ULTRASONOGRAPY IN THE DIAGNOSIS OF THE DIFFERENT STAGES OF BILHARZIAL LIVER

THESIS

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The Master Degree of Medicine

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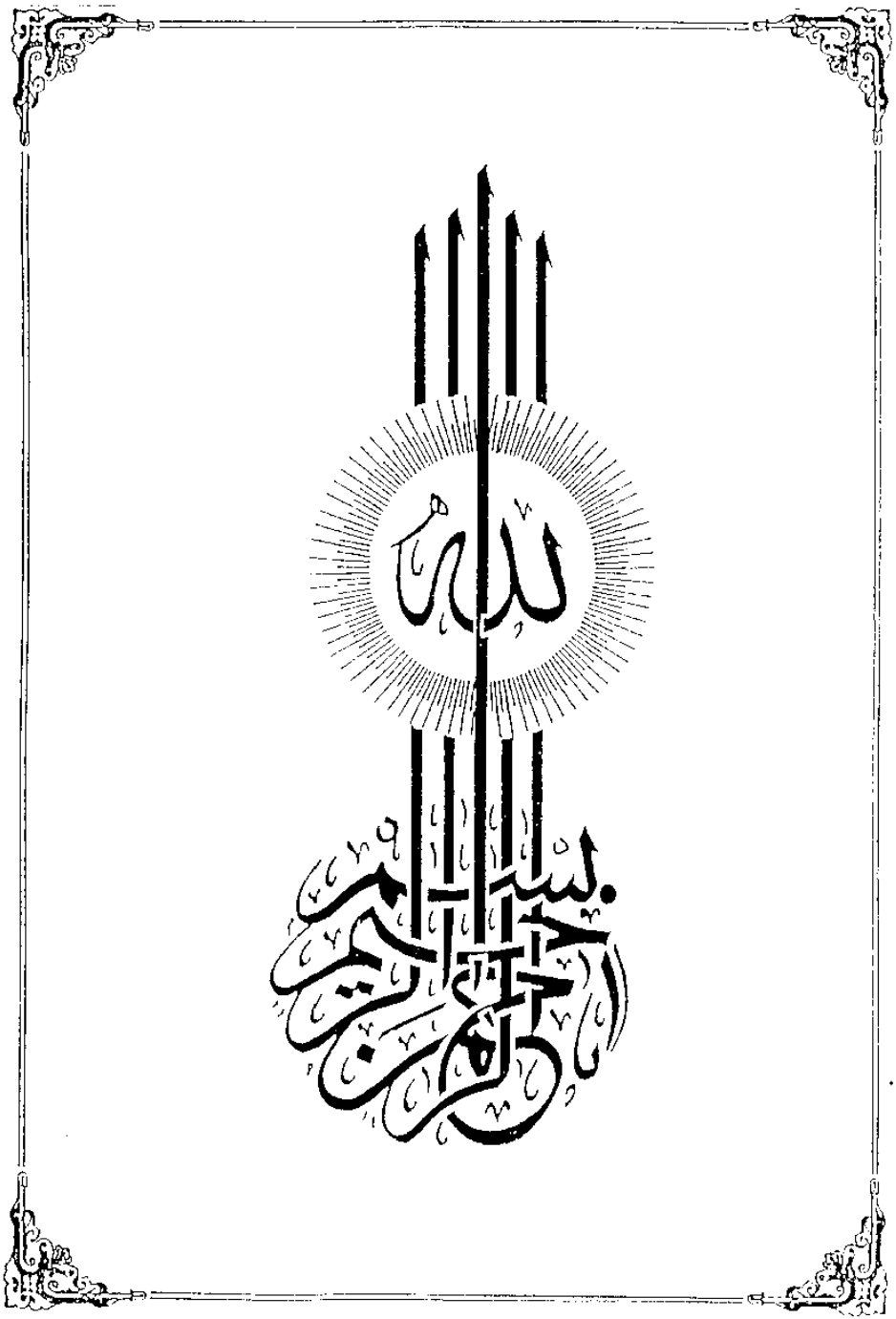
* ﴿ بسم الله الرحمن الرحيم ﴾ *

" قالوا سبحانك لا علم لنا الا ما علمتنا انك انت العليم الحكيم "

(صدق الله العظيم)



C O N T E N T S

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INTRODUCTION

Introduction and aim of the work

Introduction :-

It is possible to say that bilharziasis is one of the most common and most dangerous diseases in Egypt. The disease was first described by the ancient Egyptians, in their papyrus and the warm was also discovered for the first time in Egypt by Theoder Bilharz in 1851 (59). Until the last few decades, the vesical form of the disease was named "the Egyptian haemaruria " in the text books.

Salah (1962) found that the liver is affected in every case of intestinal bilharziasis, being a disease of the portal tract (80).

El-Mofty (1962) reported that liver bilharziasis is the most dangerous clinical type of the disease and that the liver affection with bilharziasis is the beginning of a series of severe complications. Ascites usually starts the end of the story and hepatic cell failure is a terminal event (25).

Liver bilharziasis is widely spread in Egypt, destroying

the health of a great scale of the Egyptian population. So, it is extremely important to do an intensive and careful study for the accurate method of diagnosis and the proper method of treatment of the disease.

The old methods for investigation were of limited value, risky and painful for the patient, and time consuming

Ultrasonography which is one of the most valuable advances in medical diagnosis is a safe, and non invasive method of diagnosis.

Weill et al,(1975), reported that many informations can be identified about the liver by using ultrasound e.g. identifying the portal system,and the characterstic features of the liver parenchyma, also the thickinning of the portal tracts. (99)

Aim of the work:

The aim of the present work is to study the use of ultrasonography in the diagnosis of liver bilharziasis in it's different stages which are : arrested bilharzial fibrosis, active but compensated fibrosis and decompensated fibrosis (El-Mofty 1962) (25).

REVIEW OF LITERATURE

ULTRASOUND .....

AND IT'S USE IN MEDICAL DIAGNOSIS

U L T R A S O U N D

Historical Data:

Ultrasound is not a new subject, Galton (1883) made a study for the acoustic spectrum perceived by humans, he made a whistle which can be looked for as the first known transducer, but it had no application at that time except being used as a dog whistle (13).

During the first world war (1914-1918)a great interst in the subject had developed and Lanegevin in France developed the use of quartz transducer for transmitting and receiving ultrasonic waves in water (13).

Pierce (1925) used quartz and nickel transducer for generating ultrasound of "Mega Hertz" (13).

Debge, Sears, Lucas and Biquard (1925) worked in the same subject but independntly of one another (13).

Hartman and Trolle (1927) made an ultrasonic whistle having the power of propagating ultasonic waves in fluids(13).

Soklov (1934) in the USSR published the first known record on ultrasonic flow detection (13).

Attemps were done to use ultrasound in medical diagnosis just perior to the second world war (1942-1946), Dussik saught to visualise the cerebral ventricles by measuring attenuation of ultrasound beam transmitted through the head(54).

Douglass Howry (1952) discovered the priniciple of compound scanning recording the echoes on a large phosphorous screen (20).

John wild (1952) stated that by using ultrasound, the difference between normal tissues, and begnin or malignant tumour of the breast can be detected in 90% of cases (20).

Ian Donalds (1958) developed the contact scanning consept and had a major application of ultrasound in obstertic and gynaecology (20).

The progress achieved over the last 25 years was the result of cooperation of a large group of physicians and

engineers working as a team, the continuation this effort should yeild new and improved methods and applications of diagnostic ultrasound.

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physical properties of ultrasound

Naure of ultrasound :

The only distinction between audiable sound and ultrasound is that the latter can not be detected by the human ear, this depends on the frequency of the sound waves, the human ear can detect sounds with frequency of 16,000-20,000 Hertz (cycle/ second).

Sound of a frequency above 20,000 Hertz is called "ultrasound" and sounds below 16,000 Hertz is called "infrasound". But however, there is no line of demarcation between these categories of sound, because many animals as dogs, bats and dolphins can hear sounds of a frequency above 20,000 Hertz, while few humans can hear sound of frequency above 16,000 Hertz (Ziskin 1975) (102).

Types of sound waves :

According to the type of the motion of particles, sound waves are devided to :

A- Longitudinal waves :- when the particle motion is in the direction of sound propagation, this type is supported by

all material.

B- Transverse waves :- when the particle motion is perpendicular to the direction of sound propagation, this type is supported by solids only except bones.

Characterstic's of sound waves

1. Wave length:

The wave length is the distance from one pressure peak to the next pressure peak, the wave length is symbolized by the Greek letter lambda λ .

In medical applications, wave length range is 0,1-1,5 mm.

2. Velocity:

The velocity is the speed of the wave, it depends on the density and elasticity of material in which the wave is travelling, the relationship is expressed in the equation:

$$V = \sqrt{\frac{E}{P}}$$

Where V = velocity, E = elasticity and P = density (Barnett and Morley 1977) (10).

Examples of velocity:

In air the velocity is 331 meter/ secon , in stainless