الرنين المغناطيسى فى حالات التشوهات الخلقية فى القشرة المخية

رسالة

توطئة للحصول على درجة الماجستير فى الأشعة التشخيصية

مقدمة من

طبيب / داليا محمد مدحت الموصلى

بكالوريوس الطب و الجراحه

تحت إشراف

أ.د/ هناء عبد القادر عبد الحميد أحمد

أستاذ الاشعة التشخصية

كلية الطب- جامعة عين شمس

د/ شيماء عبد الستار محمد

أستاذ مساعد الاشعة التشخصية

كلية الطب- جامعة عين شمس

كلية الطب

جامعة عين شمس

2017

MR Imaging of Malformations of Cortical Development

Thesis

Submitted for partial fulfillment
of master degree in Radiodiagnosis

Presented by

Dalia Mohamed Medhat El-Mossly

M.B., B.Ch.

Supervised by

Prof. Dr Hanaa Abd ElKader Abd ElHamid Ahmed

Professor of Radiodiagnosis
Faculty of Medicine
Ain Shams University

Dr. Shaimaa Abdelsattar Mohammad

Assistant Professor of Radiodiagnosis
Faculty of Medicine
Ain Shams University

Faculty of Medicine
Ain Shams University
2017

وَقُلِ اعْمَلُوا فَسَيَرَى اللَّهُ
عَمَلَكُمْ وَرَسُولُهُ وَالْمُؤْمِنُونَ

سورة التوبة رقم الأية ١٠٥

First and foremost, praise is to Allah, to whom I relate any success in achieving any work in my life.

I wish to express my deepest thanks, gratitude and appreciation to ***Prof. Dr. Hanaa Abd Elkader***, for her sincere encouragement, constant advice and valuable guidance throughout the performance of this work.

I owe special thanks, gratitude and appreciation to ***A. Prof. Dr. Shaimaa Abd ElSattar*** for his close supervision, continuous advice and support which gave me the best guidance during different stages of this work.

I would like to thank my professors, my family, and my colleagues, for their support and moral encouragement.

Dalia Mohamed El-Mossly

List of Contents

List of Abbreviations	
CC	Corpus Callosum
CINCA	Chronic Infantile Neurological, Cutaneous and Articular syndrome
CNS	Central nervous system
CSF	CerebroSpinal Fluid
DNET	Dysembryoplastic neuroepithelial tumors
DTI	Diffusion Tensor Imaging
FCD	Focal cortical dysplasia
FSE	Fast spin echo
GDD	Global developmental delay
GG	Ganglioglioma
HMEG	Hemimegalencephaly
HTP	Heterotopia
IVM	Isolated ventriculomegaly
LIS	Lissencephaly
MCD	Malformations of Cortical Development
MRI	Magnetic Resonance Imaging

List of Abbreviations

MRS	Magnetic Resonance Spectroscopy
NAA	N-acetyl acetate
PMG	Polymicrogyria
P-value	Probability value
PVH	Periventricular heterotopia
SCZ	Schizencephaly
SD	Standard Deviation
SGP	Simplified gyral pattern
TS	Tuberous sclerosis
VM	Ventriculomegaly

List of Figures

List of Tables

Introduction

Malformations of cortical development (MCDs) can be defined as structural abnormalities of the cerebral cortex caused by derangements in the developmental process due to various underlying etiologies, that could be genetic mutations, environmental factors ***(Mischel et al., 1995)*** occured during antenatal, perinatal, or postnatal period, during corticogenesis or after corticogenesis ***(Kumar et al., 2016).***

MCDs are classified based on the earliest disruption of the developmental process, which include abnormal neuronal and glial proliferation or apoptosis, neuronal migration, postmigrational development and finally MCDs not otherwise classified. Malformations resulting from abnormalities of cell proliferation are microcephaly, megalencephaly, and cortical dysgeneses with abnormal cell proliferation. Disorders of neuronal migration may cause heterotopia, lissencephaly, subcortical heterotopia and sublobar dysplasia and also cobblestone malformations. Malformations secondary to abnormal postmigrational development can result in polymicrogyria,

schizencephaly, focal cortical dysplasias and postmigrational microcephaly ***(Barkovich et al., 2012).***

Disorders could be also classified according to their mode of inheritance (autosomal recessive, autosomal dominant, X-linked, polygenic in rare cases, etc.) and whether the disorder is clinically or genetically defined. therefore, this could help clinicians to classify their patients more easily, specially in complicated disorders ***(Barkovich et al., 2012)***.

MCDs usually clinically present in childhood with epilepsy, developmental delay and focal neurological signs, while other patients may have normal or almost normal cognitive function with no seizures ***(Montenegro et al., 2007).***

Structural imaging findings of brain, especially magnetic resonance imaging (MRI) findings are the most important non-invasive technique for its diagnosis, which has greatly improved with the progress in the neuroimaging techniques, thus smaller lesions have been described ***(Alayón S , 2007).*** Many studies have found that underlying MCDs could be present in 23-26% cases of intractable or medication-

resistant childhood epilepsy in children and adolescents. So, MCDs should be excluded in every case of developmental delay, epilepsy or congenital neurological deficits by neuroimaging techniques ***(Kumar et al., 2016).***