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

Thesis

Submitted for Partial Fulfillment of Master Degree in Pediatrics

By

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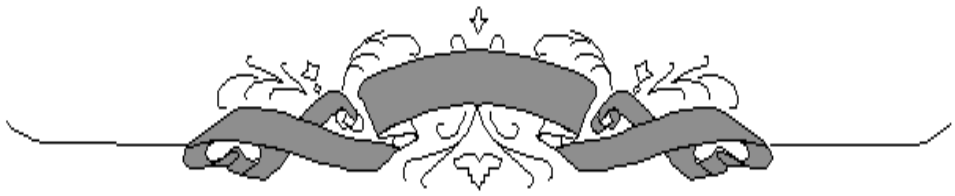
List of Abbreviations

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 .....:	Leutinising 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

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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 ≥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).***

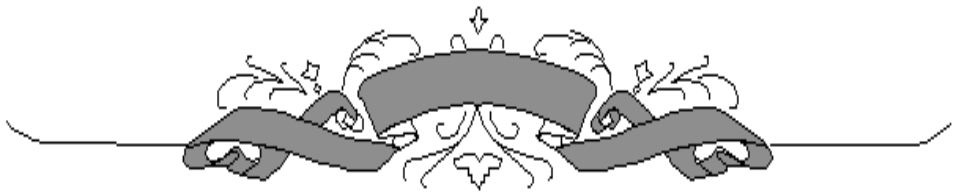
Iron over load produces toxic build up in many organs, including liver, endocrine glands, and heart ***(Vogiatzi et al., 2009).***

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 ***(Ambrostetto 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

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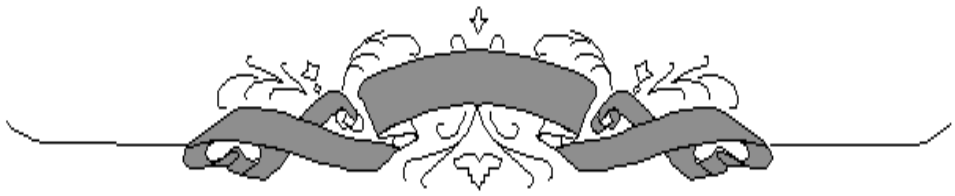
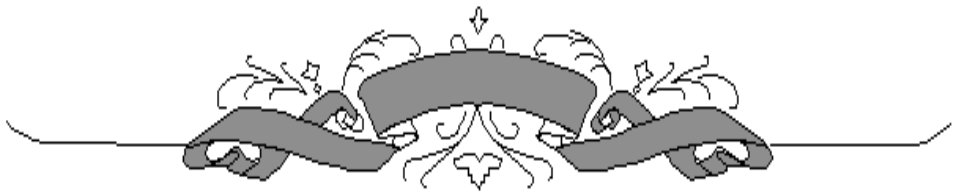
The aim of our study is to reveal any abnormal brain MRI findings in patients with beta-thalassemia major & uncover relation between MRI findings & iron overload in those patients.



Review of Literature



Chapter 1

Thalassemia