INDICATIONS AND PROBLEMS OF LIVER TRANSPLANTATION

Essay

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Master Degree in General Surgery

By

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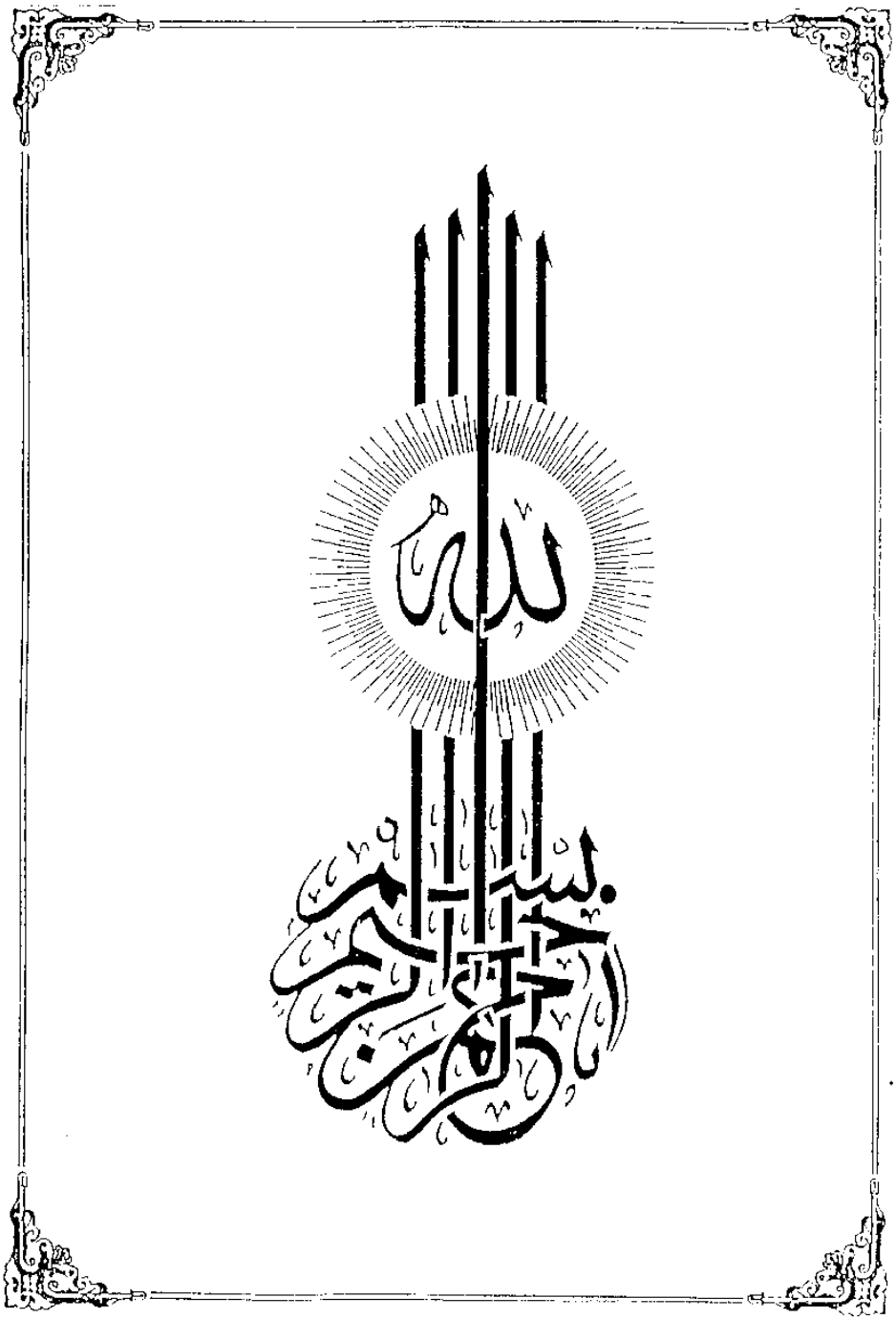

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INTRODUCTION

Liver transplantation is now considered a therapeutic option for ever expanding number of liver disease that result in end stage hepatic failure **(Simmons et al., 1994).**

In 1955 Welch performed the first transplantation of the liver in dogs. In 1963 Starzl and his group carried out the first successful hepatic transplant in man **(Sherlock et al.,1993).**

In 1992 more than 500 liver transplants were undertaken in the UK- an increase of more than 19% over the previous year. Over 2000 liver transplants were performed across Europe by more than 65 centres. A similar number of liver grafts are performed each year in North America and more than three quarters of patients transplanted now will make a full recovery **(McMaster et al., 1994).**

Human survival of more than 20 years after liver transplantation has been achieved **(Starzl et al.,1991).**

Any patient with an irreversible and progressive liver disease that is intractable to other medical or surgical therapy and doses not have a contraindication to transplantation is a potential candidate for liver replacement **(Gordon et al., 1990).**

ANATOMY OF THE LIVER AND BILIARY TRACT

Chapter 1

ANATOMY OF THE LIVER AND BILIARY TRACT

A good knowledge of the anatomy of the liver is a prerequisite for modern surgery of the liver **(Bismuth, 1988)**. The abdominal surgeon is able and willing to resect almost any structure in the abdomen except the liver. The respect afforded this organ is often based on an unfamiliarity with the anatomy of the organ, which leads to insecurity concerning the vital intrahepatic structures, especially the large veins. These intrahepatic structures are seldom taught or displayed in anatomy courses **(Ger, 1989).**

A through knowledge of the anatomy of the biliary tract is essential if dissection to be precise and error avoided **(Smadja and Blumgart, 1988)**.

The liver

Development (Fig. I).

the liver develops by proliferation of cells from the blind ends of a Y-shaped diverticulum which grows from the foregut into the septum transversum. The cranial part of the septum transversum becomes the pericardium and diaphragm. The caudal part becomes the ventral mesogastrium, and it's into this that the liver grows. At this stage the caudal part of the septum transversum transmits the vitelline veins which by numerous anastomoses form a rich venous plexus here. The proliferating liver cells break into branching buds of hepatocytes that form an anastomosing network whose meshes becomes filled with sinusoidal venous channels **(McMinn, 1990).**

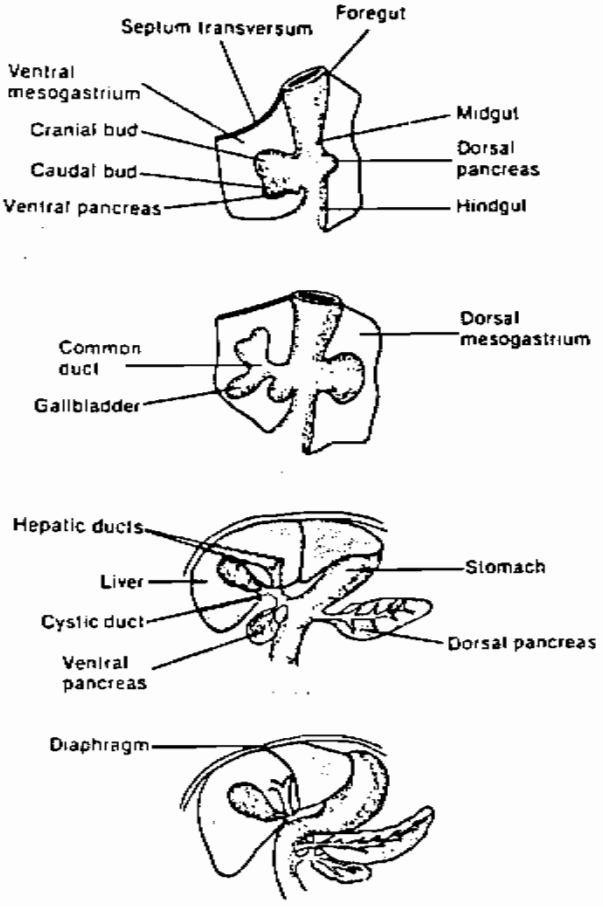

Fig. 1 : Embryologic development of the liver (Meyers, 1991)

The bud separates into two parts-hepatic and biliary. The hepatic part contains bipotential progenitor cells that differentiate into hepatocytes or ductal cells which form the early primitive bile duct structures (ductal plates). Differentiation is accompanied by changes in cytokeratin type within the cell **(Desmet et al., 1990).**

The original diverticulum from the endoderm of the foregut becomes the bile duct, its Y shaped bifurcation produces the right and left hepatic ducts. A blind diverticulum from the common bile duct becomes the cystic duct and gall bladder. The hepatic duct divide and redivide until finally liver cells grow from the blind end of each into the blood in the vitelline veins. The embryological centre of each liver lobule is a bile duct, but this is not the histological centre of the adult lobule. The lobules of the embryo fuse and are redivided by the growth of fibrous septa along the bile ducts which thus lie at the periphery of the adult lobule **(McMinn, 1990).**

Morphological anatomy (Fig. 2)

Surfaces

The liver is wedge shaped with the base of the wedge to the right and the apex to the left. It's the largest gland in the body, weighs 1500 gm and receives 1500 ml of blood per minute. It has two surfaces, diaphragmatic and visceral **(McMinn, 1990).**

The diaphragmatic surface includes smooth peritoneal areas that face upward, anteriorly and to the right and an irregular bare area devoid of peritoneum facing posteriorly. The most notable features on the diaphragmatic surface are the inferior vena cava and the peritoneal ligaments

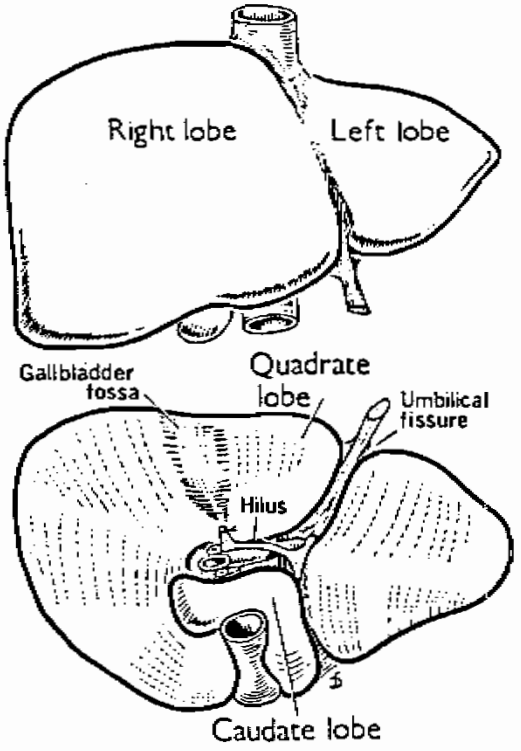

Fig. 2: Morphological aspects of the liver (Bismuth 1983).

that connect the liver to the diaphragm. The inferior vena cava is embedded in the liver in a deep sulcus located in the left portion of the bare area. This sulcus is roofed over in most cases by fibrous tissue called the ligament of the inferior vena cava which may contain hepatic tissue converting the sulcus into a tunnel. The peritoneal ligaments are the falciform ligament and the left and right coronary and triangular ligaments **(Hollinshead et al., 1985)**. The diaphragmatic surface is subdivided into anterior, superior, posterior and right surfaces which merge into one another without any clear demarcations except where the sharp inferior border is formed **(McMinn 1990).**

The superior surface is molded to the diaphragm and reaches the fifth rib on the right and the fifth space on the left. Above the diaphragm lie the lung and pleura on each side with the pericardium inbetween. The anterior surface lying between the superior blunt and inferior sharp margins, lies behind the ribs and cartilages, separated by the diaphragm, pleura and lungs **(Ger, 1989).**

The posterior surface is largely retroperitoneal and lies in contact with the retrohepatic inferior vena cava and the upper pole of the right kidney and suprarenal gland. This retroperitoneal (bare) area is enclosed by the leaves of the coronary ligaments and access to this area can only be obtained by division of these ligaments **(Ger, 1989)**. The right surface extends from ribs 7 to 11 and is related to the following logical sequence of structures: in its lower third to ribs and diaphragm; in its middle third to ribs, pleura and diaphragm; and in its upper third to ribs, pleura, lung and diaphragm **(McMinn,1990).**

The relatively flat visceral surface, also covered by peritoneum, is divided into several areas by deep fissures and impressions adjacent viscera have made on it. This surface faces downwards as well as posteriorly and is separated infront from the diaphragmatic surface by the sharp inferior margin and in the back by the posterior lamina of the coronary ligament. The most notable features of the visceral surface are the gall bladder,the fissure for the ligamentum teres hepatis (Round ligament), the fissure for the ligamentum venosum, and the porta hepatis. The gall bladder lies in an elongated fossa that runs from the inferior margin of the liver infront toward the inferior vena cava in the bare area and leads into the porta hepatis. The gall bladder is retained in the fossa partly by the continuity of the hepatic peritoneum across the inferior surface of it. The ligamentum teres continues from the free edge of the falciform ligament toward the porta hepatis, berried in its fissure, which is more or less parallel with the gall bladder. Beyond the porta hepatis, in line with the fissure for ligamentum teres is a second fissure in which is berried the ligamentum venosum **(Hollinshead et al., 1985).**

The porta hepatis is the hilum of the liver and is enclosed between the two layers of the lesser omentum, from its left end these two layers are attached to the ligamentum venosum lying deep in its groove. The lesser omentum passes down from this liver attachment to enclose the stomach and the first 2.5 cm of the duodenum. The porta is a transverse slit performed by the right and left hepatic ducts, and the right and left branches of the hepatic artery and portal vein. They lie in the order vein-artery-duct (VAD) with ducts infront (more accessible in surgery).The cystic duct lies in loose contact with the right end of the porta, and there are several lymph nodes here. From the right end of the porta hepatis the gall bladder lies in a shallow fossa on the