COMPARATIVE STUDY OF ULTRASONOGRAPHY AND LABORATORY METHODS IN ASSESSMENT OF THE LIVER IN GERIATRICS

THESIS

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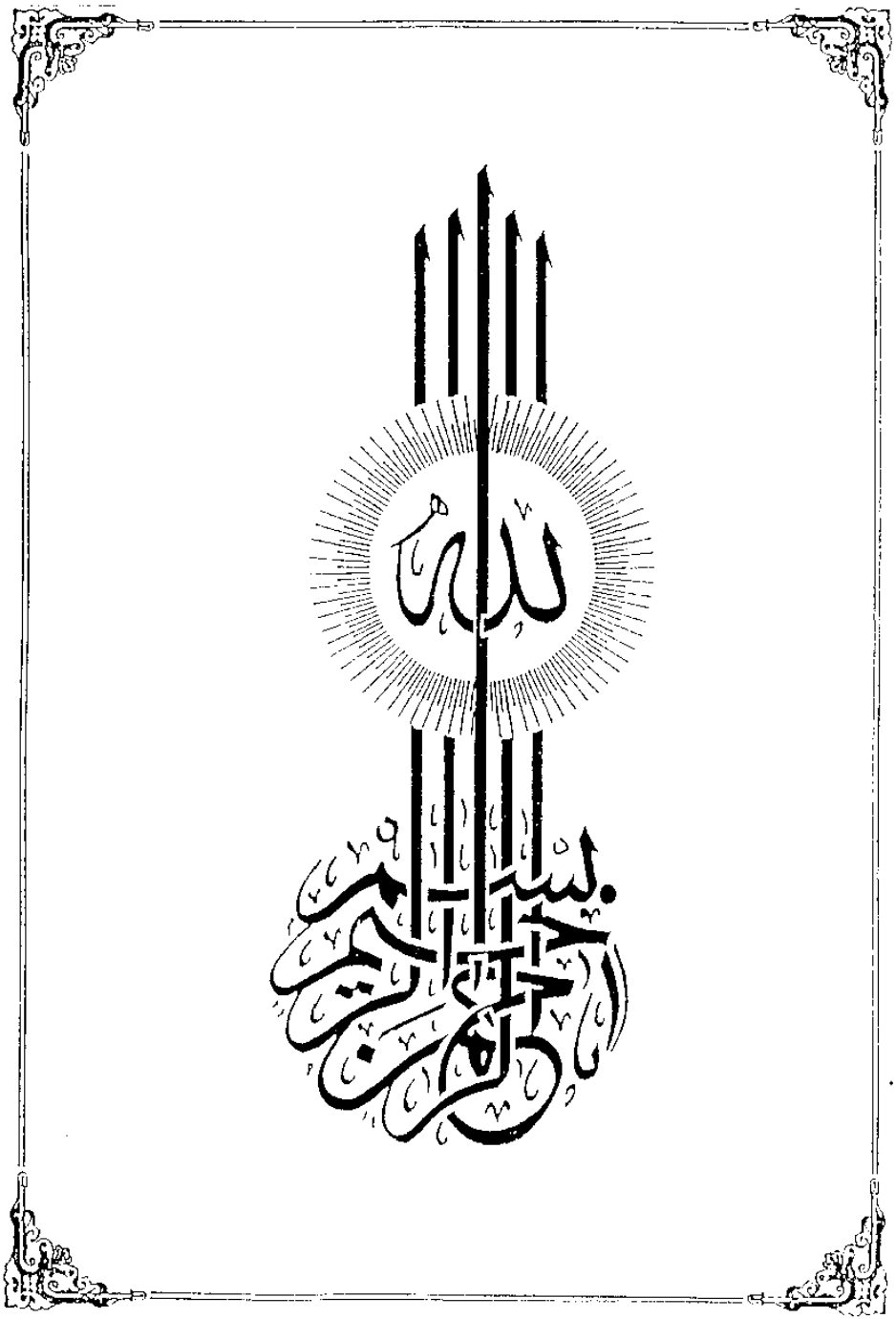

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Advancing age may bring changes in all principal functions of gastrointestinal tract.

The existance of senile liver cirrhosis has even been postulated, however, Findor et al., 1973 found that these changes reflect associated pathologic process and not physiological senescence.

The liver has many functions which can be studied by a variety of tests. However, there are often problems in selecting the most appropriate tests and in their interpretation in the elderly patients.

Many workers found that there is disturbance of liver functions during many systemic disorders in the body in geriatrics.

The aim of this study is to compare ultrasonography to other laboratory methods to detect early liver affection and to find the most sensitive method for that.

REVIEW OF LITERATURE

Effect of age on the liver and its function

The most important functions of the liver are uptake, synthesis (Feldman, 1979), metabolism (detoxication by hydroxylation or conjugation reactions) and elimination via biliary secretion or release in plasma for renal excretion. These functions are frequently intimately joined. Most of them are localised in the hepatocytes but Kupffer cells and other non-parynchymal cells also have a role (Wise & Knook, 1979).

A great deal has been written about how the aging process affects the liver. There clearly are gross and microscopic differences between livers of young and old subjects as well as age related alteration in liver function.

Macroscopic Changes

Watanab et al., (1978) found that ageing leads to progressive decrease in liver weight while Wilson & Franks (1975) found that ageing leads to involution of the liver accompained with mild increase in fibrous tissue.

Esteban Mezey (1985) found that liver size decreases after the age of 50 years but this decrease parallels a decrease in body weight until age of 70 years.

On peritoneoscopy, Tauchi & Sato (1978) found that the aged liver is smaller, greyish white with a more pronounced fibrous rim at the liver edge and with deep but localised retractions in the liver surface.

Microscopic Changes

Tauchi et al., (1975) found that ageing leads to a decrease in the number of hepatocytes. However, the cells usually increase in volume and they have an enhanced volume of mitochondria and nuclei. The amount of binuclear cells increase up to 60 years and decreases later on (Tauchi & Sato, 1978). The number of cells with large tetraploid nuclei increase with age (Watanabe & Tanka, 1982).

Invaginations of the nuclear membrane occur and may lead to the formation of intranuclear inclusions consistiting of entrapped masses of cytoplasm (Andrew, 1971).

Lipofuscin pigment is increased and is associated with increased number of lysosomes and microbodies. There is diminution in the surface area of Golgi apparatus and increase in the rough and smooth endoplasmic reticulum (Schmucker, D.L., 1976).

Functional Changes

The levels of hepatic enzymes vary little with aging. In general, the activities of respiratory enzymes decrease and those of hydrolytic enzymes increase (Wilson, P.D., 1973).

They also found a diminution of adaptability or inducibility of the enzyme with advancing age.

Other age-associated enzymatic changes include reduction in the rate of enzyme degradation and changes in isoenzyme patterns (Hyams, D.E., 1978).

Reduced hepatic blood flow was found in subjects over 50 years of age by Tesauro and Colleagues (1969).

Changes in drug metabolism & Pharmacokinetics

There is decrease in the clearance of drugs which have a low excretion ratio and whose elimination is dependent on hepatic activity of drug-metabolising microsomal enzymes. Antipyrine, aminopyrine, chlorodiazepoxide, and meperidine are examples of drugs whose metabolism is decreased in aged individuals (Schmucker, DL, 1979).

Some of these effects, such as decrease in antipyrine clearance, appear to be due to an age - dependent effect of smoking, since they are not observed in non smokers (Wood A J J , 1969).

By contrast, aging has no effect on the rate of clearance of benzodiazepines such as oxazepam and lorazepam or on morphine which are primarily metabolized by glucuronidation (Kraus, 1978).

Liver Function Tests

The liver has many functions which can be studied by a variety of tests. Many of the enzymes assayed are not specific to the liver and, since the elderly are prone to multiple pathology, an elevated aspartate transferase, for example, may indicate alteration in liver function, myocardial infarction, stroke or muscle damage.

Alkaline phosphatase levels are similarly non representative : fractionations may distinguish bone and liver isoenzymes, but many well elderly(estimates vary from 10 to 50 per cent) may have significantly elevated alk.phosphatase levels in the absence of abvious pathology (Cox and Moss, 1984).

Alkaline phosphatése

There is a great interest and controversy concerning age-related changes in alkaline phosphatase. Several studies report an increase in the "normal" level of alkaline phosphatase (Leask et al., 1973).

An age - related refrence range for total, bone and liver alkaline phosphatase was given in table (1) by Whitaker, 1982.

Age (years)	Total alk. phosphatase activity (I.U./L)	Liver alk. phosphatase activity (I.U./L)	Bone alk phosphatase activity (I.U./L)
17 - 19	60 - 280	20 - 110	20 - 190
20 - 29	60 - 220	20 - 110	20 - 140
30 - 39	60 - 200	20 - 120	0 - 120
40 - 49	65 - 200	20 - 130	0 - 110
50 - 59	75 - 230	30 - 140	5 - 120
60 - 69	90 - 260	40 - 155	5 - 150
70 - 79	105 - 290	50 - 170	10 - 170

Table (1) : age - related changes in total, bone & liver alk. phosphatase.