Diagnostic Algorithm for CT pelviabdominal masses in pediatrics

THESIS SUBMITTED FOR PARTIAL FULFILLMENT OF MASTER DEGREE IN RADIOLOGY

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List of abbreviations

CT	Computed tomography
PV	Portal vein
CBD	Common bile duct
GB	Gall bladder
CHD	Common hepatic duct
CECT	Contrast enhanced computed tomography
SMV	Superior mesenteric vein
SMA	Superior mesenteric artery
IVC	Inferior vena cava
IV	Intravenous
AFP	Alpha fetoprotein
PUJO	Pelviureteric junction obstruction
MCDK	Multicystic dysplastic kidney
CMN	Congenital mesoblastic nephroma
NHL	Non hodgkin lymphoma
MDCT	Multidetector computer tomography
US	Ultrasound

INTRODUCTION

Focal Pelvi abdominal masses are common in pediatric patients.The affected patients are presented with variable symptoms and physical examinations are also variable depending on location and mass effect on adjacent organs.

The symptoms in these patients can be abdominal pain, bowel obstruction, or fever if the underlying cause is infection **(Katz and Richardson, 2019).**

The discovery of an abdominal mass in a child is a cause for clinical concern because of the possibility of an underlying malignancy. In addition, even non-malignant conditions can pose serious problems when adjacent structures such as nerves, blood vessels and loops of bowel are compressed by the growing masses **(Nwokoro et al.,2015).**

The critical clinical questions to the radiologists in the setting of abdominal masses are the site of origin, benign versus malignant criteria. Pairing clinical presentation with imaging findings helps to reach to the diagnosis **(Katz and Richardson, 2019).**

Introduction

Although ultrasound is the imaging modality of choice for initial evaluation of focal abdominal masses in children, CT is subsequently obtained for confirmation and for further characterization. **(Katz and Richardson, 2019).**

The information obtained by CT, in a single noninvasive examination emitting minimal ionizing radiation, seems comparable to that offered by a combination of multiple radiological and imaging procedures. It is conceivable that with accumulating experience and further technological improvement CT may become an excellent procedure in the investigation of abdominal and pelvic masses in children **(Akembhavi et al.,2015)**.

AIM OF THE WORK

To review the different pelviabdominal masses encountered in pediatric age group, with emphasis on the imaging features that help to differentiate them. And to propose a practical algorithm for approaching the diagnosis of these lesions.

Chapter 1

Anatomy of the solid Pelvi Abdominal organs:

THE LIVER

Liver is divided into right and left lobes by the falciform ligament. Each lobe is divided into 2 sectors. The right hepatic vein (RHV) divides the right lobe into anterior and posterior sectors, the left hepatic vein (LHV) divides the left lobe into medial and lateral sectors **(Siegelman, 2010).**

Couinaud classification:

The Couinaud classification of liver anatomy divides the liver into eight functionally independent segments. Each segment has its own vascular inflow, outflow and biliary drainage. In the centre of each segment there is a branch of the PV, HA and bile duct. In the periphery of each segment there is vascular outflow through the hepatic veins.

RHV divides the right lobe into anterior and posterior segments. MHV divides the liver into right and left lobes (or right and left hemi-liver). This plane runs from the IVC to the GB fossa. LHV divides the left lobe into a medial and lateral part, PV divides the liver into upper and lower segments. The left and right PVs

branch superiorly and inferiorly to project into the center of each segment **(Siegelman, 2010).**

Liver Segments numbering:

There are eight liver segments. Segment 4 is divided into segment 4a and 4b . The numbering of the segments is in a clockwise manner. Segment 1 (caudate lobe) is located posteriorly. **(Siegelman, 2010).**

Radiological anatomy of the liver:

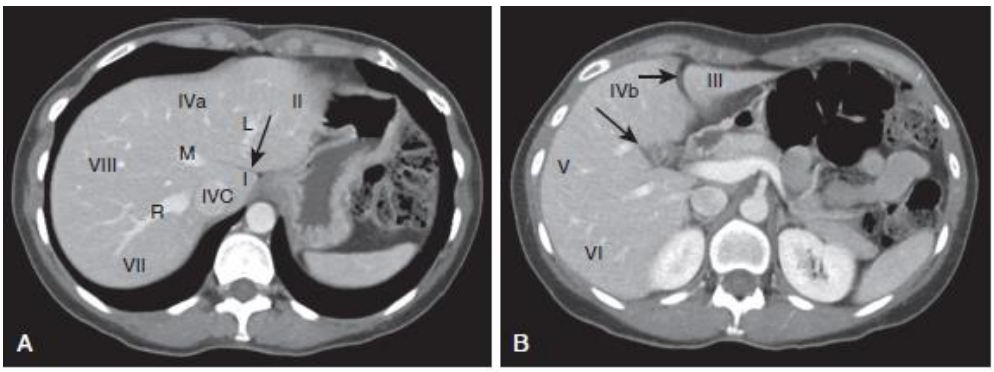

Fig. (1.1): *Normal segmental anatomy of liver on CT. A, Axial contrast-enhanced CT image through liver above plane of portal vein shows right (R), middle (M), and left (L) hepatic veins between hepatic segments that drain to inferior vena cava (IVC). Note fissure for ligamentum venosum (arrow) anterior to caudate lobe (I), as well as lateral (II), medial (IVa), anterior (VIII), and posterior (VII) segments. B, Axial contrast-enhanced CT image through liver below plane of portal vein shows left intersegmental fissure (short arrow) and interlobar fissure (long arrow), as well as lateral (III), medial (IVb), anterior (V), and posterior (VI) segments.* ***(Siegelman, 2010).***