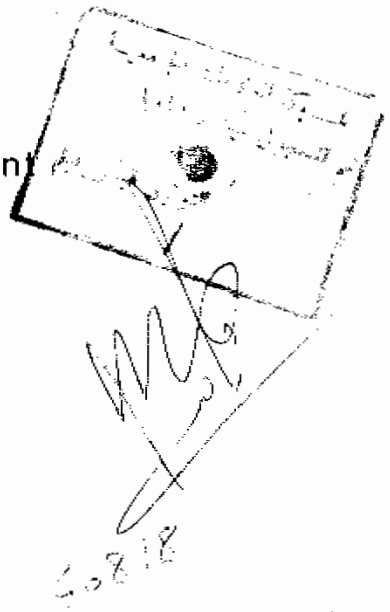
LIVER TRANSPLANTATION

ESSAY

Submitted in Partial Fulfilment
of Master Degree in
(General Surgery)



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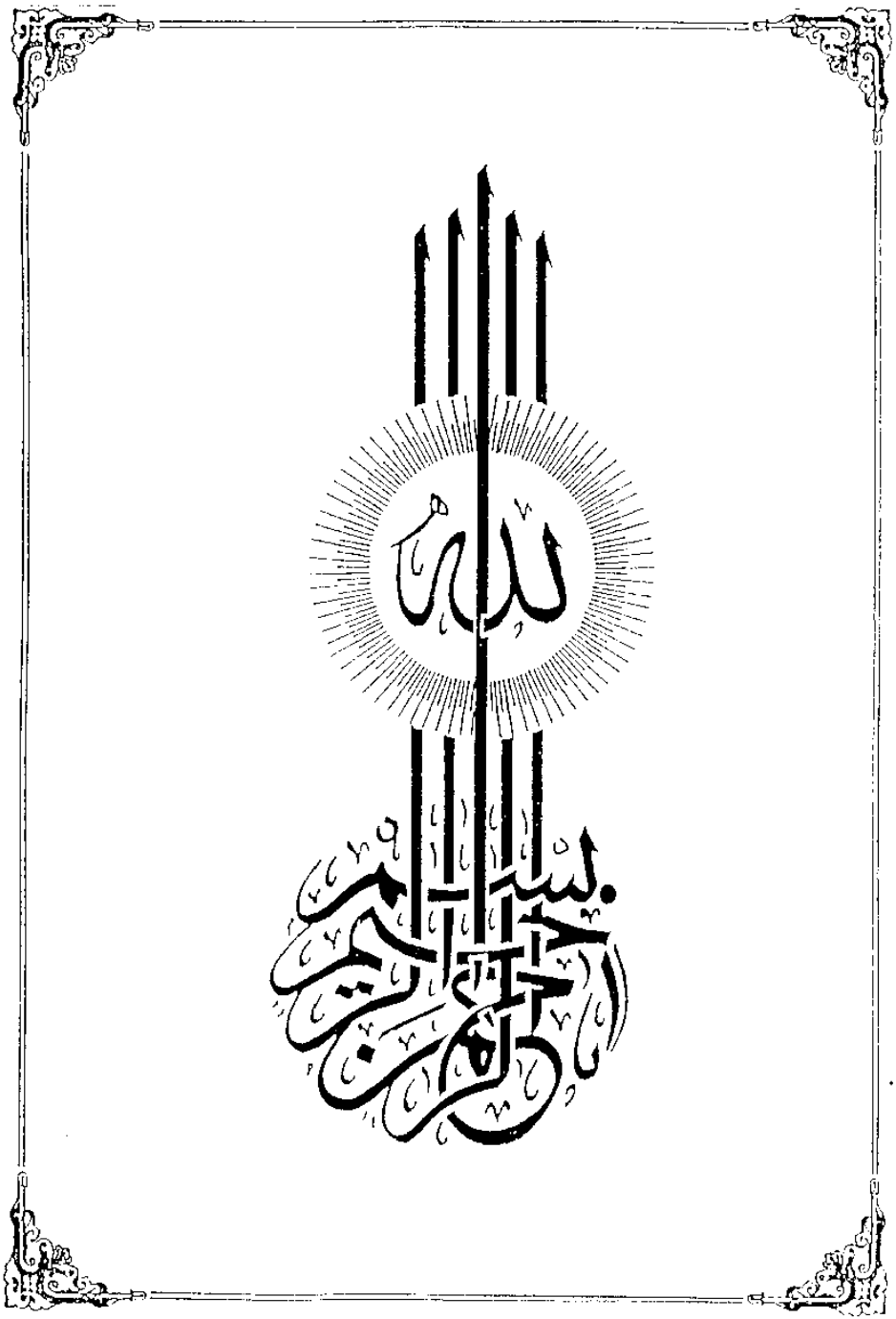
بسم الله الرحمن الرحيم

" فتعالى الله الملك الحق ولا تعجل بالقرآن
من قبل أن يقضى إليك وحيه
وقل رب زدنى علما "

صدق الله العظيم



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CHAPTER I

INTRODUCTION

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Liver transplantation is the ultimate treatment for end-stage liver disease, that developed so quickly over the last few years that its clinical application is still not well defined (Fabry and Klion, 1992).

Starzle performed the first human orthotopic liver transplant in March 1963 and during the next 4 years did a total of seven. None of these survived. for more than 23 days. Many factors were responsible for the short survival, notably the poor condition of the patient, the poor method of preservation of the graft at the time of transplantation, inadequate immunosuppression, insufficient control of infection, and undeveloped necessary surgical techniques and skills (Schaffner, 1992).

Indications and contraindications to transplant are undergoing continuous revision and clarification as experience is accrued in the expanding number of treatment centers (Jenkins and Fairchild, 1989).

Once the decision is made that liver transplantation is indicated, a more detailed evaluation is performed at the transplant center, following a strict protocol. Evaluation of specific organ systems assesses the patient's ability to undergo surgery and guides in post transplant management. (Klion and Fabry, 1992).

It is of paramount importance that meticulous and delicate surgical technique be utilized throughout the donor and recipient operative procedures (Krom and Gips, 1984).

As in any transplant operation, close attention must be constantly given to methods that minimize trauma and ischaemia to the organ during procurement and implantation (Miller et al., 1992).

With the introduction of UW solution the liver can be preserved by simple hypothermia for up to 20 hours (Kalayoglu et al., 1988).

THis permits the recipient operation to be accomplished semielectively during regular operating room hours (Turcotte et al., 1991).

Refinements in immunosuppression with the introduction of cyclosporine and monoclonal antibody therapy have extended chances for survival and contributed to considerable improvement in quality of life following transplant. (Jenkins and Fairchild, 1989).

Immediately following transplantation the patient is transferred to the surgical intensive care unit (SICU), where care is supervised jointly by the SICU staff and the transplant team. Laboratory results and others pertinent information are recorded on a bedside wall chart (Schwartz et al., 1992).

As the number of operations rises, the skills of the teams performing them will also increase. The drugs will improve and infections will be effectively controlled. The ultimate limiting factor for society will probably turn out to be cost, which is the strongest argument for present investments in research. (Schaffner, 1992).

CHAPTER II

ANATOMY

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The liver is the largest gland in the body, weights 1500 gms and receives 1500 ml of blood per minute. It has two surfaces, diaphragmatic and visceral. The diaphragmatic surface is boldly convex, moulded to the under surface of the diaphragm but is subdivided into anterior, superior, posterior and right surfaces which merge into one another without any clear demarkation, except when the sharp inferior border is formed. The visceral (or inferior) is rather flat and slopes downward, forward and to the right from the posterior surface, but again there is no clear dividing line. The junction of visceral and anterior surfaces makes the sharp inferior border of the organ. Most main vessels and ducts enter or leave at the portahepatis which is on the visceral surface but the hepatic veins emerges from the posterior surface. (Mc Minn, 1990).

Development of the liver and bile duct : (Fig. 1)

The liver begins as a hollow endothelial bud from the foregut duodenum during the third week of the gestation. 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 with the cell. The collection of rapidly proliferating cells penetrates adjacent mesodermal tissue (the septum transversum) and is met by ingrowing capillary plexuses from vitelline and umbilical veins which will form the sinusoids. The connection between this proliferating mass of cells and the foregut, the biliary part of the endodermal bud, will form the gallbladder and extrahepatic bile ducts. Haemopoietic cells, kupffer cells and connective tissue cells are derived from the mesoderm of the septum transversum. (Sherlock and Dooly, 1993).

Peritoneal attachment

The liver is surrounded by a fibrous capsule called Glisson's capsule and is invested by peritoneum throughout most of its surface.

The topographic arrangement of the liver in the right upper quadrant is secured by a number of ligaments (Fig. 2). (Reintgen and Sabiston, 1987).

In the adult, the falciform ligament stretches from the body wall to the liver. The line of its ventral attachment runs from the umbilicus along the posterior aspect of the anterior abdomenal wall and the diaphragm in the middle line as far back as the inferior vena cava opening just above the liver (Dawson and Tan, 1992). This ligament resists movement of the liver to the right. (Reintgen and Sabiston 1987).

The left leaf of the falciform ligament is continued laterally and to the left over the surface of the liver, where superiorly it becomes the left triangular ligament of the liver. Division of the left triangular ligament of the liver renders the lateral part of the left liver freely mobile. The lesser omentum is a double layer of peritoneum and represents that part of the ventral mesogastrium between the stomach and the liver; in its free lower margin run the three structures of the portal triad. The bile duct anteriorly and to the right, the hepatic artery anteriorly slightly to the left, and the portal vein immediately posterior to both structures.

The two layers of the peritoneum are widely separated to encompass the bare area of the liver, except at the exterme right where they fuse to become the right triangular ligament of the liver. (Dawson and Tan, 1992).

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).

Stability

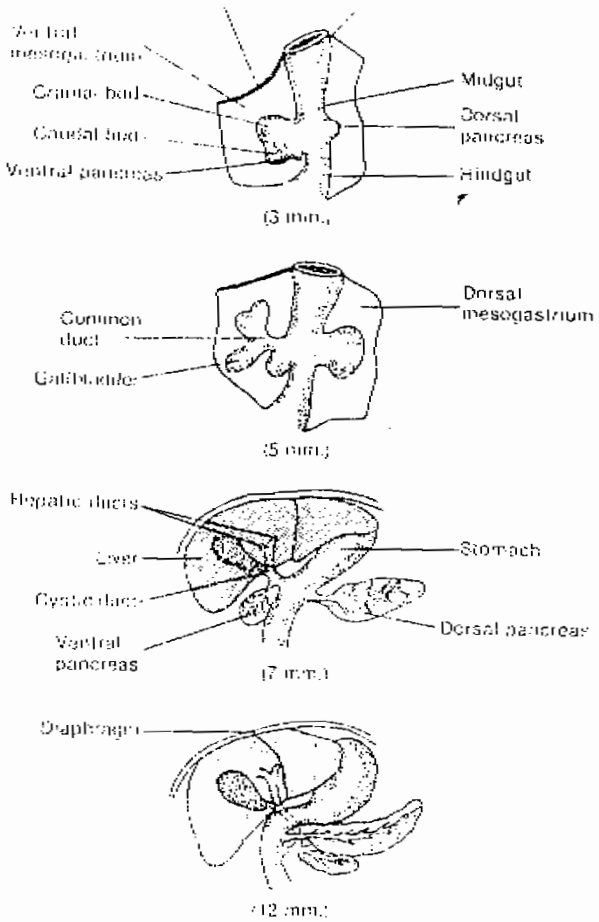
The normal or even the enlarged liver never falls down into the peritoneal cavity. It is supported by the hepatic veins and the inferior vena cava. The hepatic veins are entirely intrahepatic and enter the vena cava while it is

clasped in the deep groove on the posterior surface. The thinner anterior edge of the liver is prevented from tilting downwards by the attachment of the left triangular ligament and the ligamentum teres and by resting on the underlying viscera (stomach, hepatic flexure of the colon). (Mc Minn, 1990).

Segmental anatomy

For the clinician, the division of the liver into two functional halves called the right and left livers by the principal plane is of considerable practical importance (Fig. 3). The principal plane passes from the middle of gallbladder bed anteriorly to the left side of the inferior vena cava posteriorly. (Tung, 1979).

The branches of the portal triad are closely applied and arborize in a regular manner within the parenchyma. The right and left halves of the liver are each further divided into two sectors by the right and left fissures, which correspond to the location of the right and left hepatic veins (Fig. 4). The right fissure extends from the anterior border of the liver at a point midway between the right margin of the liver and the gallbladder fossa, to the confluence of the inferior vena cava and the right hepatic vein posteriorly. It divides the right half of liver into an anterior and posterior sector. The left fissure is not well defined and extend from



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