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وَقُلْ اَعْمَلُوا فَسَيَرَى اللّٰهُ
عَمَلَكُمْ وَرَسُولُهُ وَالْمُؤْمِنُونَ



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List of Contents

Title	Page no.
Table of contents	I
List of abbreviations	II
List of figures	IV
List of tables	VIII
Introduction & Aim of the work	1
Review of literature	
• Embryology and Classification of malformations of cortical development (MCD)	5
• MRI characteristic features of MCD	23
Patients and Methods	63
Results	68
Illustrative cases	84
Discussion	105
Summary and conclusion	109
References	112
Arabic summary	-

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

Fig. No.	Title	Page No.
Fig.(2.1)	Embryological Brain Development	6
Fig.(2.2)	Normal multilayered MRI appearance of fetal brain early in gestation.	10
Fig.(2.3)	Normal smooth surface of the fetal brain early in gestation.	11
Fig.(2.4)	MRI appearance of normal fetal brain maturation.	12
Fig.(2.5)	A suggested scheme for detecting maturation of cerebral sulcation.	13
Fig.(2.6)	Normal midsagittal magnetic resonance imaging (MRI) anatomy of the fetal brain.	16
Fig.(2.7)	Coronal T2 WI demonstrates horizontally oriented hippocampi.	18
Fig.(2.8)	MRI appearance of fetal pachygyria.	24
Fig.(2.9)	MRI demonstrating right superior front-parietal focal cortical dysplasia.	26
Fig.(2.10)	Imaging features of tuberous sclerosis.	29
Fig.(2.11)	MRI appearance of fetal subependymal giant astrocytoma.	30
Fig.(2.12)	11-year-old girl with seizures secondary to dysembryoplastic neuroepithelial tumor.	32
Fig.(2.13)	Patient with infantile gangliogliomas.	33
Fig.(2.14)	Sorting of microcephalies by morphologic characteristics.	35

Fig. No.	Title	Page No.
Fig.(2.15)	Imaging features of hemimegalencephaly.	36
Fig.(2.16)	MRI demonstrating type I Lissencephaly.	38
Fig.(2.17)	Imaging features of Schizencephaly.	40
Fig.(2.18)	MRI demonstrating encephalomalacia in surviving twin after demise of monochorionic co-twin.	41
Fig.(2.19)	Ventriculomegaly and cerebral clefts at 30 weeks gestational age.	42
Fig.(2.20)	Imaging features of subcortical band heterotopia.	44
Fig.(2.21)	Imaging features of periventricular nodular heterotopia.	45
Fig.(2.22)	MRI features of polymicrogyria.	46
Fig.(2.23)	MRI of patient with many aspects of tubulinopathies.	48
Fig.(2.24)	Fetal MRI appearance of agenesis of corpus callosum.	51
Fig.(2.25)	Partial agenesis of the corpus callosum.	52
Fig.(2.26)	Fetal MRI appearance of pontocerebellar hypoplasia.	54
Fig.(2.27)	MRI of a fetus aged 22 gestational weeks with Dandy–Walker malformation.	56
Fig.(2.28)	MRI of a fetus with corpus callosum agenesis and Dandy–Walker malformation.	57
Fig.(2.29)	Spectrum of fetal posterior fossa abnormalities as depicted by MRI scan.	58

Fig. No.	Title	Page No.
Fig.(4.1)	Characteristics of the study population.	70
Fig.(4.2)	Bar chart illustrating the incidence of polymicrogyria with main clinical presentation.	72
Fig.(4.3)	Bar chart illustrating the incidence of tuberous sclerosis with main clinical presentation.	73
Fig.(4.4)	Bar chart illustrating the incidence of focal cortical dysplasia with main clinical presentation.	74
Fig.(4.5)	Other anomalies associating malformations of cortical development.	76
Fig.(4.6)	MRI illustrating different forms of corpus callosum abnormalities.	79
Fig.(4.7)	MRI illustrating posterior fossa anomalies.	80
Fig.(4.8)	MRI illustrating absent septum pellucidum in a case with closed-lip-schizencephaly.	81
Fig.(4.9)	Associated syndromes with different types of cortical malformations.	83
Fig.(4.10)	Case (1): 6-month-old patient with left hemimegalencephaly with cobblestone lissencephaly and left cerebellar dysplasia.	84
Fig.(4.11)	Case (2): 7-year-old patient with right parietal focal cortical dysplasia.	86
Fig.(4.12)	Case (2): MRS shows subtle reduction of NAA in a case with right parietal focal cortical dysplasia.	87
Fig.(4.13)	Case (3): Axial T2, Axial, Coronal and Sagittal T1 showing the imaging features of bilateral perisylvian polymicrogyria	88
Fig.(4.14)	Case (4): A 10-year-old with band subcortical heterotopia and partial corpus callosal agenesis.	91
Fig.(4.15)	Case (5): A 5-year-old patient with right open lip schizencephaly, PMG, CC hypoplasia and absent septum pellucidum.	92

Fig. No.	Title	Page No.
Fig.(4.16)	Case (6): MRI showing right sided perisylvian PMG associated with closed lip schizencephaly.	92
Fig.(4.17)	Case (7): MRI showing microcephaly with simplified gyral pattern and CC agenesis.	94
Fig.(4.18)	Case (8): Imaging features of tuberous sclerosis with giant cell astrocytoma.	95-96
Fig.(4.19)	Case (9): a 45 day old patient with bilateral schizencephaly open lip on right side & closed on left side associated polymicrogyria.	97
Fig.(4.20)	Case (10): MRI showing left parietal DNET.	99
Fig.(4.21)	Case (10): MRS findings in a low grade tumor (DNET).	100
Fig.(4.22)	Case (11): MRI showing a case of Walker Warburg Syndrome.	101
Fig.(4.23)	Case(12): MRI showing bilateral subependymal heterotopia and left frontal subcortical heterotopia associated with PMG	103-104

List of Tables

Table No.	Title	Page No.
Table (2.1)	Schematic Approach for Normal MRI Appearances of the Developing Brain Features, Pitfalls in Diagnosis, and Recommendations to Avoid Misdiagnosis.	21
Table (2.2)	Classification of malformations of cortical development.	25
Table (2.3)	New classification system of focal cortical dysplasia by Blumcke et al. 2011.	27
Table (2.4)	Mechanisms for development of ventriculomegaly.	61
Table (4.1)	Characteristics of the study population.	69
Table (4.2)	Incidence of various types of MCD with main clinical presentation.	71
Table (4.3)	Other anomalies associating malformations of cortical development.	77
Table (4.4)	Number of patients with multiple abnormalities.	82

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*) occurred 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*).