Ain Shams University
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STUDY OF GLYCOPROTEINS IN OBESITY

Thesis

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of the Master Degree in General Medicine

By

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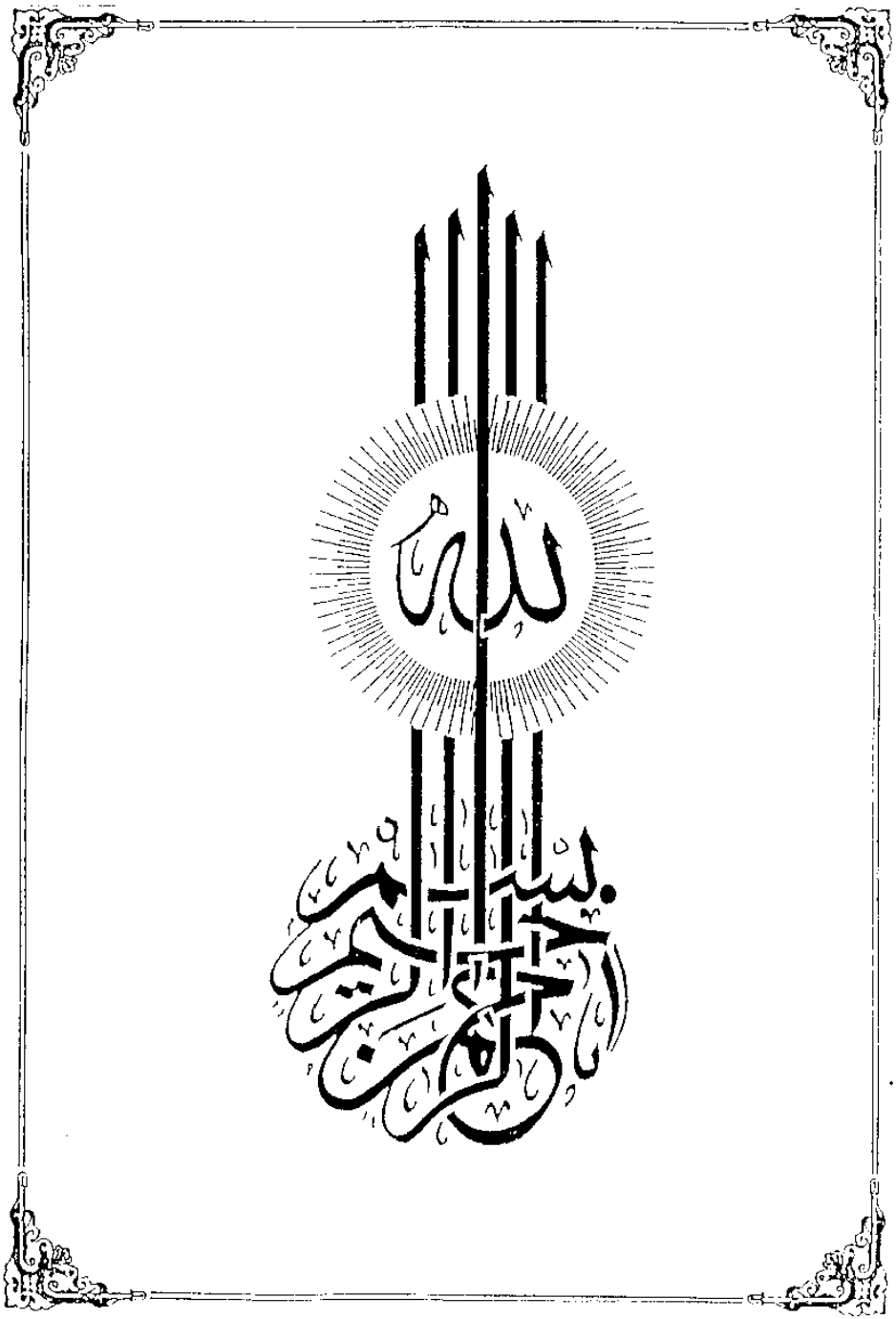

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INTRODUCTION

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Glycoproteins are a group or proteins Synthesized by the liver. Various workers suggested that it is an early indicator of liver cell function. As obesity is a prediabetic condition and also the liver is liable to fatty infilteration in obesity.

AIM OF THE WORK

So the aim of this work is to measure serum glycoproteins (Haptoglobin - Prealbumin - Alpha 2 Macroglobulin) as a measure of early liver affection in obese non diabetics.

REVIEW OF LITERATURE

OBESITY

It is not clear whether obesity represents a disease or a common clinical manifestation of a group of disorders since body weight (more accuratly quantity of body fat) is continously distributed in population (Bierman Edwin 1981).

Obesity at the simplest level can be difined as an excess of body fat (adipose tissue). Although other bodily tissues including skeleton and muscle (lean body mass) may also, and often do, increase in the obese individuals. The predominant and most characteristic anatomic change is the excessive accumulation of adipose tissue (Salans 1981). It is considered one of the modern epidemics which affect affluent societies in which the pattern of life is characterized by over feeding and less physical work (Williams and Glomst 1974).

Clinical Types :

There are two clinical types of obesity :

1. Life long obesity :

Patients give a characterisitic history although generally of normal birth weight. They tend to have been heavier as children since early grade school, to have had a large spurt in weight gain during puberty, and (in females who have been pregnant). These individuals tend to be grossly obese (more than 150 % of ideal body weight) adults.

2. Adult onset obesity :

It represents " middle age spread ". These individuals give a history of being thin or of average weight untill age 20-40 when weight gain associated with a more sedentary existence, adult onset obesity simply may reflect imbalance between caloric intake and utilization.

Ahrens (1970) has calculated that the daily caloric requirement for weight maintainance of adults decreases 43 calories / decade / m^2 surface area for males and 27 calories /decade / m^2

surface area for females. These two broad clinical types of obesity were recognized by Albrink and Meigs (1964) who proposed that adult onset obesity is mainly central in Location, whereas lifelong obesity might be peripheral as well as central.

Pathophysiology of Obesity :

A possible pathophysiologic basis for these clinical observations was first proposed by Bjurulf (1959) who suggested that some forms of obesity might be due to increased number of cells. Proof for this hypothesis was proved by the elegant experiments of Hirsch et al (1966).

They demonstrated that grossly obese humans (lifelong) have characteristically an increase of adipose cell number as well as in adipose cell size, After weight reduction adipose cell size shrinks but hypercellularity remains fixed. Adult onset obesity is usually not as severe and appears to be characterized predominatly by

adipose cell hypertrophy with only minimal increase in cell number. Thus all human obesity is accompanied by cellular enlargment. Adipose cell number appears to be determined early in life in studies with rats : animal subjected to overnutrition before weaning maintained great numbers of adipose cells throughout life more than rats subjected to undernutrition prior to weaning (Knittle and Hirsch 1968), weight changes during adult life did not influence the cell number of these animals.Studies in human also have shown that adipose cell number is determined early in life (Knittle et al., 1979, Hager et al., 1977). This may have profound implications with regard to the effects of feeding patterns during infancy and early childhood on the subsequent development of lifelong obesity. It has been shown that excessive weight gain within the first 6 monthes of life is correlated with over weight at the age of 6-8 years (Eid 1970) and at the age of 20-30 years (Charney et al., 1976).

Although less than one third of obese adults were overweight children, most overweight children become obese adults. The familial aggregation of obesity (Mayer, 1965) then, could be explained in part by a familial aggregation of eating patterns, particularly as applied to nutrition in early life. There also appears to be an important genetic influence since body weights and skin fold thicknesses of identical twins are correlated more closely than are those of fraternal twins (Newman et al., 1937; Borjeson, 1976).

Overweight and Obesity :

Obesity is a condition in which there is an excess of body fat. The point is often made that the excess weight may be muscle (Parnell 1977). The objection is theoretically correct : indeed the classic work of (Behnke et al; 1942) was stimulated by the rejection by the U.S Navy of some national ranking football players on the ground that they were overweight. The method

which comes closest to meeting this requirement is by the estimation of skinfold thickness. Durnin and Womersley (1974) have published tables from which the sum of skinfold thickness at biceps, Triceps suprailiac and subscapular sites can be used to estimate the percentage of fat in the body.

It is possible to use only the triceps skinfold as a measure of obesity (Selzer and Mayer 1965). Another reason why it is Justifiable to classify obesity by over weight is that important misclassifications will rarly arise. The example of the overweight football players has already been mentioned but even champion athlets do not exceed W/H^2 = 25 except in those sports, such as Japanese Sumo wrestling (Nishizawa et al 1976) in which champions are obese as well as heavily muscled. A possible exception are the women shot-put, discus and Javelin throwers studied by Wilmore et al., 1977 : with weight 80.8 kg; fat 21.8 kg and height 1.74 m they had a W/H^2 = 27 but could hardly be called obese.

Relative weight, or the W/H^2 criterion will tend to underestimate obesity in old people, but this is not clinically very important. Lesser et al (1971) showed that women aged 62 - 77 years were often in the normal range of weight for height but had a high percentage body fat.

Prevalence and Natural history of obesity :

Current estimates of the prevalence of Obesity are highly variable and its exact incidence in the population is not known. Nevertheless the available data indicate that overweight and obesity probably Obesity highly prevalent at every age and both sexes. Data on the body weight from the build and blood pressure study of 1959 indicate that at that time and in that particular population of Americans, Overweight increased considerably with advancing age , the greatest increase occuring from the age 20 to 30 years (Build and blood pressure study chicago, society of Actuaries, 1959).