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Role of Thoracic Surgery in Patients with Thymus Gland Pathology

Essay

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قالوا

سبحانك لا علم لنا
إلا ما علمتنا إنك أنت
العليم العظيم

صدقة الله العظيم

سورة البقرة الآية: ٣٢



وَأَنْزَلَ اللَّهُ عَلَيْكَ
الْكِتَابَ وَالْحِكْمَةَ
وَعَلَّمَكَ مَا لَمْ تَكُنْ
تَعْلَمُ وَكَانَ فَضْلُ
اللَّهِ عَلَيْكَ عَظِيمًا

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Candidate



Mahmoud Gamal Gaber

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List of Abbreviations

Abbr.	Full-term
ACh	: Acetyl choline
AchR	: Acetyl choline receptor
ADH	: Anti diuretic hormone
AIRE	: Autoimmune regulator
APECED	: Autoimmune polyendocrinopathy candidiasis ectodermal dystrophy
CO₂	: Carbon dioxide
CSR	: complete stable remission
CT	: Computerized tomography
cTECs	: Cortical thymic epithelial cells
DC	: Dendritic cells
DGA	: DiGeorge Anomaly
DP	: Double-positive
FH	: Follicular hyperplasia
G-CSF	: Granulocyte colony stimulating factor
GH	: Growth hormone
IgG	: Immunoglobulin G
IL	: Interleukin
ITMIG	: International Thymic Malignancy Interest Group
IVI	: Intravenous immunoglobulin
LOMG	: Late-onset MG
M-CSF	: Macrophage CSF
MEN-type I	: multiple endocrine neoplasia syndrome type I
MG	: Myasthenia Gravis
MGFA	: Myasthenia Gravis Foundation of America

MHC	: Major Histocompatibility Complex
MRI	: Magnetic resonance imaging
MSAB	: Medical Scientific Advisory Board
MTC	: MultilocularThymic Cyst
mTEC	: Medullary thymic epithelial cells
MTH	: Massive thymic hyperplasia
NKT	: Natural killer T
RCTs	: randomized controlled trials
RCTs	: Randomized controlled trials
RE	: Reticulo-epithelial
RNS	: Repetitive nerve stimulation
RRs	: Relative rates
S1P1	: Sphingosine 1-phosphate type 1 receptor
SFEMG	: Single- fiber electromyography
SNMG	: Seronegative MG
SP	: Single positive
TCR	: T-cell receptors
TCT	: Transcervical approaches
TF5	: Thymosinfraction 5
TF-5	: Thymosinfraction 5
THF	: Thymichumoral factor
TNC	: Thymic nurse cells
TP-F	: pentapeptide thymopentin
Treg-cells	: regulatory T-cells
TTH	: True thymic hyperplasia
VATS	: Video assisted thoracoscopic surgery
WHO	: World Health Organization

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Introduction

The thymus is a gland that over the last two centuries has generated great awareness not only from the anatomical perspective but also for the physiological and pathological roles it plays in many disease processes. Prior to the early studies on its anatomy and physiology in the 18th century, the thymus was believed to perform unusual and curious functions such as purification of the nervous system, providing a protective cushion for the vasculature of the superior mediastinum, fetal nourishment, or more spiritual roles such as being the seat of the soul, among others (*Miller, 2002*).

During the 19th century important anatomical/physiological studies took place focusing on the role of the thymus in pathological conditions. However, it was not until the middle of the 19th century that a more comprehensive analysis of the role of the thymic gland and its role in pathogenesis began to emerge (*Doyle, 2006*).

Currently, while the knowledge gained on the diverse aspects of the thymic gland has furthered understanding of its role in a gamut of processes, more knowledge is still being sought, and by no means is a full understanding of the gland's physiology and pathology complete. Different aspects, including its purported endocrine function, its

association with other autoimmune diseases like multiple sclerosis, rheumatoid arthritis, and lupus erythematosus, among others, are under evaluation and research (*Takahama, 2006*).

In addition, surgical modalities in the treatment of pathological conditions affecting the thymus gland are also under evaluation and scrutiny in order to provide the best methodology. Therefore, daily practice regarding diseases involving the thymic gland has become a multidisciplinary approach in which experts, including radiologists, neurologists, immunologists, pathologists, oncologists, and surgeons, participate in the evaluation of patients (*Fang et al., 2007*).

New pathological and oncological classifications are carefully presented and discussed; the role of thymopathies with special interest on myasthenia gravis is clearly addressed; and the role of the different diagnostic imaging modalities, including PET and the different surgical techniques, is carefully reviewed (*Hanisch et al., 2006*).

Special emphasis is given to the surgery of the thymus: the different approaches including open conventional, open video-assisted, totally endoscopic, and robotic techniques, and the types of interventions including the complex techniques in superior vena cava syndrome, and the re-interventions (*Shrager et al., 2006*).

As would be expected, an accurate analysis of the anesthesiological and intensive care problems is also presented. From the oncological point of view, the role of radiation, chemotherapy, and complementary treatments (steroids, octreotide) is highlighted (*Bagshaw O, 2007*).

In the section of myasthenia gravis, the effectiveness of modern therapeutic protocols, the use of multimodal therapy, and the follow-up of patients are carefully discussed (*Romi et al., 2005*).

Aim of the Work

The aim of work is to review the role of thoracic surgery in patients with thymic gland pathology and how to assess different thymic gland diseases with special interest on myasthenia gravis and thymic gland tumors with explaining different surgical approaches for thymic resection.