

RECENT ADVANCES IN MANAGEMENT OF HYPERPARATHYROIDISM

Essay

Submitted for partial fulfillment of Master
Degree in
General Surgery

Presented By

Abd El Maguid Sadek Abd El Maguid

(M.B.,B.Ch, Faculty of Medicine, Ain Shams University)

Under Supervision of

Prof. Dr. Ibrahim M.H. El Ghazawy

Professor of General Surgery

Faculty of Medicine, Ain Shams University

Prof. Dr. Ashraf Fawzy

Professor of General Surgery

Faculty of Medicine, Ain shams University

Dr. Mohamed Ali Lashin

Lecturer of General Surgery

Faculty of Medicine, Ain Shams University

**Faculty of Medicine
Ain Shams University**

2010-2011

الطرق الحديثة في علاج زيادة إفراز الغدة الجار درقية

رسالة توطئة للحصول على درجة الماجستير في الجراحة العامة

مقدمة من

الطبيب/ عبد المجيد صادق عبد المجيد محمد

بكالوريوس الطب والجراحة جامعة عين شمس

تحت إشراف

أ.د/ إبراهيم الغزاوي

أستاذ الجراحة العامة

كلية الطب جامعة عين شمس

أ.د/ اشرف فوزي

أستاذ الجراحة العامة

كلية الطب جامعة عين شمس

د/محمد علي لاشين

مدرس الجراحة العامة

كلية الطب جامعة عين شمس

2010-2011

Summary and Conclusion

Hyperparathyroidism is a serious metabolic disorder, The incidence of hyperparathyroidism is about one in 20.000 people. The incidence of hyperparathyroidism has increased substantially, largely as a result of routine blood calcium measurement. Primary hyperparathyroidism is usually a disease of adults, most cases occur in the fifties or later in life, it is more common in women than in men, and most prevalent in postmenopausal women. Of all patients with PHPT, approximately 87% have a single adenoma while only 9% have four-gland hyperplasia, 3% have double adenomas, and 1% have parathyroid carcinoma , Although most patients with **Primary Hyperparathyroidism** have sporadic disease, some Patients have primary hyperpara-athyroidism associated with familial endocrinopathies, including multiple endocrine neoplasia type 1 (MEN1), multiple endocrine neoplasia type 2 (MEN 2), familial hyperparathyroidism without other endo-crinepathies and neonatal hyperparathyroidism.

The most common presentation of PHPT is the detection of unsuspected asymptomatic hypercalcemia by routine biochemical screening diagnosis of

ACKNOWLEDGEMENT

first and foremost, I fell always indebted to **Allah**, the most beneficent and merciful.

It is a great honor to express my deep gratitude and appreciation to **Professor Dr. Ibrahim El ghazawy** Professor of General Surgery, Faculty of Medicine, Ain Shams University, for his generous support, valuable advice, kind supervision and continuous encouragement to complete this work.

I'm greatly honored to express my deepest gratitude and sincere appreciation to **Professor Dr. Ashraf fawzy** . Professor of General surgery, Faculty of Medicine, Ain Shams University, for his kind help and directions.

I would like to express my deep thanks, gratitude and appreciation to **Dr. Mohammed Lashin** , Lecturer of General Surgery, Faculty of Medicine Ain Shams University for his guidance, his assistance and supervision in helping me to complete this work.

Finally, I would love to thank my **wife**, my **Family**, my **Family in - law**, my **Colleagues** and **Each one who helped me** in the preparation of this work.

ABD EL MAGUID DEGHADY

CONTENTS

<i>List of figures.....</i>	<i>III</i>
<i>List of tables.....</i>	<i>IV</i>
<i>List of abbreviations.....</i>	<i>V</i>
<i>The aim of work,.....</i>	<i>VII</i>
1- <i>Introduction.....</i>	<i>1</i>
2- <i>Review of literature</i>	
• <i>Anatomy of the parathyroid glands.....</i>	<i>5</i>
• <i>Physiology of the parathyroid glands.....</i>	<i>18</i>
• <i>Pathology of hyperparathyroidism.....</i>	<i>28</i>
• <i>Diagnosis of hyperparathyroidism.....</i>	<i>40</i>
• <i>Treatment of hyperparathyroidism.....</i>	<i>60</i>
3- <i>Summary and conclusions.....</i>	<i>127</i>
4- <i>References.....</i>	<i>132</i>
5- <i>Arabic summary.....</i>	<i>148</i>

List of figures

<i>Fig. no.</i>	<i>Title</i>	<i>Page</i>
<i>1</i>	<i>Embryology of parathyroids</i>	<i>9</i>
<i>2</i>	<i>Course of rec. laryngeal n.</i>	<i>12</i>
<i>3</i>	<i>Sites of parathyroid glandular tissue</i>	<i>15</i>
<i>4</i>	<i>Parathyroid adenoma</i>	<i>35</i>
<i>5</i>	<i>parathyroid adenoma</i>	<i>36</i>
<i>6</i>	<i>Parathyroid hyperplasia</i>	<i>39</i>
<i>7</i>	<i>parathyroid carcinoma</i>	<i>40</i>
<i>8</i>	<i>Osteitis fibrosa cystica</i>	<i>52</i>
<i>9</i>	<i>Parathyroid hormone (PTH) measure</i>	<i>63</i>
<i>10</i>	<i>Scintigraphic image from Yale's 99mTc-sestamibi</i>	<i>68</i>
<i>11a</i>	<i>Sestamibi scan</i>	<i>95</i>
<i>11b</i>	<i>Neck ultrasound</i>	<i>95</i>
<i>12</i>	<i>Incubation time quick PTH assay</i>	<i>96</i>
<i>13</i>	<i>Placement of the collar incision</i>	<i>98</i>
<i>14</i>	<i>dorsal aspect of the thyroid</i>	<i>102</i>
<i>15</i>	<i>Conduct of parathyroidectomy.</i>	<i>109</i>
<i>16</i>	<i>Location of ectopic parathyroid glands</i>	<i>110</i>
<i>17</i>	<i>Llocation of ectopic parathyroid glands</i>	<i>149</i>
<i>18</i>	<i>Recurrent and persistent HPT</i>	<i>152</i>

List of tables

<i>Table no.</i>	<i>title</i>	<i>page no.</i>
1.	<i>locations of ectopic parathyroids</i>	8
2.	<i>D.D of Hypercalcemia</i>	58
3.	<i>Biochemical features of HPT</i>	65
4.	<i>Indications of parathyroidectomy</i>	85
5.	<i>parathyroid localization studies</i>	89
6.	<i>Medications of Hypercalcemia</i>	155

List of abbreviations

1.25 (OH)2D3:	1-25-hydroxycholecalceferol
5-HIAA:	5-hydroxyindole- acctic acid
AT Pase:	Adenosine Triphosphatase.
BMD:	Bone mineral density.
Ca2+:	Calcium ions or ionized calcium.
CAMP	Cyclic adenosine monophosphate.
Cc:	Cubic centimeters:
Ccr & Cca:	Creatinine clearance & Calcium clearance
Cm:	Centimeter.
CT scanning:	Computed tomography scanning
Ctal:	Cortical thick ascending limb of loop of Henel.
EAMIP:	Endoscopically assisted, minimally invasive parathyroidectomy.
FHH:	Familial hypocalciuric hypercalcemia.
FLE:	Focused lateral exploration.
FNA:	Fine Needle Aspiration biopsy
GIT:	Gastrointestinal tract.
GTP:	Guanosine triphosphate
H:	Hydrogen ions.
IV:	Intravenous
ICMA:	Immunochemiluminometric
IOPTH:	Iintraoperative PTH measurement
iPTH:	Intraoperative rapid parathyroidhormone.
IRMA:	Immunoradiometric
LA:	Local anesthesia
Mg/dL:	Miligram per deciliter.
Mg/kg:	Miligram per kilogram
Mg:	Magnesium ions or ionized magnesium
MIP:	Minimally invasive parathyroidectomy.
MIRP:	Minimally invasive radio- guided parathyroidectomy

MIVAP:	<i>Minimally invasive videoscopically assisted parathyroidectomy.</i>
Mm:	<i>Millimeter</i>
MRI:	<i>Magnetic resonance imaging</i>
Na:	<i>Sodium ions.</i>
NaPi:	<i>Sodium – (inorganic) phosphate Cotransporters.</i>
NIH:	<i>National Institutes of Health.</i>
Nmol/L:	<i>Nano mol per liter.</i>
Pg/dL:	<i>Pico gram per deciliter.</i>
PTHrP:	<i>PTH-related protein</i>
SPECT:	<i>Single photon emission computed tomography.</i>
TC-MIBI:	<i>Technetium/2 Methoxy Iso Buty Isonitrite</i>
Th – Te subtraction scanning:	<i>Thallium 201- Technetium 99 subtraction scanning.</i>
UELA:	<i>Unilateral exploration under local anesthetic.</i>
VATS:	<i>Video- assisted thoracic surgery</i>

Introduction

Introduction

Hyperparathyroidism is a serious metabolic disorder, The incidence of hyperparathyroidism is about one in 20.000 people. It's fairly uncommon-actually sort of rare. Thus, most surgeons only see one patient with this disease per Year or two, It occurs in women more often than men , and the average age is about 58 years old , but people of any age can get it , The types of hyperparathyroidism is primary, secondary and tertiary hyperparathyroidism [**Gordon , 2006**].

The most common cause of excess hormone production (hyperparathyroidism) is the development of a benign tumor in one of the parathyroid glands. This enlargement of one parathyroid gland is called parathyroid adenoma which accounts for about 90% of all patients with primary hyperparathyroidism. Approximately 9% of all patients with primary hyperparathyroidism will have an enlargement of all four parathyroid glands, a term called parathyroid hyperplasia. In about 1% of primary hyperparathyroidism the cause may be due to cancer [**Ray Sahclian, 2006**].

Selective unilateral neck exploration guided by preoperative sestamibi (SM) scanning, is an effective surgical approach for the management of primary hyperparathyroidism [**Baliski et al., 2005**].

Since the initiation of maintenance dialysis and renal transplantation, the lives of patients with chronic renal failure have been prolonged, secondary hyperparathyroidism develops as a result of the metabolic alterations occurring in chronic renal failure, phosphate retention and hyperparathyroidism in conjunction with a decrease in the renal production of vitamin D3 reduce the serum calcium producing secondary hyperparathyroidism. Also, aluminum present in the dialysate water and in oral phosphate binder medications accumulates in bone and contributes substantially to the osteomalacia component of the disease.

Therapy should be directed toward controlling the serum phosphate level by dietary restriction, Tertiary hyperparathyroidism is a further stage in the development of reactive hyperplasia, where autonomy occurs, as the parathyroid no longer respond to physiological stimuli [**Koop, 2006**].

Accurate preoperative localization benefit both the patient and the surgeon by limiting exploration, thereby reducing the risk of complication such as damage to laryngeal nerve and normal adjacent parathyroid glands. So a reliable method for a preoperative localization of a parathyroid gland has long been sought to increase the cure rate of surgical treatment [**Kaplan, 1989**].

Surgical management of primary hyperparathyroidism is a very effective method.

Complications are infrequent and mortality is very low [**Libansky et al., 2004**].

Owing to Spectacular growth and the advances in the trends of localization and management of parathyroid disease we decided to put the subject again into light through a concise review demonstrating the current trends and advances in management.

Aim of The work

The aim of this work is to spotlight the recent trends in management of hyperparathyroidism regarding recent preoperative investigations and localization studies and new surgical and non-surgical methods of treatment

Chapter 1
Anatomy of
Parathyroid Glands