

Magnetic Resonance Imaging of Brain for Detection of Morphological Changes in Children with Beta-Thalassemia Major

Thesis

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By

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List of Abbreviations

Abb.	Meaning
ALT	Alanine amino transaminase
BMI	Body mass index
BTM	Beta thalassemia major
CBC.....	Complete blood count
CP	Choroid plexus
DFO	Desferoxamine
DFP.....	Deferiprone
DFX.....	Deferasirox
FSH.....	Follicle stimulating hormone
GVHD	Graft versus host disease
Hb	Hemoglobin
LH	Leutinisising hormone
LIC.....	Liver iron concentration
MRI.....	Magnetic resonance imaging
PRBCs	Packed red blood cells
RBCs	Red blood cells
RDW	Red cells distribution width
TI.....	Thalassemia intermedia
TIAs:	Transient ischemic attacks
TIBC	Total iron binding capacity
UCB	Umbilical cord blood
VTEs	Venous thromboembolic events
WBC.....	White blood cells



Introduction



INTRODUCTION

Beta-thalassemias are a group of hereditary blood disorders characterized by anomalies in the synthesis of the beta chains of hemoglobin resulting in variable phenotypes ranging from severe anemia to clinically asymptomatic individuals (*Galanollo and Origa, 2010*).

The hemoglobin disorders are the most common clinically serious single gene disorders in the world. In Egypt, beta-thalassemia is the most common type with a carrier rate varying from 5.3 to $\geq 9\%$ and a So, it was estimated that 1,000/1.5 million per year live births will suffer from thalassemia disease in Egypt (total live births 1,936,205 in 2006) (*Elbeshlawy and Youssry, 2009*).

Children with untreated thalassemia major have been reported to experience transient ischemic attacks, silent infarctions that result in brain injury, but often with subtle or undetectable clinical symptoms, stroke (*Armstrong , 2005*).

In most cases, neurological involvement does not initially present with relevant signs or symptoms. (i.e., is subclinical) and can only be detected during neurophysiological or neuroimaging (*Zafeiriou et al., 2006*).

Iron over load produces toxic build up in many organs, including liver, endocrine glands, and heart (*Vogiatzi et al., 2009*).

Deposition of iron in the anterior pituitary gland may cause hypogonadotropic hypogonadism and growth hormone deficiency, leading to delayed puberty as the most frequent endocrine complication of beta thalassemic patients (*Jensen et al., 1997*).

Magnetic resonance imaging (MRI) has been used for evaluation of pituitary gland damage due to siderosis (*Argyropoulou et al., 2001*).

Several studies have indicated signal intensity reduction of anterior pituitary gland caused by magnetic field of iron (*Ambrosetto et al., 1998*).

Others have shown pituitary gland height or volume decrease created by gonadotropin cell death due to iron toxicity (*Argyropoulou et al., 2001, Chatterjee et al., 1998, Fujisawa et al., 1988, Lau et al., 1988*).



Aim of the Work



AIM OF THE WORK

The aim of our study is to reveal any abnormal brain MRI findings in patients with beta-thalassemia major & uncover relation between MRI findings & iron overload in those patients.



Review of Literature





Chapter 1

Thalassemia

