UNIVERSITI TEKNOLOGI MARA

THE EFFICACY OF COMPUTED TOMOGRAPHY (CT) SCAN AND MAGNETIC RESONANCE IMAGING (MRI) IN DETECTING HEPATOCELLULAR CARCINOMA (HCC): RETROSPECTIVE STUDY

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Thesis submitted in fulfillment of the requirement for the degree of Bachelor of Medical Imaging (Hons)

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AUTHOR'S DECLARATION

I declare that the work in this dissertation was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This dissertation has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

Purpose: The aim of this thesis was to determine the diagnostic accuracy as well as the sensitivity of CT scan and MRI in detecting hepatocellular carcinoma HCC).

Methodology: This is a retrospective study to identify the sensitivity and specificity of CT scan and MRI in detecting HCC. The study was done at Diagnostic and Radiology Department, Selayang Hospital. The time frame for the sample data collection was taken from January 2013 until March 2015. 74 samples were selected based on the inclusion criteria of the study. The patient data selections were strictly the patients who underwent for both CT scan and MRI for detection of HCC. The reference of standard that was used to confirm the presence of the HCC included other interventional findings such as percutaneous biopsy, surgical resection and liver transplant.

Result: The results were used in Bayers' theorem to calculate the sensitivity, specificity, positive predictive value, negative predictive value, and diagnostic accuracy of CT scan and MRI in detecting HCC. Based on the Bayers' theorem, the sensitivity of CT scan and MRI is 81% and 94% respectively. The specificity of CT scan and MRI is 40% and 90% respectively. The positive predictive value of CT scan and MRI is 90% and 98% respectively. The negative predictive value of CT scan and MRI is 25% and 69% respectively. Diagnostic accuracy of CT scan and MRI in detecting HCC is 76% and 93% respectively. From the result, it showed that CT scan and MRI have higher sensitivity in detecting HCC. However, result was found MRI is more sensitive in detecting small HCC lesion less than 2 cm.

Conclusion: CT scan and MRI show similar diagnostic performance for the detection of HCC. However, the advancement in MRI technologies and use of gadoxetix acid-enhanced MRI improve the sensitivity in the detection of HCC lesion less than 2 cm in diameter.

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CHAPTER ONE
INTRODUCTION

1.1 BACKGROUND OF STUDY

Hepatocellular carcinoma is the most common primary malignant tumor of liver (Sattar et al., 2014). According to the Baek and others (2012), HCC is the fifth most common cancer worldwide. Even Malaysia is considered to be very privileged to have some of the best healthcare system and technologies available, but there are still remain at risk to have a certain disease like other countries. It is because Malaysia has various cultural background and lifestyle that can lead to a certain cancerous disease.

According to the statistic, incidence of HCC continues to increase each year due to rising cases of hepatitis B infection, hepatitis C infection, alcoholic liver disease and cirrhosis (Simpson and Guire, 2015). HCC is very dangerous and it is the third most common cause of cancer related death (Society, 2011). This is because liver is the second largest organ in the body and role as an important function that are vital to life, so any problem cause from the liver could worsen the patient condition. The prognosis of HCC is poor where patient without any treatment they are survived less than 5% (Baek et al., 2012). HCC result in poor prognosis because patients do not show any symptoms at an early stage (Thestar, 2011).

There are many treatment options for HCC such as surgical resection, liver transplantation, radiofrequency ablation (RFA), transarterial chemoembolization (TACE), selective internal radiation therapy, and systemic chemotherapy (Baek et al., 2012). The options of the treatment are depends on the evaluation of the diagnosed HCC lesion which are size of the lesion, number of lesion present, location and morphology of the tumour. This is because for every stage of the disease may offer different treatment planning. Dr Mellor explained in Thestar (2011), in early stage of HCC, surgery resection which could be partial or total removal of the liver or other techniques such as percutaneous ablation is used. However, for the intermediate stage, transarterial chemoembolisation (TACE) is used. Therefore, accurate detection of HCC is important