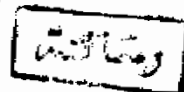


INDICATIONS AND PROBLEMS OF LIVER TRANSPLANTATION

Essay

Submitted for Partial fulfillment of
Master Degree in General Surgery



By

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LIST OF CONTENTS

	Page
1- Introduction-----	1
2- Anatomy of the liver and biliary tract.-----	2
3- Indications of liver transplantation. -----	22
4- Patient selection and preoperative preparation. -----	38
5- Recent policies in reduction of blood transfusion requirements in liver transplantation. -----	45
6- Operative techniques of liver transplantation. -----	51
7- Postoperative complications after liver transplantation. -----	81
8- English summary. -----	111
9- References. -----	114
10- Arabic summary.	

List of Tables

	Page
Table 1. Indications for liver transplantation. -----	22
Table 2. Indications for paediatric liver transplantation. -----	23
Table 3. Specific diseases for which liver transplantation may be indicated in adult patients. -----	24
Table 4. Child's functional classification of liver disease.-----	36
Table 5. Work-up of potential recipients for liver transplantation. ----	43
Table 6. Monitoring during anaesthesia for liver transplantation.-----	66
Table 7. Peak incidence of graft hepatitis with respect to the time after transplantation. -----	87
Table 8. Causes of renal failure after liver transplantation.-----	100
Table 9. Clinical manifestations of cyclosporin induced neurotoxicity.	104

List of Figures

	Page
Fig. 1 Embryologic development of the liver. -----	2a
Fig. 2 Morphological aspects of the liver. -----	3a
Fig. 3 The obliquity of the middle and right portal scissurae -----	8a
Fig. 4 The functional division of the liver -----	8b
Fig. 5 Diagrammatic illustration showing the segmental fissures and the distrubtion of the hepatic and portal veins. -----	9a
Fig. 6 Diagram of hepatic microscopic structure. -----	10a
Fig. 7 Anatomy of the hepatic artery. -----	12a
Fig. 8 Intrahepatic distribution of the hepatic portal vein. -----	12b
Fig. 9 The intrahepatic hepatic veins. -----	12b
Fig 10a Superficial lymphatic drainage of the liver. -----	14a
Fig. 10b Deep lymphatic drainage of the liver. -----	14b
Fig. 11 Intrahepatic distriubtion of the bile ducts. -----	15a
Fig. 12 Extrahepatic biliary tree. -----	17a
Fig. 13 Indications for liver transplantation in pediatric recipients. -	23a
Fig. 14 Indications for liver transplantation in adult recipients. -----	24a
Fig. 15 Total midline incision used for multiple organ procurement	52a
Fig. 16 Method of rapid liver cooling. -----	54a
Fig. 17 Incisions for orthotopic liver transplantations. -----	56a
Fig. 18 Recipient hepatectomy, "take down of a previous Kasai". ---	56b
Fig. 19 Recipient hepatectomy, "isolation of the liver". -----	56c
Fig. 20 Recipient hepatectomy, "Clamping of suprahepatic inferior vena cava. -----	56d
Fig. 21a Operative field after recipient hepatectomy. -----	56e
Fig. 21b Elimination of raw surfaces. -----	56f

Fig. 22	Donor hepatectomy specimen. -----	56g
Fig.23	Venous bypass from the vena cava and portal system to the superior venous system. -----	57a
Fig. 24	Anastomosis of the suprahepatic vena cava. -----	58a
Fig. 25	Anastomosis of the infrahepatic vena cava. -----	58b
Fig. 26	Anastomosis of the portal vein. -----	58c
Fig. 27	Stage in the operation "incomplete reconstruction of inferior vena cava". -----	59a
Fig. 28	A defect is made in the transverse colonic and small bowel mesentery "to make a tunnel for the donor supraceliac axis aorta". -----	59b
Fig. 29	The piggyback modification. -----	60a
Fig. 30	Biliary reconstruction. -----	60b
Fig. 31	Auxiliary liver transplant. -----	61a
Fig. 32	The two kinds of graft reduction. -----	63a
Fig. 33	Diagram of the two grafts after preparation from one donor liver. -----	64a
Fig. 34	The left lobe graft after revascularization. -----	64b

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 does 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 thorough 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).

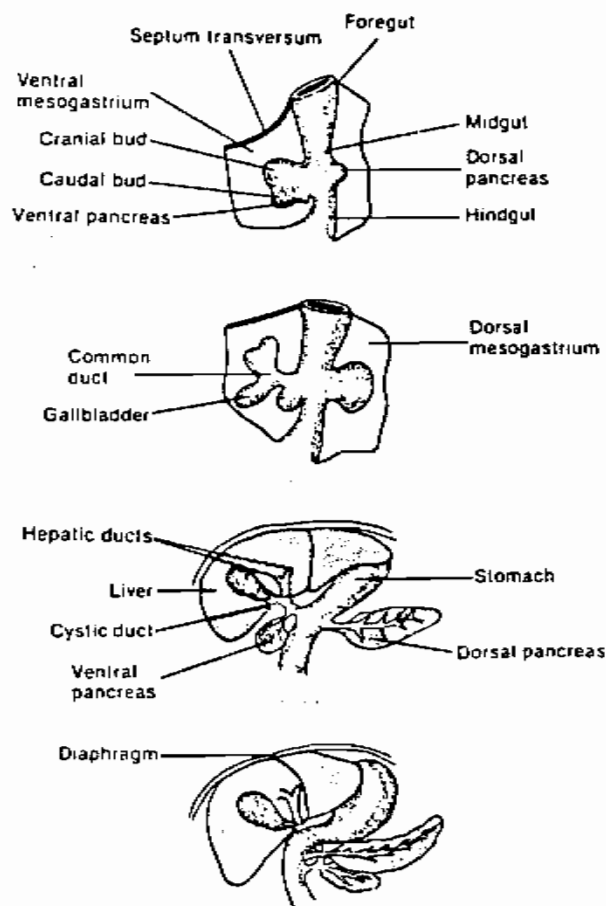


Fig. 1 : Embryologic development of the liver (Meyers, 1991)

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

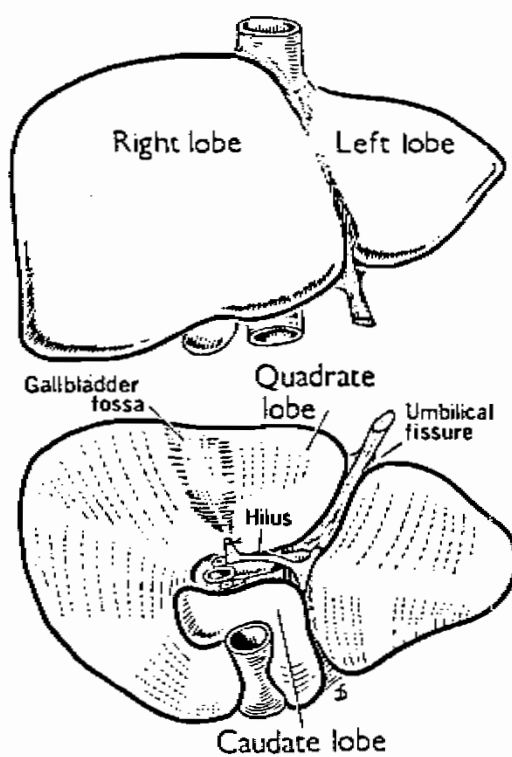


Fig. 2: Morphological aspects of the liver (Bismuth 1983).

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 in front 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 in front 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, buried 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 buried 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 in front (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
