ

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.

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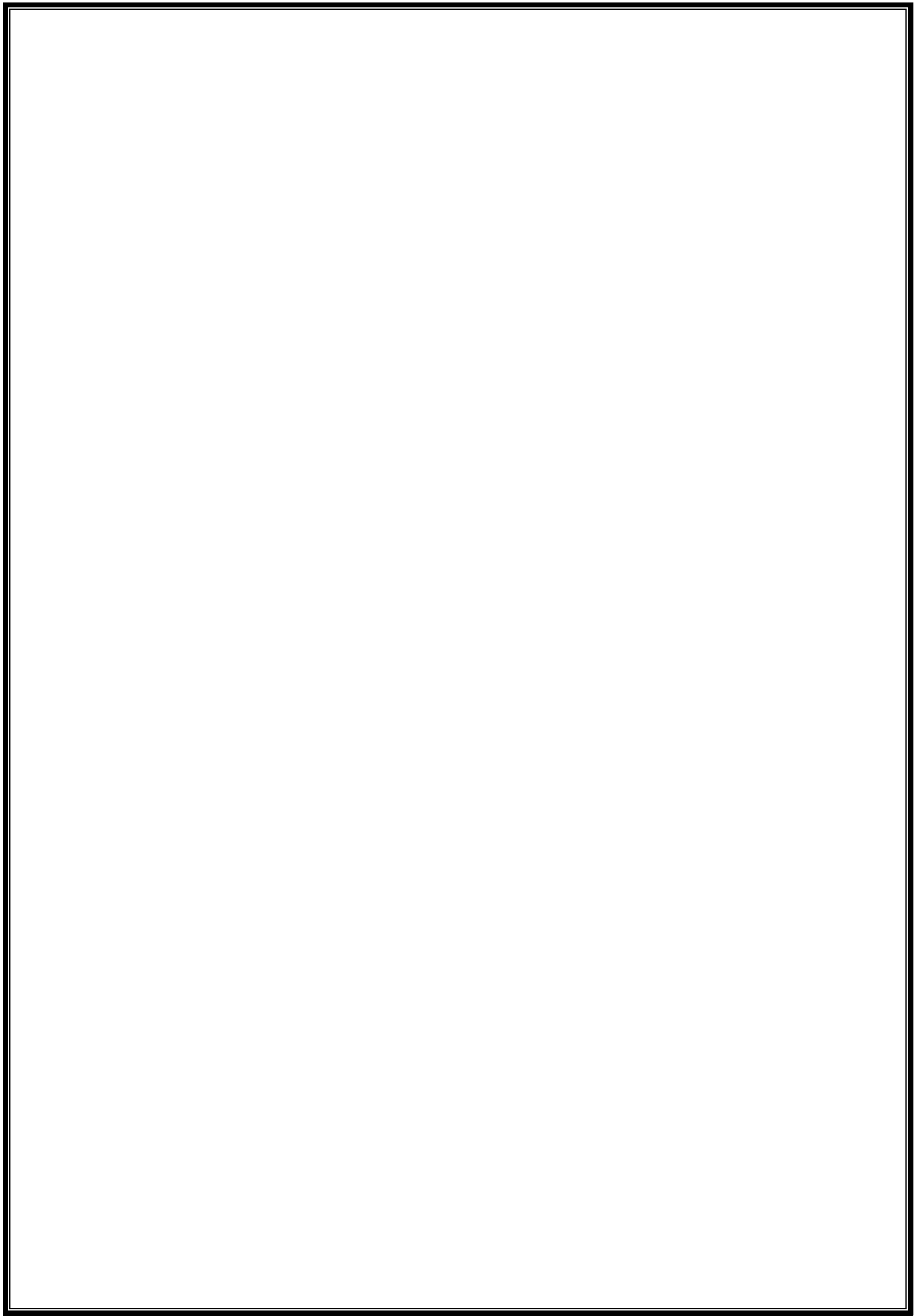
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List of Abbreviations

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

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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.