



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم



MONA MAGHRABY



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شبكة المعلومات الجامعية التوثيق الإلكتروني والميكروفيلم



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التوثيق الإلكتروني والميكروفيلم

جامعة عين شمس التوثيق الإلكتروني والميكروفيلم

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MONA MAGHRABY



Role of Susceptibility Weighted Images (SWI) in Grading of Brain Glioma

A Thesis

*Submitted for Partial Fulfillment of M.D. Degree in
Radio-Diagnosis*

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2020

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قالوا

سببناك لا علم لنا
إلا ما علمتنا إنك أنت
العليم العظيم

صدق الله العظيم

سورة البقرة الآية: ٣٢

Acknowledgment

*First and foremost, I feel always indebted to **ALLAH**, the
Most Kind and Most Merciful.*

*I'd like to express my respectful thanks and profound gratitude to **Dr. Amany Moh. Rashad Abdel-Aziz**, Professor of Radio-diagnosis Faculty of Medicine - Ain Shams University for her keen guidance, kind supervision, valuable advice and continuous encouragement, which made possible the completion of this work.*

*I am also delighted to express my deepest gratitude and thanks to **Dr. Jougan Jaha**, Assistant Professor of Radio-diagnosis Faculty of Medicine - Ain Shams University, for her kind care, continuous supervision, valuable instructions, constant help and great assistance throughout this work.*

*I am deeply thankful to **Dr. Sameh Roshdy Jawadros**, Lecturer of Neurosurgery Faculty of Medicine - Ain Shams University, for his great help, active participation and guidance.*

*I wish to introduce my deep respect and thanks to **Dr. Fady Mamdouh**, Lecturer of Radio-diagnosis Faculty of Medicine - Ain Shams University, for his kindness, supervision and cooperation in this work.*

Ayah Abdelaziz

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List of Abbreviations

Abb.	Full term
1p/19q	Short arm of chromosome 1”1p” & the long arm of chromosome 19 “19q”.
1.5 T	1.5 Tesla
3T	3 Tesla
3D	Three dimensional
ATRX.....	Alpha thalassemia/mental retardation syndrome X-linked chromatin remodeler
CBV	Cerebral blood volume
CE-T1WI	Contrast enhanced T1WI
CNS	Central nervous system tumors
CSF.....	Cerebro-spinal fluid
CT.....	Computed tomography
DLGNT.....	Diffuse leptomeningeal glioneuronal tumour
DWI	Diffusion weighted imaging
FLAIR.....	Fluid-attenuated inversion-recovery
GBM	Glioblastoma multiforme
H3 K27 M	mutation gene encoding H3 histone variants
HP.....	High pass
HR-SWI	High resolution SWI
ICAs.....	Internal carotid arteries
IDH.....	Isocitrate dehydrogenase
IR	Inversion recovery
ITSS.....	Intratumoral susceptibility signals
Min IP/mIP.....	Minimum intensity projections images
MRI.....	Magnetic resonance imaging
NOS	Not otherwise specified
PXA.....	Pleomorphic xanthoastrocytoma
SE	Spin echo
SEGA.....	Subependymal giant cell astrocytoma

List of Abbreviations Cont...

Abb.	Full term
SNR.....	Signal to noise ratio
SWI.....	Susceptibility weighted imaging
T1WI.....	T1 weighted image
T2WI.....	T2 weighted image
TIM	Total image matrix
TE	Echo time
TR	Repetition time
TP53	Tumor protein p53
TSC	Tuberous Sclerosis complex
WHO.....	World Health Organization

INTRODUCTION

Cerebral gliomas are the most common and devastating primary brain tumors. Although these tumors are traditionally considered to be arising from normal glial cells, the origin of the tumors remains undetermined. More recently, neural stem cells are proposed to be the source of glioma. The World Health Organization (WHO) published a classification system of central nervous system tumors (CNS) in 1979 and subsequently revised the system in 2000 and 2007 (*Kao et al., 2013*). In 2016 the WHO published a new classification system for brain glioma (*Louis et al., 2016*).

The grading of gliomas mainly relies on histological features, including cellularity, nuclear atypia, mitotic activity, vascularity, and necrosis, observed on light microscopy with the aid of immunohistochemistry (*Kao et al., 2013*).

Imaging plays a central role in diagnosis, characterization, surveillance and therapeutic monitoring of intracranial tumors. Magnetic resonance imaging (MRI) using T1 weighted image (T1WI), T2 weighted image (T2WI) and gadolinium enhanced sequences provides high resolution multiplanar structural information, and substantially improves tissue characterization compared with computed tomography (CT) (*Upadhyay & Waldman, 2011*).