



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكرو فيلم

بسم الله الرحمن الرحيم



MONA MAGHRABY



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم



شبكة المعلومات الجامعية التوثيق الإلكتروني والميكروفيلم



MONA MAGHRABY



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

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



يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار



MONA MAGHRABY



Faculty of Medicine
Ain Shams University 2020

Role of hepatic Doppler as compared to Fibro-scan in evaluation of post virus C hepatic fibrosis

Thesis

Submitted for partial fulfillment of Master degree in Radiodiagnosis

Presented by

Manar Mohamed Soufy

M.B, B.Ch.

Ain-shams University

Supervised by :

Prof.Dr. Randa Hussein abdullah

Professor of Radiodiagnosis

Faculty of Medicine

Ain Shams University

Dr. Essam Mohamed Abdulhafez

Lecturer of Radiodiagnosis

Faculty of Medicine

Ain Shams University

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

وَأَنْزَلَ اللَّهُ عَلَيْكَ الْكِتَابَ وَالْحِكْمَةَ
وَعَلَّمَكَ مَا لَمْ تَكُنْ تَعْلَمُ وَكَانَ فَضْلُ
اللَّهِ عَلَيْكَ عَظِيمًا

صدق الله العظيم



First, thanks ARE ALL directed to **ALLAH** for blessing this work until it HAS REACHED its end, AS A PART of generous help throughout my life.

I would like to express my deepest gratitude to prof.Dr.Randa Hussein Abdullah , professor of Radiodiagnosis , faculty of medicine , Ain shams University , for her great support and continuous encouragement throughout the whole work .it is a great honor to work under her guidance and supervision

I AM truly grateful to Dr. Essam Mohamed Abdulhafez lecturer of Radiodiagnosis Ain Shams University, for his close supervision, VALUABLE suggestions AND continuous encouragement throughout the whole work.

LAST, but not LEAST, I cannot fully express by ANY words my deep gratitude to my DEAR parents, my beloved sister AND brother.

Special thanks to my **dear husband Eng/ Mohamed sabry abdalla** , my lovely daughter / **Talia** ,without their help AND without their support. This work wouldn't, come to light.

 **manar Mohamed soufy**

Title.	Page No..
--------	-----------

List of Contents

List of Abbreviations	II
List of Figures.....	IV
List of Tables.....	VII
Introduction	1
Aim of the work.....	4
Normal sonographic anatomy of the liver	7
Pathogenesis of hepatic fibrosis	14
Transient Elastography and Doppler ultrasound finding in normal liver versus in hepatic fibrosis.....	25
Patients and methods.....	48
Statistical analysis.....	63
Illustrated cases.....	86
Discussion.....	97
Summary.....	104
Conclusion.....	106
References.....	107
Arabic Summary.....	\

List of Abbreviations

- IVC-----Inferior vena cava
- HCV-----hepatitis c virus
- DHS-----demographic health survey
- CD-----center for disease control and prevention
- ECM-----extracellular matrix
- MMPs-----metalloprotease
- TIMPs-----tissue inhibitor of metalloprotease
- HSCs-----hepatic stellate cells
- PDGFs-----platelet derived growth factors
- ROS-----reactive oxygen species
- LSECs-----liver sinusoidal endothelial cells
- Cox1-----cyclooxygenase 1
- TXA₂-----thromboxane A₂
- NO-----Nitric oxide
- MPS-----mononuclear phagocyte system
- IL-----interleukin
- TGF β -----transforming growth factor beta
- TNF-----tumour necrosis factor
- IFN γ -----interferon gamma
- IHVR-----intrahepatic venous resistance
- ET1-----endothelin 1
- KPa-----kilopascal

- US-----ultrasound
- ROI-----region of interest
- RI-----resistive index
- HARI-----hepatic artery resistive index
- HAPSV-----hepatic artery peak systolic velocity
- PVmax-----portal vein maximum velocity
- HV-----hepatic vein
- HVmax----- hepatic vein maximum
- HAPSV-----hepatic artery peak systolic velocity
- SD -----standard deviation
- ANOVA----- A one way analysis of variance
- LSD----- least significant difference
- ROC----- receiver operating characteristic
- P value----- probability value
- CHC -----chronic hepatitis c
- TE----- transient elastography

List of Figures

Fig. No.	Title	Page No.
Fig. (1):	liver segments	9
Fig. (2):	left branch of portal vein sonographic anatomy.....	10
Fig. (3):	Right branch of portal vein sonographic anatomy	11
Fig. (4):	Hepatic artery sonographic anatomy	12
Fig. (5):	middle and left hepatic veins sonographic anatomy	13
Fig. (6):	percentage of men and women with hepatitis c antibody by age	16
Fig. (7):	progression of hepatitis c	18
Fig. (8):	changes in hepatic architecture with advanced fibrosis and follow chronic liver injury.....	19
Fig. (9):	cellular mechanism of liver fibrosis	21
Fig. (10):	position of probe of fibroscan	27
Fig. (11):	user interface of fibroscan	28
Fig. (12):	cutoff value of fibroscan.....	28
Fig. (13):	normal liver echogenicity	31
Fig. (14):	ultrasound show irregular contour of liver in patient with hepatic cirrhosis	33
Fig. (15):	diagram illustrate normal hepatic arterial flow direction and waveform	35
Fig. (16):	diagram illustrate normal hepatic venous flow direction and wave form	37
Fig. (17):	Doppler waveform of main portal vein of 35yrs old female with hepatic steatosis	38
Fig. (18):	normal portal venous flow direction and waveform.....	39

Fig. No.	Title	Page No.
Fig. (19):	color Doppler of porta hepatis demonstrate a prominent vessel anterior to main portal vein represent dilated proper hepatic artery ...	41
Fig. (20):	spectral analysis of middle hepatic vein demonstrate damped monophasic wave form.....	41
Fig. (21):	portal vein doppler shows decreased peak velocity	42
Fig. (22):	colour Doppler imaging demonstrate helical flow pattern in main portal vein.....	43
Fig.(23):	spectral analysis of main portal vein demonstrate alternating hepatopetal and hepatofugal flow	44
Fig.(24):	spectral analysis of main portal vein demonstrate reversed hepatofugal.....	45
Fig.(25):	dilated vessel represent recanalized paraumbilical vein , spectral analysis confirm the suspected hepatofugal flow..	46
Fig.(26):	pie chart gender distribution of patients group.....	66
Fig.(27):	bar chart fibroscan score distribution of patients Group.....	67
Fig.(28):	k pascal unit range in each group.....	68
Fig.(29):	pie chart hepatic vein wave form distribution of patients group.....	70
Fig.(30):	pie chart portal vein wave form distribution of patients group.....	70
Fig.(31):	relation between fibroscan score and sex.....	71
Fig. (32):	scatter plot between k.pascal unit and portal vein maximum.....	73
Fig. (33):	scatter plot between k.pascal unit and hepatic artery psv/pv _{max}	73
Fig. (34):	Bar chart between non fibrotic f0 and fibrotic f1-f4 according to hepatic vein wave form.....	75

Fig No	Title	Page No
Fig. (35):	Bar chart between non fibrotic f0 and fibroticf1-f4 according to PV_{max}	76
Fig. (36):	Bar chart between non fibrotic f0 and fibroticf1-f4 according to hepatic artery PSV/ PV_{max}	76
Fig. (37):	Bar chart relation between fibroscan score and hepatic vein waveform	78
Fig. (38):	Bar chart relation between fibroscan score and PV_{MAX}	79
Fig. (39):	Bar chart relation between fibroscan score and hepatic artery PSV/ PV_{max}	79
Fig. (40):	Reciever operating curve for prediction of fibrosis using PV and hepatic artery PSV/ PV_{max}	80
Fig. (41):	Doppler wave form of female patient with HCV +ve ,A) normal hepatic artery wave form , B)normal PV wave form , C)normal HV waveform	86
Fig. (42):	Doppler wave form of female patient with HCV +ve ,A) normal hepatic artery wave form , B)normal PV wave form , C)normal HV waveform	88
Fig. (43):	Doppler wave form of female patient with HCV +ve ,A) normal hepatic artery wave form , B)normal PV wave form , C)normal HV waveform.....	90
Fig. (44):	Doppler wave form of female patient with HCV +ve ,A) normal hepatic artery wave form , B)decreased PV maximum velocity C)normal HV waveform	92
Fig. (45):	Doppler wave form of female patient with HCV +ve ,A) normal hepatic artery wave form , B)decreased PV maximum velocity , C)monophasic HV wave form	

List of Tables

Table. No.	Title	Page No.
Table (1):	Liver fibrosis stages according to the METAVIR scoring system.....	60
Table (2):	Demographic data distribution of the patients group.....	66
Table (3):	Fibroscan score distribution of the patients group	67
Table (4):	k-pascal unit range in each group.....	68
Table (5):	Mean value of different hepatic doppler parameters in all groups	69
Table (6):	Relation between fibro scan score and demographic data	71
Table (7):	Correlation between K Pascal unit with age and doppler ultrasound parameters, using Pearson Correlation Coefficient in patients group.....	72
Table (8):	Comparison between non fibrosis (F0)and fibrosis (F1-F4) according to Doppler ultrasound parameters	74
Table (9):	Relation between fibro scan score and doppler ultrasound parameters in each group.....	77
Table (10):	Receiver-operating characteristic (ROC) curve for prediction of fibrosis using the Doppler ultrasound.....	80
Table (11):	Receiver-operating characteristic (ROC) curve between F0 and F1.....	81
Table (12):	Receiver-operating characteristic (ROC) curve between F0 and F2.....	81
Table (13):	Receiver-operating characteristic (ROC) curve between F0 and F3	81

Table. No.	Title	Page No.
Table (14):	Receiver-operating characteristic (ROC) curve between F0 and F4.....	82
Table (15):	Receiver-operating characteristic (ROC) curve between F1 and F2	82
Table (16):	Receiver-operating characteristic (ROC) curve between F1 and F3	82
Table (17):	Receiver-operating characteristic (ROC) curve between F1 and F4.....	83
Table (18):	Receiver-operating characteristic (ROC) curve between F2 and F3	83
Table (19):	Receiver-operating characteristic (ROC) curve between F2 and F4	83
Table (20):	Receiver-operating characteristic (ROC) curve between F3 and F4.....	84
Table (21):	Comparison between Mean value of portal vein maximum velocities in our study and in Afif et al.,study.....	100
Table (22):	Comparison between HAPSV/PVmax between our study and Tuney et al. study	102

