Intra-operative Parathyroid Hormone Level as a Predictor of Postoperative Hypocalcaemia in Thyroid Surgery

Thesis

Submitted for the partial fulfillment of the M.D. Degree in General Surgery

By

Ahmed Aly AbdelRahman Saad
(M.B.,B.Ch.), (M.Sc.)

Supervised by

Prof. Dr. Ahmed Ibrahim G. Badran
Professor of General Surgery
Faculty of Medicine
Cairo University

Prof. Dr. Ramadan Ahmed N. Morra
Professor of General Surgery
Faculty of Medicine
Cairo University

Prof. Dr. Azza M. El Khawaga
Professor of Chemical Pathology
Faculty of Medicine
Cairo University

Assist. Prof. Dr. Hussam Eldin Hosni
Assistant Professor of General Surgery
Faculty of Medicine
Cairo University

Faculty of Medicine
Cairo University
2014

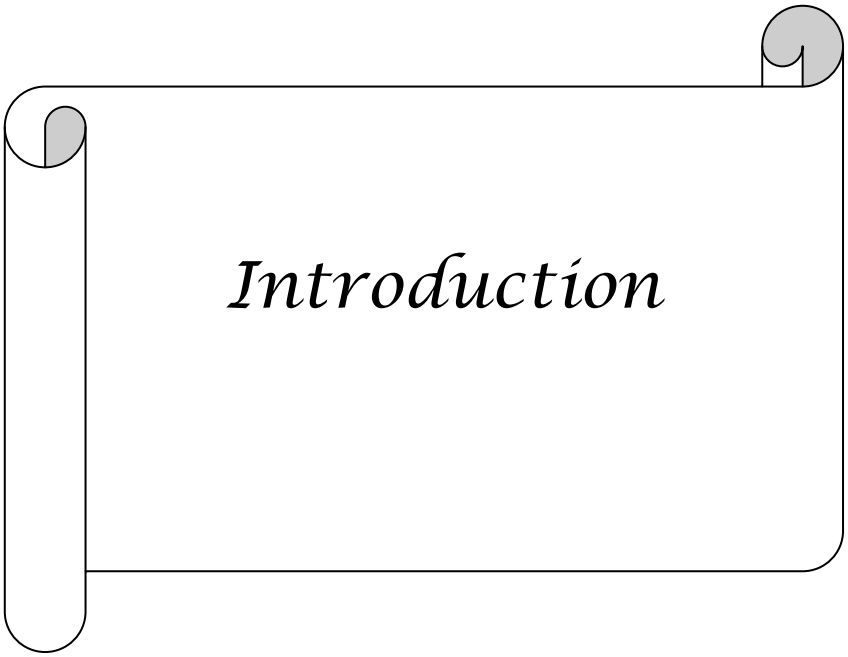
Abstract

Postoperative hypocalcaemia represents one of the most important complications of thyroidectomy. The main cause of hypocalcaemia is inadvertent damage to the parathyroid glands as well as incomplete knowledge of the possible embryological anomalies.

Early detection of patients with suspected hypocalcaemia is important to reduce the incidence of complications and minimize hospital stay and health care expenses post operatively. Intraoperative parathyroid hormone assay is of great accuracy in early prediction of post thyroidectomy transient and permanent hypocalcaemia.

Key Words:

- Thyroidectomy.
- Parathyroid Hormone.
- Hypocalcaemia.


Introduction

Introduction

Thyroidectomy is one of the most commonly performed surgical procedures done nowadays. The complications following thyroidectomy are well known, some of which are fatal, and others are quite disturbing particularly in their permanent form **(Bergamaschi et al, 1998)**.

Post operative hypocalcaemia whether symptomatic or not is a common complication after thyroid surgery with an incidence ranging from 1.7 % **(Al Suliman et al, 1997)** to above 68 % **(Wilson et al, 2002)**.The incidence can sometimes be as high as 83 % **(Abboud et al, 2002)**.

Post thyroidectomy hypocalcaemia may be transient or permanent. There is a great difference in literature in reporting the incidence of both. This is due to differences in the definition of hypocalcaemia and due to different surgical techniques for thyroidectomy **(Fahmy et al, 2004)**.

The pathogenesis of transient hypocalcaemia is not fully understood **(Cakmakli et al, 1996)**. Among the potential factors causing this decrease of serum calcium are haemodilution secondary to surgical stress with elevation of urinary calcium

excretion, calcitonin release, and hungry bone syndrome which was implicated in patients with hyperthyroidism and osteodystrophy **(Elshafei et al, 2007)**.

Permanent hypocalcaemia is most probably caused by hypoparathyroidism secondary to trauma, devascularization or inadvertent excision of one or more parathyroid glands during operation **(Rubin et al, 2001)**.

Risk factors for post thyroidectomy hypocalcaemia include the extent of resection, exposure of recurrent laryngeal nerves, parathyroid gland identification, reoperation and lack of surgical experience **(Bergamaschi et al, 1998).**

The common practice to assess calcium concentrations daily until a rising trend is obtained **(McHenry, 1997)** has recently been challenged. Instead, it has been suggested that serum calcium concentrations should be measured in selected cases **(Bentrem et al, 2001)** or during the initial 24 hours period only **(Marohn et al, 1995).**

Although the measurement of total serum calcium is inexpensive, it is inaccurate because of post operative haemodilution thus poorly predicts symptomatic hypocalcaemia **(Irvin et al, 1994).**

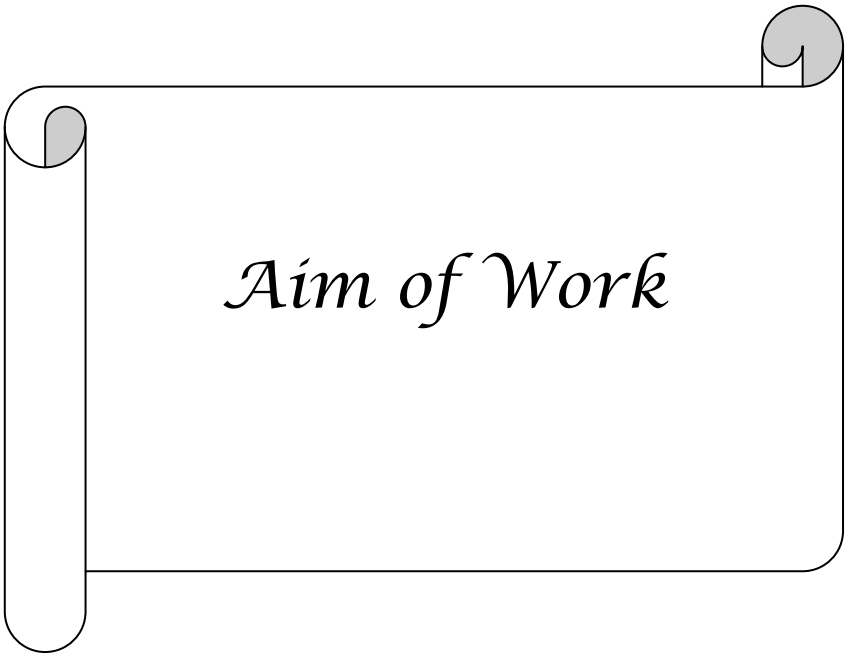
To discharge patients on the first day after bilateral thyroid surgery, a method that detects treatment demanding hypocalcaemia with good reliability would be of great importance **(Bentrem et al, 2001).**

Intra operative intact parathyroid hormone monitoring had emerged as an indicator of parathyroid function and completeness of parathyroidectomy over the past decade **(Garner et al, 1999)**.

Until recently, intra operative parathyroid hormone monitoring has been limited to surgeries on the parathyroid glands **(Sokoll et al, 2000)**. However, its value as a predictor of parathyroid function may be applied to other cervical surgeries that could potentially affect parathyroid gland function **(Lo and Luk, 2002).**

Intact parathyroid hormone has a very short half-life and its activity is a suitable index of parathyroid gland function. Intact parathyroid hormone level on the first post operative day in patients in whom parathyroid glands have been preserved in situ may be a good parameter for predicting the degree of long-term post operative functional recovery **(Kihara et al, 2000).**

A quick parathyroid hormone assay during thyroidectomy is both sensitive and specific in identifying normocalcaemic patients. Patients can be discharged home early without the need for serum calcium monitoring. Furthermore, the quick parathyroid hormone assay can identify patients at risk of developing clinically significant hypocalcaemia **(Lo and Luk, 2002).**


Aim of Work

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This study is designed to evaluate the problem of hypoparathyroidism following thyroid surgery and to assess the use of intra operative PTH level to predict patients with risk of post operative hypocalcaemia.

Through this study, it is sought that we can reach a recommendation to rely on the routine utilization of intra operative PTH assay to allow for a safe and timely discharge of normocalcaemic patients and for the early identification of patients requiring treatment of post thyroidectomy hypocalcaemia.

Acknowledgement

Thanks to "ALLAH" who inspired me the will and effort to complete this work.

I wish to express my supreme gratitude and appreciation to **Prof. Dr. Ahmed Ibrahim Gamil Badran,** professor of general surgery, Cairo University who gave me a lot of his valuable time for support and guidance in preparation of this work and for whom no words of gratitude are sufficient.

I am indebted to **Prof. Dr. Ramadan Ahmed Nabawy Morra**, professor of general surgery, Cairo University for his unconditional support and sincere piloting.

Many thanks to **Prof. Dr. Azza El khawaga;** professor of chemical pathology, Cairo University for her patience and enormous effort to assist me step by step to complete this work.

I do honestly wish to extend my deepest appreciation and sincere gratitude to **Prof. Dr. Hussam Eldin Hosni,** assistant professor of general surgery, Cairo University who inspired me the spirit of research and granted me close supervision, precious aid and extreme help.

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List of Abbreviations

MNG	Multinodular goitre
RLN	Recurrent laryngeal nerve
EBSLN	External branch of superior laryngeal nerve
PTH	Parathyroid Hormone
SD	Standard deviation
SEM	Standard error of mean
S	Significant
HS	Highly significant
NS	Non significant
PPV	Positive predictive value
NPV	Negative predictive value