Introduction

The liver is the largest of the abdominal viscera, occupying a substantial portion of the upper abdominal cavity. It performs a wide range of metabolic activities necessary for homeostasis, nutrition, and immune defence. The liver is important in the removal and breakdown of toxic, or potentially toxic, materials from the blood. It regulates blood glucose and lipids, and plays a role in the storage of certain vitamins, iron, and other micronutrients as well as breaking down or modifying amino acids. A substantial part of the thermal energy production of the body, especially at rest, is provided by the liver. In fetal life, the liver is an important site of haemopoiesis *(Borley. 2005)*.

From an oncologic perspective, the liver is an important organ. Although hepatic neoplasms are relatively infrequent in infants (only 1-2% of all pediatric tumors occur in the liver), they are clinically relevant since nearly two thirds of them are malignant *(Helmberger, et al. 1999)*. The liver is the third-most-common site for intra-abdominal malignancy in children, following Wilm's tumor and adrenal neuroblastoma. The incidence of primary malignant hepatic neoplasms in children per year is 1-1.5 per million children in the United States *(Abramson, et al. 2007)*. The liver is the most common site of metastasis from gastrointestinal tumors. High blood flow (about 25% of cardiac output), a favorable microscopic anatomy (liver sinusoids and

gaps in subendothelial basement membrane), and a rich biochemical environment favor the rapid growth of metastatic deposits in the liver *(Robinson. 2000).*

The primary hepatic neoplasms in children are a diverse group of epithelial and mesenchymal tumors whose incidence can vary considerably with patient age *(Emre, et al. 2004).*

Initial presentations of focal hepatic neoplasms in children are variable. Patients with primary malignant hepatic neoplasms may be presented mainly with abdominal discomfort or palpable abdominal mass. Patients with benign and metastatic hepatic neoplasms can be presented with an incidental finding by abdominal US examination. Embryonal carcinoma can be presented with precocious puberty. Some hepatic neoplasms can be discovered by surgical emergency such as hypovolemic shock after tumor rupture in hepatocellular carcinoma and severe heart failure in some benign hepatic neoplasms *(Wang, et al . 2007).*

The objectives of liver imaging in oncology are detection and characterization of suspected primary or secondary hepatic neoplasms, staging of malignant neoplasms, evaluation of biliary ductal status, evaluation of treatment response, and assessment of vascular anatomy for surgical planning *(Sica, et al. 2000).*

The initial workup for focal hepatic neoplasms includes: radiographic assessment using ultrasound (US) to confirm the location and to characterize the consistency as cystic or solid, in

addition with the use of Doppler imaging to evaluate vascular lesions. Computed tomography (CT) and magnetic resonance imaging (MRI) are used to further delineate the location and multiplicity of the lesions and to detect metastases. The use of (MR) angiography has essentially replaced arteriography in assessing resectability in complex cases *(Abramson, et al. 2007).*

Aim of the study

The aim of this study is to review the different US, CT, and MRI techniques used in detection and characterization of focal hepatic neoplasms in children, and the possible imaging findings.