The Role of PET CT in The Evaluation of Hepatic Focal Lesions

Essay

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Shaimaa Mahmoud

Aim Of The Work

The aim of this work is to highlight the role of PET CT in better characterization of hepatic focal lesions.

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Introduction

The increased use of radiological imaging has led to much more frequent identification of hepatic focal lesions. Diagnosis depends on whether the patient has underlying liver disease, when hepatocellular carcinoma has to be excluded, or whether the lesion is benign or a metastasis. **(Sherlock and Dooly, 2002)**. Detection and characterization of liver lesions often present a diagnostic challenge to the radiologists **(Namasivayam et al., 2007)**.

Benign hepatic tumors include a broad spectrum of lesions. They are increasingly reported with the widespread use of sensitive imaging studies. They usually occur in asymptomatic patients with or without underlying liver disease. The most common benign hepatic tumors include cavernous hemangioma, focal nodular hyperplasia, hepatic adenoma, and nodular regenerative hyperplasia (**Choi and Nguyen, 2005)**.

Malignant tumours arising in the liver can be primary, in the form of hepatocellular carcinoma, or secondary, resulting from dissemination of a primary tumour

outside the liver. Metastatic disease involving the liver represents a common challenge in oncology. The liver is the most common site of metastases that arise from gastrointestinal malignancies; other primary sites of origin include breast, lung, pancreas, and melanoma. Advances in imaging techniques, notably computed tomography (CT), magnetic resonance imaging (MRI), ultrasonography (US), positron emission tomography (PET), and integrated PET CT imaging, have increased the ability to detect and characterize hepatic focal lesions. This has led to increased interest in both hepatic imaging and image-guided hepatic interventions (**Choi, 2006**).

Functional imaging with positron emission tomography (PET) is playing an increasingly important role in the diagnosis and staging of malignant disease**.** PET imaging with the fluorine 18 (18F)-labeled glucose analogue 18 fluorodeoxyglucose (FDG) is a relatively recent addition to the technology for imaging cancer. FDG PET complements the more conventional anatomic imaging modalities of computed tomography (CT) and magnetic resonance (MR) imaging. Anatomic imaging modalities are complementary to functional imaging in the sense that while CT provides accurate localization of organs and lesions, PET

provides information on tissue function, both normal and pathologic (**Blodgett et al., 2007**) . Combining PET with a high-resolution anatomical imaging modality such as computed tomography (CT) can help both identify and localize functional abnormalities (**Townsend, 2008**).

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ANTOMY OF THE LIVER

Introduction:

Liver is one of the first organs to develop in the embryo, and it rapidly becomes one of the largest organs in the fetus (***Zaret , 2001***). The liver is the largest internal organ in the body, accounting for approximately 2% to 3% of the total body weight of an adult (***Skandalakis et al., 2004***).

Longmire ,1982 who devoted his life to the study of the liver, called it a ‘‘hostile’’ organ because it welcomes malignant cells and sepsis so warmly, because it bleeds so copiously, and because it is often the first organ to be injured in blunt abdominal trauma. Liver anatomy can be described according to 2 different aspects, (1) morphologic anatomy and (2)functional anatomy (***Bismuth , 1988***).

Morphologic Anatomy:

Surfaces of the liver and their relations :

Sheltered by the ribs in the right upper quadrant, the upper border lies approximately at the level of the nipples