Biochemical and Ultrasonographic Study of the Liver in Functional Colonic Disease

Thesis

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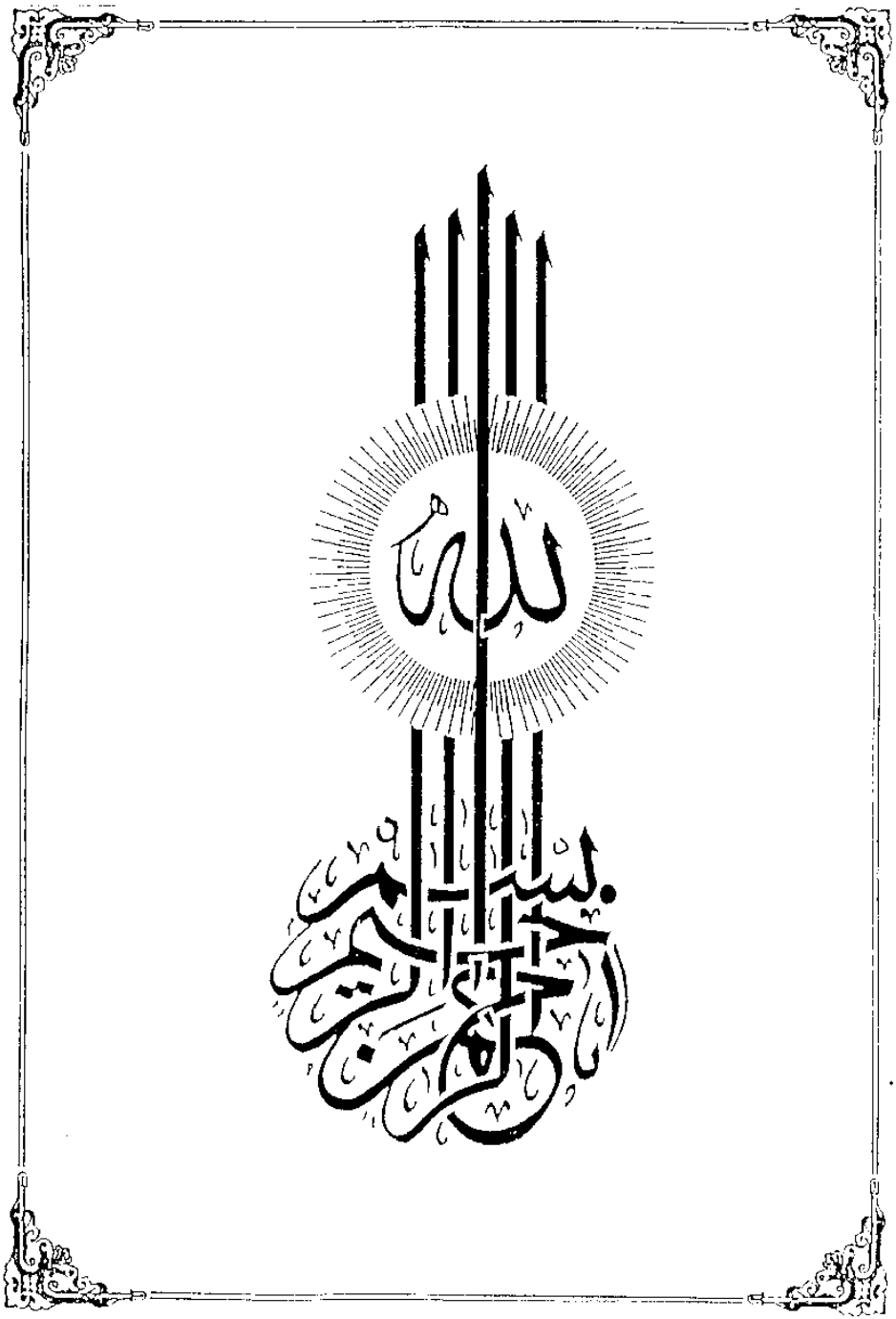

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INTRODUCTION AND AIM OF THE WORK

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It is well known that many patients with abdominal symptoms have no organic disease, but their symptoms nevertheless arise from a disorder of gut function. Several quite different syndromes among patients without demonstrable organic disease could be distinguished:

1. Irritable bowel syndrome (IBS)

There are abdominal pain and altered bowel habit. In all of them a relation between abdominal pain and abnormal colonic function could be established from the history (pain relieved by bowel action or passing flatus, distension with wind, looser motions at onset of pain, mucus in stools. ***Manning, et al., 1978).***

2. Painless (Functional) diarrhea

Some patients have functional, painless diarrhea with fecal urgency but with no associated anatomical or histological abnormality. ***(James, 1992).***

3. Painless (Functional) constipation

There are infrequent bowel movements less than every other day result in hard fecal pellets which require straining to eliminate. ***(James, 1992).***

4. Acute intestinal pseudo-obstruction (Ogilvie's syndrome).

It is characterized by acute intestinal dilatation, involving primarily the colon but occasionally also the small intestine ***(James, 1992).***

5. Depression with abdominal pain

There is depression in association with abdominal symptoms particularly pain. In this group the pain differed from that in the first category. It tends to be constant, to be present on waking in the morning, to last all day and it seldom was affected by anything. ***(Harvey, 1983).***

6. Habit disorders

Friends and relatives complained of these habits more often than the patients themselves. Most patients have their symptoms for years before attending in clinic. Air swalling, habit vomiting are the commonest disorders. ***(Harvey, 1983)***

7. Mad and incurable

A group of people have bizarre complaints, e.g. "acid in the testicles" or "I have got a rat grawing inside my bowel" ***(Harvey, 1983).***

Biliary tract diseases are exceedingly common and often coexist with the (IBS). They possess characteristic features e.g, In acute cholecystitis examination shows right hypochondrial tenderness, rigidity worse on inspiration (Murphy's sign), and the gall bladder mass may be palpable,

these features cause little confusion when one or the other accompanies a functional bowel disorder ***(Williams, 1985)***.

Several reports have firmly established a nonrandom association between inflammatory bowel disease and certain hepatobiliary disorders e.g. fatty change, pericholangitis, cirrhosis. ***(Rankin, 1990)***.

Aim of the Work

The previous findings lead us to investigate whether there is any association between functional colonic disease and hepatic lesions.

REVIEW OF THE LITERATURE

Chapter One
Physiology of the Colon

Physiology of the Colon

The human colon is subdivided into right (ascending and transverse) colon and left (descending and sigmoid) colon. The right portion acts as fermenting chamber with bacteria and an area for electrolyte and water absorption, while the left portion especially the descending colon serves as a continence. The portion of the ileum containing the ileocecal valve projects slightly into the cecum, so that increases in colonic pressure squeeze, it shut off, whereas increases in ileal pressure open it. Therefore it effectively prevents reflux of colonic contents into the ileum. This valve consists of upper and lower lips projecting into the lumen of the bowel, it has no true valve and is controlled by a thickening of the circular muscle in the terminal 3cm. of the ileum. It is normally closed, each time a peristaltic wave reaches it, it opens briefly, permitting some of the ileal chyme to squirt into the cecum. When food leaves the stomach, the cecum relaxes and the passage of chyme through the ileocecal valve increases (Gastroileal reflex) ***(Kutachia, 1988)***.

The sympathetic stimulation increases the tonic contraction of the valve ***(Gyton, 1991)***.

Aproximately 1.5 liters of fluid enter the colon each day whereas only 0.05 liters are excreted .Abnormal motility can lead to either rapid passage of the fecal stream through the colon, resulting in diarrhea, or to a prolongation of this passage which increases contact time between the

contents of the colon and the mucosa possibly resulting in constipation ***(Kerlin, 1983).***

Colonic motility

More activity of the colon is performed by two muscle layers with long axis of their cells perpendicular to each other. The inner layer of circular muscle cells is continuous and circumferentially oriented. The outer longitudinal layer is also continuous but is concentrated into three bands called toeniae. Throughout its length there is an intrinsic nervous system (Auerbach's plexus) situated between the twomuscle layers, from which nerves innervate the muscle cells. Extrinsic parasympathetic innervation comes to the proximal colon via the vagus and to the distal colon by the pelvic nerves from the sacral segments of the spinal cord. The movements of the colon include segmentation contractions and peristaltic waves, although weak antiperistaltic waves are sometimes seen. There is a third type of contraction that occurs only in the colon, the mass action contraction, in which there is simultaneous contraction of the smooth muscle over large confluent areas. These contractions move material from one portion of the colon to another. They also move material into the rectum and rectal distension initiates the defecation reflex ***(Gyton, 1991).***

Control of colonic motor activity

By three mechanisms

A- Myogenic:-

1- Electrical control activity (ECA) = short duration contraction

2- contractile electrical complex = long duration contraction

B- Neural:-

1- C N S = central nervous system
2- A N S = Autonomic nervous system
3- E N S = Enteric nervous system

C- Chemical e.g Acetylcholine, peptides, Amines, fatty acid derived substances

Myogenic control

Myogenic control refers to the control of contractions by oscillations of the smooth muscle membrane potential. The membrane potential exhibits periodic depolarization called the electrical control activity (ECA) also known as slow wave basic electrical rhythm, or pacesetter potential. The significance of these periodic depolarization in the control of contractions is that when the membrane potential depolarizes beyond certain threshold, the muscle generate another type of electrical activity known as spikes or action potential and concomitant with this activity, the muscle contracts ***(Sarna, 1975).***

Initiation of contractions occurs through spiking activity. Spikes only occur on the most depolarized phase of the oscillations.

The short duration contraction is controlled by electrical control activity (ECA) which is spontaneous and omnipresent and it occurs in a substantially lower frequency range of (2-13 cycles/min) in human. The (ECA) likely originates in the circular muscle layer and is highly disorganized and variable in frequency and amplitude ***Sarna et al., 1982).***

The long duration contractions are controlled by an electrical activity called the contractile electrical complex ***(Sarna et al., 1981).***

This complex consists of intermittent bursts of membrane potential oscillations in the frequency range of 25-40 cycles per minute. This contractile electrical complex likely originates in the longitudinal muscle layer.

Motor activity in the colon is highly variable, with periods of contraction and motor quiescence ***(Karaus, et al., 1991)***, but despite that there is a very good correlation between slow electrical oscillations, spikes and contraction. Each oscillation with superimpsed spikes (oscillatin - spike complex) is associated with a contraction ***(Huizinga, 1986).***