**Faculty of Medicine**
**Ain Shams University**
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# Role of Thoracic Surgery in Patients with Thymus Gland Pathology

## Essay

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in Cardiothoracic Surgery

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سورة البقرة الآية: ٣٢


وأنزل الله عليك
الكتاب والحكمة
وعلَّمَكَ مَا لَمْ تَكُن
تَعْلَمُ وكَانَ فَضْلُ
اللَّهِ عَلَيْكَ عَظِيماً
صدق الله العظيم
سورة النساء الآية
(113)

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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 19$^{th}$ 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.