Platelet Count/Splenic Diameter Ratio: A Non Invasive Method for Diagnosis of Oesophageal Varices in Cirrhotic Patients

Thesis

Submitted for partial fulfillment of master degree in Internal Medicine

By

Ahmed Mahmoud Gad El-Rab

M.B.,B.Ch

Under Supervision of

Prof. Dr. Maryse Soliman Ayoub

Professor of Internal Medicine and Hematology
Faculty of Medicine – Ain Shams University

Assist. Prof. Dr. Hany Mohamed Abdullah Hegab

Assistant Professor of Internal Medicine and Hematology
Faculty of Medicine – Ain Shams University

Assist. Prof. Dr. Walaa Ali ElSalakawy

Assistant Professor of Internal Medicine and Hematology
Faculty of Medicine – Ain Shams University

Faculty of Medicine
Ain Shams University
2015

سورة البقرة الآية: ٣٢

Acknowledgments

First and foremost, I feel always indebted to ***Allah*** *the Most Beneficent and Merciful.*

I wish to express my deepest gratitude and thanks to **Prof. Dr. Maryse Soliman Ayoub,** *Professor of Internal Medicine and Hematology, Faculty of Medicine – Ain Shams University, for her constructive criticism, unlimited help and giving me the privilege to work under her supervision.*

My most sincere gratitude is also extended to **Assistant Assist. Prof. Dr. Hany Mohamed Abdullah Hegab,** *Assistant Professor of Internal Medicine and Hematology, Faculty of Medicine – Ain Shams University, for his enthusiastic help, continuous supervision, guidance and support throughout this work.*

Words fail to express my appreciation to **Assist. Prof. Dr. Walaa Ali ElSalakawy,** *Assistant Professor of Internal Medicine and Hematology, Faculty of Medicine – Ain Shams University, for her enthusiastic help, continuous supervision, guidance and support throughout this work.*

I can't forget to thank our patients who participated

Last but not least, all thanks to the members of my Family, especially ***my Parents*** *and* ***my Wife*** *for pushing me forward in every step in the journey of my life.*

Candidate

Ahmed Mahmoud Gad

List of Contents

List of Abbreviations

Abbr.	Full-term
AFP	: Alfa Feto Protein
ALP	: Alkaline phosphatase
ALT	: Alanine transaminase
AST	: Aspartate transaminase
AST	: Aspartate transaminase
AUROC	: Area under rock curve
CBC	: Complete blood count
CPT	: Child-Pugh-Turcotte
CT	: Computed tomography
DIC	: Disseminated intravascular coagulation
EV	: Esophageal varices
EVBL	: Endoscopic variceal band ligation
HCV	: Hepatitis C virus
HCV	: Hepatitis C virus
IFN	: Interferon
INR	: International normalized ratio
ITP	: Idiopathic thrombocytopenic purpura
IVC	: Inferior vena cava
LEV	: Large varices
MELD	: Model for End-Stage Liver Disease
MR	: Magnetic resonant
NAFLD	: Nonalcoholic fatty lives disease
NO	: Nitric oxide
NPV	: Negative predictive value
OPSI	: Overwhelming post-splenectomy infection

List of Abbreviations *(Cont.)*

Abbr.	Full-term
OV	: Oesophageal varices
PLT	: Platelet
PLT/SD	: Platelet Count/Spleen Diameter
PPV	: Positive predictive value
PSE	: Partial splenic embolization
PSVT	: Portal and splenic vein that thrombosis (PSVT)
ROC	: Receiver operating characteristic
SD	: Standard deviation
SPSS	: Statistical Program for Social Science
SV	: Splenic vein
TE	: Transient elastography
TIPS	: Transjugular intrahepatic portosystemic shunt
UGIE	: Upper gastrointestinal endoscopy
US	: Ultrasonography or ultrasound
VEGF	: Vascular endothelial growth factor

List of Tables

List of Tables *(Cont.)*

List of Figures

List of Figures *(Cont.)*

Introduction

Cirrhosis is the end stage of chronic liver disease, resulting in formation of fibrous tissue, disorganization of liver architecture, and nodule formation, which interferes with liver function and results in portal hypertension. Portal hypertension is associated with development of a hyperdynamic circulation and complications such as ascites, hepatic encephalopathy, and oesophago-gastric varices. Patients with cirrhosis and gastro-oesophageal varices have a portal venous pressure of at least 10–12mmHg ***(Garcia-Tsao et al., 2007).***

Esophageal variceal bleeding remains the leading cause of acute mortality in patients with cirrhosis ***(Chawla et al., 2012).***

Oesophageal varices (OV) are present at diagnosis in approximately 50% of cirrhotic patients, being more common in Child-Pugh class C patients ***(Merli et al., 2003).***

Although mortality from a bleeding episode has decreased with improved endoscopic and radiological techniques together with new pharmacologic therapies, a 20–30% mortality means that bleeding from oesophageal varices remains of significant clinical importance. Early diagnosis of varices before the first bleed is essential as studies of primary prophylaxis clearly show that the risk of variceal

haemorrhage can be reduced by 50% to about 15% for large oesophageal varices ***(Rye et al., 2012).***

According to current guidelines, all patients with cirrhosis should be screened for OV at the time of diagnosis. Endoscopy is the only validated method for diagnosis of OV ***(Rye et al., 2012).***

Repeated endoscopies cause a significant burden and cost to endoscopy units and expose patients to unnecessary procedures as up to 50% of patients may still not have developed oesophageal varices 10 years after the initial diagnosis ***(Berzigotti et al., 2008).***

However, in recent years, several non-invasive methods for detecting OV have been evaluated. These include clinical and biochemical parameters, ultrasonographic findings ***(Giannini et al., 2006)*** transient elastography (***Vizzutti and Arena, 2007)*** computed tomography (CT) scanning ***(Perri et al., 2008)*** and video capsule endoscopy ***(De Franchis et al., 2008).***

Diagnosing OV by non-invasive methods could reduce the need of endoscopy only for patients with a high probability of having OV, thus avoiding unnecessary examinations. Amongst the non-invasive methods, the platelet count/spleen diameter ratio (platelet/spleen) has shown promising performance characteristics. A positive

predictive value (PPV) of 96% and a negative predictive value (NPV) of 100% for the presence of OV have been reported using a cut-off value of 909 ***(Giannini et al., 2003).***

The same cut-off value has been validated in a multicentre study showing a PPV and NPV of 76.6% and 87%, respectively. Other studies have reported PPV and NPV values ranging from 71% to 96.9% and from 35.2% to 100% respectively, considering the same or different cut-off values ***(Sarangapani et al., 2010).***

Aim of the Work

To assess the diagnostic accuracy of Platelet count/splenic diameter ratio for identification and diagnosis of oesophageal varices in Patients with liver cirrhosis.

Liver Cirrhosis

Structure and Blood supply of the liver

The liver is the largest internal organ in the body and is situated in the right hypochondrium. Functionally,it is divided into right and left lobes by the middle hepatic vein. The right lobe is larger and contains the caudate and quadrate lobes. The liver is further subdivided into a total of eight segments by divisions of the right, middle and left hepatic veins. Each segment receives its own portal particle, permitting individual segment resection at surgery ***(Kumar and Clark, 2012).***

The blood supply of the liver constitutes 25% of the resting cardiac output and is via two main vessels:

* The hepatic artery, which is a branch of the coeliac axis, supplies 25% of total blood flow. Autoregulation of blood flow by the hepatic artery ensures a constant total liver blood flow.
* The portal vein drains most of the gastrointestinal tract and the spleen. It supplies 75% of the blood flow.

Both vessels enter the liver via the hilum (porta hepatis).

The blood from these vessels is distributed to the segments and passes into the sinusoids via the portal tracts ***(Davidson's, 2014).***