Effectiveness of Percutaneous Intervention Radioloigy in Cases with Malignant Biliary Obstruction

Thesis

*Submitted for Partial Fulfillment of M.D. Degree in **Radiodiagnosis***

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2009

List of Contents

List of Tables

List of Figures

List of Figures (Cont.)

List of Abbreviations

CBD····· Common bile duct
CCA ····· Cholangiocarcinoma
CHD ····· Common hepatic ducts
CT ····· Computed tomography
ERCP ····· Endoscopic retrograde cholangiopancreatography
EUS ····· Endoscopic ultrasound
F ····· French
GB ····· Gall bladder
GDA ····· Gastroduodenal artery
HCC ····· Hepatocellular carcinoma
IHBR····· Intrahepatic biliary radicles
IVC····· Inferior vena cava
LGA ····· Left gastric artery
LHA ····· Left hepatic artery
LHV ····· Left hepatic vein
MHV ····· Middle hepatic vein
MPD····· Main pancreatic duct
MRCP ····· Magnetic resonance cholangiopancreatography
MRI····· Magnetic resonance imaging
MS ····· Metal stent
PC····· Prothrombin concentration
PS ····· Plastic stent
PT····· Prothrombin time
PTBD ····· Percutaneous transhepatic biliary drainage
PTC ····· Percutaneous transhepatic cholangiography
RHA ····· Right hepatic artery
RHV ····· Right hepatic vein
SMA ····· Superior mesenteric artery
SMV ····· Superior mesenteric vein
SV····· Splenic vein
US····· Ultrasonography

Acknowledgment

First and for most I thank Allah *for enabling me to attain knowledge and experience through this work.*

I am also greatly indebted to Prof. Dr. Abdel Zaher Ali Hassan*, Professor of Radiodiagnosis, Faculty of Medicine, Ain Shams University for his supervision, continuous guidance and encouragement.*

I would like to express my sincerely felt gratitude to Prof. Dr. Hanan Essa Ahmed, *Professor of Radiodiagnosis, Faculty of Medicine, Ain Shams University, for her sincere supervision, kindness and continuous support throughout this work.*

I am also very greatful to Assist. Prof. Dr.Mohsen Gomaa Hasan Ismail, *Assist. Professor of Radiodiagnosis, Faculty of Medicine, Ain Shams University for his generous help, direction and guidance throughout the work.*

I would like to thank my all collegues at the radiodiagnosis department. National liver institute, menofeya university for their help and encouragement.

Finally, I wish to express my sincere thanks to all members of my family for their great help and continuous encouragement.

Sayed Hamada

INTRODUCTION

Malignant biliary obstruction is a common problem that is regarded as having a poor prognosis and is usually managed with palliation ***(Weaver et al., 2001).***

Malignant strictures usually are the result of either a primary bile duct cancer or extrinsic compression of the bile ducts by a neoplasm in an adjacent organ, such as the gallbladder, pancreas, or liver ***(Hemant et al., 2004).***

The vast majority of patients with unresectable bile duct die within 6 months to a year of diagnosis. Death usually results from liver failure or infectious complications secondary to biliary obstruction ***(Blumgart and Frong 2000).***

Liver resections are associated with significant rates of mortality and morbidity, resulting mainly from development of postoperative complications such as sepsis, bleeding, and liver failure ***(Cherqui et al., 2000).***

When obstructing malignancy is not respectable for cure, relief of cholestatsis usually represents a major goal of palliation ***(Goldman and Bennett 2000).***

Surgical resection and palliative biliary enteric bypass are the most common methods used with endoscopic and percutaneous therapies reserved for palliating patients not fit for surgery ***(Hii and Gibson 2004).***

CT scanning is superior to ultrasound in visualizing the distal CBD area; however, ultrasound generally is considered the imaging modality of choice for the initial screening of biliary disorders ***(Hemant et al., 2004)***.

Percutaneous transhepatic cholangiography has been used for the diagnosis and treatment of biliary tract disorders; it is especially useful for lesions proximal to CBD ***(Hemant et al., 2004)***.

Biliary stent insertion is a well-established method for palliating patients with inoperable malignant obstructive jaundice ***(Indar et al., 2003).***

Endoscopic insertion is the preferred method for most bile duct obstruction, but high obstructions, bilateral or multiple strictures and previous upper gastrointestinal tract surgery make endoscopic stent placement difficult or imposible, and percutaneous transhepatic biliary insertion is preferred ***(Indar et al., 2003).***

The aim of palliative drainage therapy is to improve quality of life by removing the jaundice and purities. In addition, the development of cholangitis as well as impending deterioration of the hepatic function can be prevented ***(Hartman et al., 2003)***.

AIM OF THE WORK

To evaluate the effectiveness of percutaneous trans-hepatic placement of metallic stent and /or plastic tube in cases of malignant biliary obstruction.

ANATOMY OF THE LIVER, BILIARY SYSTEM AND PANCREAS

ANATOMY OF LIVER

The normal adult liver is a large, wedge shaped organ occupying the right upper quadrant of the abdomen. It extends vertically on the right side from the undersurface of the right hemidiaphragm to the anterior costal margin and horizontally to the left midclavicular line at the superior pole of the spleen ***(Byrad, 2001).***

Most surfaces of the liver are covered by peritoneal reflections, with the exceptions of the fossa for the inferior vena cava, the fossa for the gallbladder, and the bare area of the liver, posteriorly where the liver comes in direct contact with the diaphragm ***(Haaga et al., 2003).***

The superior aspect of the liver as it abuts the diaphragm and ribs is generally smooth with a rounded margin, while inferiorly the visceral surface of the liver with its convex margin has an irregular and changing shape as it accommodates the various sub-hepatic organs ***(Haaga et al., 2003).***

Anteriorly, lies the anterior slips of the diaphragm and the anterior abdominal wall, although occasionally colon can extend anterior to the liver. Posteriorly, lies the diaphragm, and more posterior, inferior, and medially, the right kidney and the

right adrenal gland. Medially, lies the stomach. Inferiorly at different levels are the gallbladder, duodenum, and colon. The liver comes in close contact with the inferior vena cava, posteriorly at inferior levels and surrounding the inferior vena cava at more superior levels ***(Haaga et al., 2003).***

Functional Segmental Anatomy:

Advances in surgical techniques and percutaneous intervention have popularized the use of the sub-segmental anatomic classification of Couinaud, with modification of Bismuth and Colleagues, to define the hepatic location more precisely. In this system, the liver is divided into one segment and eight sub-segments (figure 1) ***(Erick and Richard, 2000).***

Segment 1 is the caudate lobe. The well-known vertical divisions along the planes of hepatic veins are maintained, but each segment is further divided into superior and inferior sub-segments by a transverse fissure (a plane through the right and left portal veins).The sub-segments are numbered in a clockwise fashion when viewing the liver in frontal projection except for segment 4a ***(Erick and Richard, 2000).***

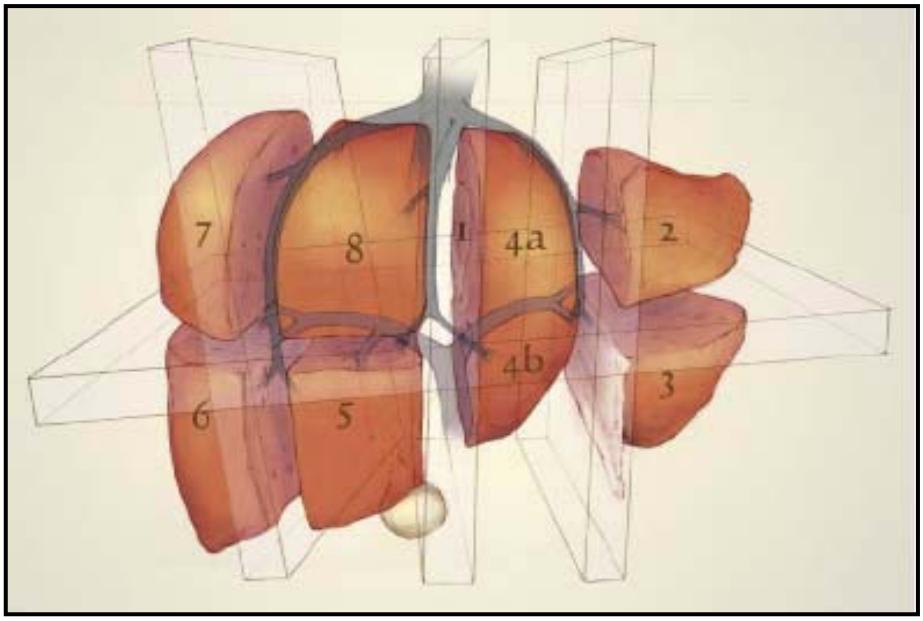

Figure (1): Segmental anatomy of the liver as originally described by Couinaud ***(Quoted from Florman and Miller, 2006).***

Comparison of various published nomenclatures of segmental anatomy is presented in Table 1 ***(McGahan and Goldberg, 1998).***

Anatomic segment	Nomenclature Couinaud	Bismuth	Goldsmith and Woodburne
Caudate lobe	**1**	**1**	Caudate lobe
Left lateral superior segment	**2**	**2**	Left lateral segment
Left lateral inferior segment	**3**	**3**	
Left medial superior segment	**4**	**4a**	Left medial segment
Left medial inferior segment	**4**	**4b**	
Right anterior inferior segment	**5**	**5**	Right anterior segment
Right anterior superior segment	**8**	**8**	
Right posterior inferior segment	**6**	**6**	Right posterior segment
Right posterior superior segment	**7**	**7**	

Table (1): Segmental anatomy of the liver: segments of the liver and corresponding nomenclature ***(McGahan and Goldberg, 1998).***

Vascular anatomy

The liver has dual blood supply; the hepatic artery which provides systemic arterial circulation, and portal vein, which returns blood from the gut and spleen. Arterial flow is primarily nutritive and provides about 20% of the blood supply; the remainder is supplied by the mesenteric portal drainage, which is a consequence of gastrointestinal functional activity ***(Gore and Remer, 2000).***

The hepatic artery, portal vein, bile ducts, and lymphatic vessels are enveloped in the perivascular fibrous capsule (hepatobiliary capsule of Glisson), which also surrounds the vessels as they course through the portal canals in the liver, and continues with the fibrous hepatic capsule ***(Williams et al., 1999).***