SERUM CALCITONIN IN CHRONIC RENAL DISORDERS IN CHILDHOOD

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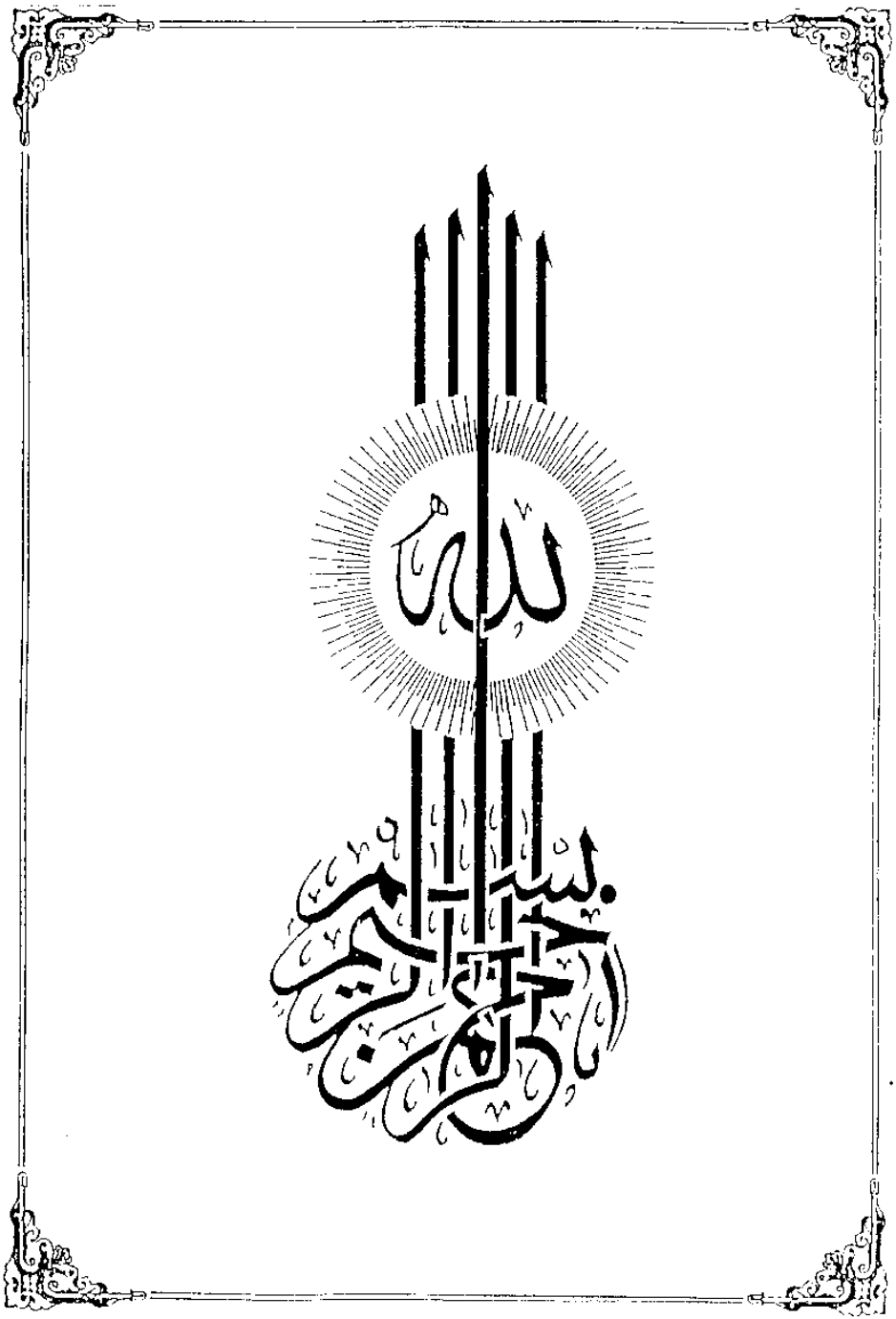

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LIST OF ABBREVIATIONS

ALP	: Alkaline phosphatase.
Ca	: Calcium.
C.AMP	: Cyclic adenosine monophosphate.
Ch.R.F., C.R.F	: Chronic renal failure.
Crea	: Creatinine.
CT	: Calcitonin.
C_3	: Complement 3
GFR	: Glomerular filtration rate.
HCT	: Human calcitonin.
IgG	: Immunoglobulin G.
MCNS	: Minimal change nephrotic syndrome.
MCR	: Metabolic clearance rate.
M.TC., M.CT.	: Medullary thyroid carcinoma.
N.S.	: Nephrotic syndrome.
OHPR	: Hydroxyprofine.
P	: Phosphorus.
PTH	: Parathyroid hormone.
RIA	: Radio immuno assay.
SAP	: Serum alkaline phosphatase.
SCT	: Salmon calcitonin.
S.E.M	: Standard error of mean.
1,25 $(OH)_2$ D_3	: 1,25 dihydroxy cholecalciferol.

INTRODUCTION
AND
AIM OF WORK

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Several reviews on the problem of growth failure in renal disorders have been published. They all stress the fact that while a number of factors have been documented as potentially harmful for the growth process, mechanisms of growth retardation in children with chronic renal disorders are not yet completely understood and its therapy is often disappointing.

Among these factors are disturbances of elementary water and electrolytes, energy and protein malnutrition, metabolic disturbances, vitamin D deficiency as well as the effect of drug therapy (Cupoli et al., 1980).

Several hormonal systems involved in growth are also disturbed including, hyperparathyroidism and decreased somatomedin and thyroxine (Steinman et al., 1984).

Calcitonin is known to have its main effect on bone by promoting bone formation and inhibiting bone resorption especially that produced by hyperparathyroidism (Fischer et al., 1977).

The kidney appears to be the dominant organ in the metabolism of human calcitonin and most of the total metabolic clearance rate of calcitonin is greatly decreased in

patients with renal failure (Feletti et al., 1981).

Consequently, calcitonin could have such antagonistic effect to parathyroid hormone to prevent renal osteodystrophy (Kanis et al., 1977).

AIM OF THE STUDY

With this idea in mind, the aim of the present study is to estimate serum calcitonin level in different renal disorders and to define its exact role in relation to different phases of the disease as well as in relation to therapy.

CHAPTER (1)
REVIEW OF LITERATURE

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CALCITONIN HORMONE

Discovery of calcitonin (Copp et al., 1962) opened a very wide field for researches and investigation to find out its role in calcium homeostasis.

Calcitonin (CT) is produced by the C-cells system mainly. These C-cells are parafollicular cells scattered throughout major parts of the thyroid gland (Foster et al., 1964).

Embryology

The C-cell system arises from the fifth pharyngeal pouch, forming the so called ultimo-branchial body which is incorporated with the medical portion of the fourth branchial pouch, into lateral lobes of the thyroid gland, accounting for the intrathyroidal location of the parafollicular cells (Foster et al., 1972).

The primordial cells that give rise to the parafollicular cells are derived from ectodermal neural crest precursors that migrate ventrally into the branchial pouch rather than

from the branchial endoderm (Talmage et al., 1983).

The early demonstration of C-cells within human thyroid gland has been reported in 14 weeks old fetuses (Chan and Conen, 1971). Neonatal thyroid gland have been shown to contain -3 to 19 fold greater number of C-cells and significantly greater amounts of stored CT than do adult glands (Tsang et al., 1975).

Chemical structure

Calcitonin is a single - chain,32 - amino acids and has a molecular weight of 3418 Daltons. It is a polypeptide hormone with an N-terminale 7-membered disulfide ring and a C-terminus of prolineamide (Potts and Aurbach, 1976).The amino acid sequences of human calcitonin is shown in Fig. (I).

Many calcitonins are isolated and identified e.g. pourcine (pig), Salmon, eel, dog, rat, and others all are 32 aminoacid polypeptide chain but the aminoacid sequence varies considerabily. Salmon CT which is the most commonly available form in therapeutic use differs from human calcitonin in 16 sites. Salmon CT is 20 times as active as human CT (Queener and Bell, 1975).

It was found that there are mutiple forms of CT in the plasma and in the thyroid with multiple molecular weight.