Evaluation of serum levels of Vascular Endothelial Growth Factor in patients with cirrhotic and noncirrhotic chronic viral hepatitis (B & C)

Thesis

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تقييملمستويات عامل النمو البطاني الوعائي في مصل الدم في المرضى الذين يُعانون من إلتهاب الكبد الفيروسي المزمن (B أو C) المتليف و غير المتليف

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List of Abbreviations

Abb.	Mean
aFGF	acidic fibroblast growth factor
AFP	Alpha feto protein
ALT	Alanine Aminotransferase
Ang	Angiopoietin
AST	Aspartate Aminotransferase
AUC	Area under curve
bFGF	basic fibroblast growth factor
CBC	Complete blood count
CT	Computed Tomography
EC	endothelial cell
ECM	extracellular matrix
EDTA	Ethylene-Diamine-Tetra-Acetic acid
ELISA	Enzyme-linked immunosorbent assay
DNA	DeoxyriboNucleic Acid
Focal PN	Focal piecemeal nicrosis
HBcAb	Hepatitis B virus core antibody

HBeAg	Hepatitis B virus e antigen
HBsAg	Hepatitis B virus surface antigen
HBV	Hepatitis B virus
HCV	Hepatitis C virus
HCV Ab	Hepatitis C virus antibody
HGF	hepatocyte growth factor
HIF	Hypoxia inducible factor
HRP	Hypersensitive Response And Pathogenicity
IgG	Immunoglobulin G
INF- β	interferon β
INR	International Normalized Ratio
JAM	junctional adhesion molecule
LIM	leukemia inhibitory factor
LSD	Least significant difference
MCP	monocyte chemoattractant protein-1
MEF2C	myocyte enhancer-binding factor 2C
MELD	model for end-stage liver disease
MMP	matrix metalloproteinase

MRCP	Magnetic Resonance Cholangiopancreatography
N.O	Nitric oxide
NPR-1	neuropilin-1
O.D.	Optical Density
P value	Probability value
PAI-1	plasminogen activator inhibitor-1
PDGF-B	platelet-derived growth factor-B
PECAM-1	platelet endothelial cell adhesion molecule-1
PF-4	platelet factor 4
PIGF	placental growth factor
RNA	RiboNucleic Acid
Rpm	Revolution per minute
TGF	transforming growth factor
TIMP	tissue inhibitor of matrix metalloproteinase
TSP-1	, thrombospondin-1
uPA	urokinase plasminogen activator
V.E-cadherin	vascular endothelial-cadherin
VEGF	vascular endothelial growth factor
VEGF-R	vascular endothelial growth factor receptor

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Introduction

The liver is a vital organ present in vertebrates and some other animals. It has a wide range of functions, including detoxification, protein synthesis, and production of biochemicals necessary for digestion. The liver is necessary for survival; there is currently no way to compensate for the absence of liver function in the long term, although new liver dialysis techniques can be used in the short term.**(Cotran, Ramzi et al, 2005).**

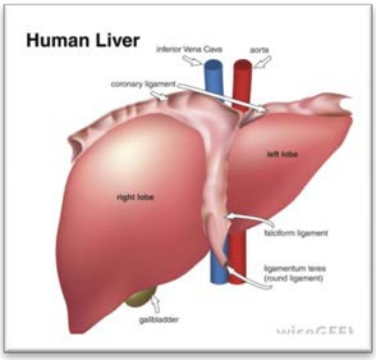


Figure (1): Human Liver

Cotran, Ramzi et al, 2005

This gland plays a major role in metabolism and has a number of functions in the body, including glycogen storage, decomposition of red blood cells, plasma protein synthesis, hormone production, and detoxification. It lies below the diaphragm in the abdominal-pelvic region of the abdomen. It produces bile, an alkaline compound which aids in digestion via the emulsification of lipids. The liver's highly specialized tissues regulate a wide variety of high-volume biochemical reactions, including the synthesis and breakdown of small and complex molecules, many of which are necessary for normal vital functions. Terminology related to the liver often starts in

hepar- or hepat- from the Greek word for liver, hēpar (ἧπαρ, root hepat-, ἡπατ-). **(Cotran, Ramzi et al, 2005).**

Anatomy:

The liver is a reddish brown organ with four lobes of unequal size and shape. A human liver normally weighs 1.44–1.66 kg (3.2–3.7 lb), and is a soft, pinkish-brown, triangular organ. It is both the largest internal organ (the skin being the largest organ overall) and the largest gland in the human body.The human liver is normally divided into two lobes (left and right), if viewed from the parietal surface; but if observed on the visceral surface it is divided into four lobes with the addition of the caudate and quadrate lobe. There are two major types of cells populate the liver lobes: karat parenchymal and non-parenchymal cells. 80% of the liver volume is occupied by parenchymal cells commonly referred to as hepatocytes. Non-parenchymal cells constitute 40% of the total number of liver cells but only 6.5% of its volume. Sinusoidal hepatic endothelial cells, Kupffer cells and hepatic stellate cells are some of the non-parenchymal cells that line the liver sinusoid. **(Kmieć Z, 2001)**

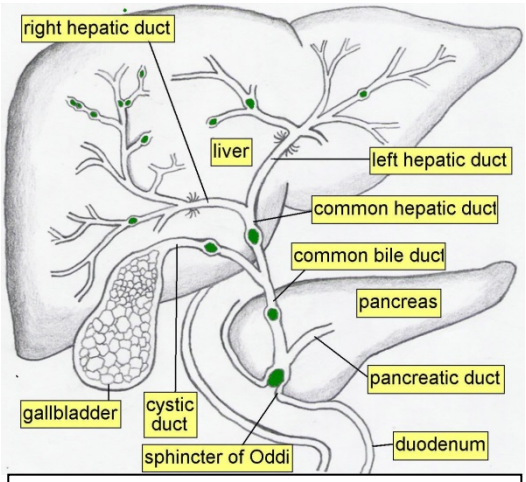
- **Blood and Biliary flow**

The liver gets a dual blood supply from the hepatic portal vein and hepatic arteries. Supplying approximately 75% of the liver's

blood supply, the hepatic portal vein carries venous blood drained from the spleen, gastrointestinal tract, and its associated organs. The hepatic arteries supply arterial blood to the liver, accounting for the remainder of its blood flow. Oxygen is provided from both sources; approximately half of the liver's oxygen demand is met by the hepatic portal vein, and half is met by the hepatic arteries. Blood flows through the liver sinusoids and empties into the central vein of each lobule. The central veins coalesce into hepatic veins, which leave the liver**. (Shneider, et al., 2008).**

- **The biliary tree**

The term biliary tree is derived from the arboreal branches of the bile ducts. The bile produced in the liver is collected in bile canaliculi, which merge to form bile ducts. Within the liver, these ducts are called intrahepatic (within the liver) bile ducts, and once they exit the liver they are considered extrahepatic (outside the liver). The intrahepatic ducts eventually drain into the right and left hepatic ducts, which merge to form the common hepatic duct. The cystic duct from the



Figure(2):biliary tr**ee(Shneider,et al., 2008)**

gallbladder joins with the common hepatic duct to form the common bile duct. Bile either drains directly into the duodenum via the common bile duct, or is temporarily stored in the gallbladder via the cystic duct. The common bile duct and the pancreatic duct enter the second part of the duodenum together at the ampulla of Vater. **(Shneider, et al., 2008).**

Physiology:

The various functions of the liver are carried out by the liver cells or hepatocytes. Currently, there is no artificial organ or device capable of emulating all the functions of the liver. Some functions can be emulated by liver dialysis, an experimental treatment for liver failure. The liver is thought to be responsible for up to 500 separate functions, usually in combination with other systems and organs. **(Maton, et al., 1993).**