



شبكة المعلومات الجامعية

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

Ain Shams University Information Network  
جامعة عين شمس

شبكة المعلومات الجامعية

@ ASUNET



# شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



شبكة المعلومات الجامعية

# جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

## قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها  
علي هذه الأفلام قد أعدت دون أية تغيرات



## يجب أن

تحفظ هذه الأفلام بعيدا عن الغبار

في درجة حرارة من ١٥-٢٥ مئوية ورطوبة نسبية من ٢٠-٤٠%

To be Kept away from Dust in Dry Cool place of  
15-25- c and relative humidity 20-40%

# بعض الوثائق الأصلية تالفة



# بالرسالة صفحات نم ترد بالاصل

# NON-INVASIVE IMAGING OF HEPATIC VEINS DISEASES

## ESSAY

Submitted for Partial Fulfillment of  
M. Sc. Degree in  
*Radiodiagnosis*

*B7613*

*By*

*[Handwritten signature]*  
*[Handwritten signature]*  
*[Handwritten signature]*

*Viola Galal Saleh*

M.B., B. Ch. Ain Shams University

*Supervised By*

*Dr. Ola Gamal Nouh*

Assistant Prof. of Radiodiagnosis  
Faculty of Medicine,  
Ain Shams University

*Dr. Layla Ahmed Abd-El Rahman*

Lecturer of Radiodiagnosis  
Faculty of Medicine  
Ain Shams University

**Faculty of Medicine**  
**AIN SHAMS UNIVERSITY**  
**(2000)**



## *Acknowledgment*

*Thanks to God that this work has been completed*

*I would like to express my sincere appreciation and profound gratitude to Ass. Prof. Dr. Ola Gamal Nough, Assistant Prof. of Radiodiagnosis, Faculty of Medicine, Ain Shams University, for her encouragement, precious advice, kind supervision and her endless support.*

*I wish also to express my deep gratitude and sincere thanks to Dr. Layla Ahmed Abd El-Rahman, Lecturer of Radiodiagnosis, Faculty of Medicine, Ain Shams University for her kind guidance which has been of great help throughout every step of this work.*

*My gratefulness goes to my professors and members of staff in Department of Radiodiagnosis, Faculty of Medicine, Ain Shams University.*

*Last, but not least, my dept goes to my housband and family for their continuous support and love.*





## CONTENTS

	<b>Page</b>
Introduction and aim of the work	<b>1</b>
Anatomy of hepatic veins	<b>3</b>
Pathological consideration of hepatic veins diseases	<b>11</b>
Ultrasonography and Doppler imaging of hepatic veins disease	<b>30</b>
Computerized tomography scanning of hepatic veins diseases	<b>54</b>
MRI & MRA imaging of hepatic veins diseases	<b>76</b>
Summary and Conclusion	<b>96</b>
References	<b>102</b>
Arabic Summary	<b>--</b>



## LIST OF DIAGRAMS

<b>No.</b>	<b>Title</b>	<b>Page</b>
<b>1</b>	Hepatic veins	<b>4</b>
<b>2</b>	Types of ramification patterns of the right hepatic vein	<b>5</b>
<b>3</b>	Types of ramification patterns of the left hepatic vein	<b>7</b>
<b>4</b>	Hepatic veins and drainage of right hepatic lobe	<b>9</b>
<b>5</b>	Various patterns of the veins of the caudate lobe	<b>9</b>
<b>6</b>	Scanning geometry in helical CT	<b>55</b>
<b>7</b>	Demonstration of hepatic veins with CT	<b>56</b>



## LIST OF FIGURES

No.	Title	Page
1	Sarcoidosis adjacent to a central vein	2
2	Sarcoidosis invading the wall of a central vein	21
3	Periportal sinusoidal dilatation following prolonged use of contraceptives	23
4	Infectious mononucleosis	26
5	Transverse view of the three main hepatic vein trunks as they enter the inferior vena cava	31
6	Normal pulsatile hepatic vein Doppler signal	34
7	Doppler signal from a hepatic vein	35
8	Normal duplex Doppler waveforms of hepatic veins	37
9	Sagittal ultrasound image at the site of flow acceleration revealing a slender hepatic vein web	37
10	Budd- Chiari syndrome with occlusion of right hepatic vein	42
11	Budd- Chiari syndrome with reversal of flow direction	42
12	Color Doppler ultrasound showing no hepatic venous flow and small spider web collaterals in B mode scan	44
13	Pediatric Budd- Chiari syndrome with B-mode scan and color Doppler ultrasound	46

No.	Title	Page
14	Chronic right heart failure with distended hepatic veins and ascites	49
15	Duplex ultrasound images of a hepatic vein in a patient with congestive heart failure	50
16	Hepatic venous anatomy demonstrated by CT with oblique CT reformation through the right hepatic vein	61
17	Hepatic segmental anatomy	64
18	Budd- Chiari syndrome with patchy peripheral enhancement	66
19	Budd- Chiari syndrome secondary to polycythemia rubra vera	66
20	Normal non-opacification of hepatic veins	67
21	Possive hepatic congestion in elderly	69
22	Hepatic congestion due to secondary heart failure with pulmonary embolism	70
23	Hepatic arteriovenous malformation from Osler-Weber-Rends disease	73
24	Arteriovenous shunting due to hepatocellular carcinoma	74
25	Normal anatomy of the liver and adjacent organs by MRI	81
26	Budd-Chiari syndrome-transverse T <sub>1</sub> post-gadolinium image showing typical feathery pattern of impaired enhancement	85
27	Budd-Chairi postgadolinium images with compression of intrahepatic branches and decreased signal from the right lobe of liver	86