Sick Euthyroid Syndrome In Prevalent Hemodialysis Patients

Thesis

Submitted for partial fulfillment of Master

Degree in Internal Medicine

By

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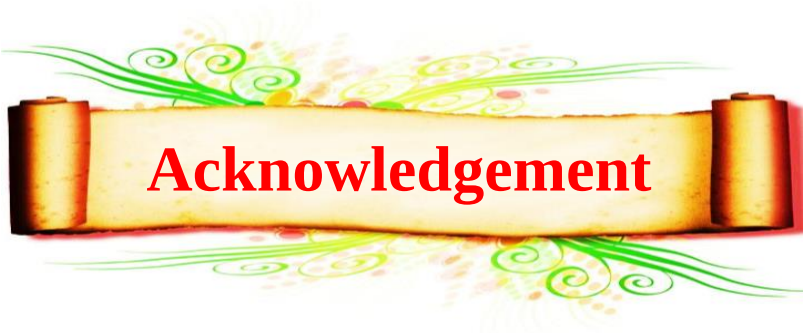
2017



Acknowledgement

First and foremost thanks to ALLAH, the Most Merciful.

I wish to express my deep appreciation and sincere gratitude to ***Prof Dr. Mohamed Ali Ibrahim,*** *Professor of Internal Medicine and nephrology, Ain Shams University, for his close supervision, valuable instructions, continuous help, patience, advices and guidance. He has generously devoted much of his time and effort for planning and supervision of this study. It was a great honor to me to work under his direct supervision.*

I wish to express my great thanks and gratitude to ***Dr. Essam Mohamed Abdel Hafiz*** *Lecturer of radiodiagnosis , Ain Shams University, for his kind supervision, indispensable advice and great help in this work.*

Last and not least, I want to thank all my family, my colleagues,, for their valuable help and support.

Finally I would present all my appreciations to my patients without them, this work could not have been completed.

Contents

List of Abbreviations

Abb.	Full Term
T4	Tetraiodothyronine
T3	Triiodothyronine
TSH	Thyroid stimulating hormone
TRH	Thyrotropin-releasing hormone
SRIH	Somatotrophin (somatostatin)-release-inhibiting hormone
GFR	Glomerular filteration rate
CKD	Chronic kidney disease
RBF	Renal blood flow
PCT	Proximal convoluted tubules
IGF-I	Insulin growth factor I
SES	Sick Euthyroid Syndrome
RT3	Reverse triiodothyronine
ESRD	End stage renal disease
TNF-α	Tumour necrosis factor- alpha
IL-1	Interleukin-1
HD	Hemodialysis
^{131}I	Radioactive iodine
rh-EPO	Recombinant human erythropoietin
TBG	Thyroid binding globulin
AKI	Acute kidney injury

List of Abbreviations(cont…)

Abb.	Full Term
DI	Diabetes insipidus
NTI	Non thyroidal illness
HPT	Hypothalamus-pituitary-thyroid axis
ICU	Intensive care unit
D2	Diiodothyronine
TTR	Transthyretin
TBPA	Thyroxine binding prealbumin
CRF	chronic renal failure
CRP	C reactive protein
P-gp	P-glycoprotein
OATP	organic anion transporting polypeptide
CYP	cytochrome P450
RCC	Renal cell carcinoma
AIT	Amiodarone induced thyrotoxicosis
AIH	Amiodarone induced hypothyroidism
TKI	Tyrosine kinase inhibitor
ATP	Adenosine triphosphate
MHC	major histocompatibility complex
AEDS	Anti epileptic drugs
VPA	Valproate
CBZ	Carbamazepine
OXC	oxcarbazepine

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Abstract:

Numerous abnormalities of thyroid hormones in end-stage renal disease (ESRD) have been described, one of these abnormalities is sick euthyroid syndrome.The aim of the study is to assess the frequency of sick euthyroid syndrome in prevalent hemodialysis patients .patients and methods: forty stable prevalent hemodialysis patients were randomly selected from Ain shams university hemodialysis unit and all were subjected to full history and detailed clinical examination especially thyroid gland , CBC , thyroid profile fT3 , fT4 , TSH and rT3 (by ELISA) as well as thyroid ultrasound.Exclusion criteria included patients with known thyroid disorders or receiving drugs affecting thyroid functions.The studied population was divided into 2 groups according to level of fT3 , 27 (67.5%)patients had low fT3 and 13(32.5%) patients had normal level of fT3.there was no statistically significant difference between the 2 groups as regard demographic , laboratory and ultrasound data. The studied population was divided into another 2 groups according to level of rT3.Patients with high level of rT3 had high prevalence of thyroid nodules.Conclusion : there is high prevalence of sick euthyroid syndrome in hemodialysis patients, patients with SES had higher incidence with thyroid nodules which may have prognostic value as nodules may be precancerous.Recommendation: studying risk factors which may lead to SES, follow up the patients with thyroid nodules.

Keywords : thyroid disorders , hemodialysis , sick euthyroid syndrome, thyroid nodules , reverse T3.

Introduction

INTRODUCTION

The kidney normally plays an important role in the metabolism, degradation and excretion of thyroid hormones. CKD affects thyroid function in many ways, including low circulating thyroid hormone levels, altered peripheral hormone metabolism, insufficient binding to carrier proteins, reduced tissue thyroid hormone content and altered iodine storage in the thyroid gland ***(Malyszko et al., 2006)***. The most obvious abnormality observed in CRF patients is a reduction in the serum level of total triiodothyronine. The serum levels of free triiodothyronine and total thyroxine are also reduced, although the reduction in the latter is less significant ***(Lim, 2001).***

Variation in thyroid function test findings also depends on the severity and duration of the disease. In chronic renal failure, total T4 and free T4 can be either normal or elevated, total T3 is reduced significantly, free T3 is reduced, rT3 is unchanged, basal TSH can be unchanged or elevated, and TSH response to TRH stimulation is decreased or delayed. Many of these abnormalities are reversed with kidney transplantation ***(Iglesias, 2009).***

Sick Euthyroid Syndrome (SES) can be described as abnormal findings on thyroid function tests that occur in the setting of a nonthyroidal illness (NTI), without preexisting hypothalamic-pituitary and thyroid gland dysfunction e.g. starvation, sepsis, surgery, myocardial infarction, bypass, bone marrow transplantation, and in fact probably any severe illness. After recovery from an NTI, these thyroid function test result abnormalities should be completely reversible ***(Soetedjo et al., 2009).***

Aim of the Work

AIM OF THE STUDY

To assess the frequency of sick euthyroid syndrome in prevalent hemodialysis patients.

Review of literature

Chapter (1)

Thyroid disorders in chronic kidney disease and hemodialysis

Chapter:-1

Thyroid disorders in chronic kidney disease and hemodialysis

Introduction:

The thyroid gland is one of the largest endocrine glands in the body. It is found in the anterior neck, below the laryngeal prominence (Adam's apple). The thyroid gland controls rate of use of energy sources, protein synthesis, and controls the body's sensitivity to other hormones. It participates in these processes by producing thyroid hormones, the principal ones being thyroxine (T_4) and triiodothyronine (T_3), which is more active. These hormones regulate the growth and rate of function of many other systems in the body. T_3 and T_4 are synthesized from iodine and tyrosine. The thyroid also produces calcitonin, which plays a role in calcium homeostasis ***(Boulpaep et al., 2009)***.

Hormonal output from the thyroid is regulated by thyroid-stimulating hormone (TSH) produced by the anterior pituitary, which itself is regulated by thyrotropin-releasing hormone (TRH) produced by the hypothalamus ***(Boulpaep et al., 2009)*.**

Regulation of thyroid hormones :

The production of thyroxine and triiodothyronine is primarily regulated by thyroid-stimulating hormone (TSH), released by the anterior pituitary. The thyroid, and thyrotropes in the anterior pituitary, form a negative feedback loop: TSH production is suppressed when the free T_4 levels are high. The negative feedback occurs on both the

hypothalamus and the pituitary, but it is of particular importance at the level of the pituitary The TSH production itself is modulated by thyrotropin-releasing hormone (TRH), which is produced by the hypothalamus **(*Johannes& Dietrich, 2002).***

The thyroid may be affected by some frequent thyroid diseases. Hyperthyroidism occurs when the gland produces excessive amounts of thyroid hormones, the most common cause being Graves' disease . In contrast, hypothyroidism is a state of insufficient thyroid hormone production. Worldwide, the most common cause is iodine deficiency. In iodine-sufficient regions, the most common cause of hypothyroidism is Hashimoto's thyroiditis. In addition, the thyroid gland may also develop several types of nodules and cancer ***(Longo et al., 2012)***