# MIB-1 AS A PROGNOSTIC FACTOR IN MENINGIOMA

Thesis Submitted for the Partial Fulfillment of the Master Degree in Pathology

Ву

Manal Mohamed El-Mahdy

M.B., B.Ch

Supervised by

Prof. Dr. Salwa Ibrahim Ali El-Haddad

Professor of Pathology
Faculty of Medicine-Ain Shams University

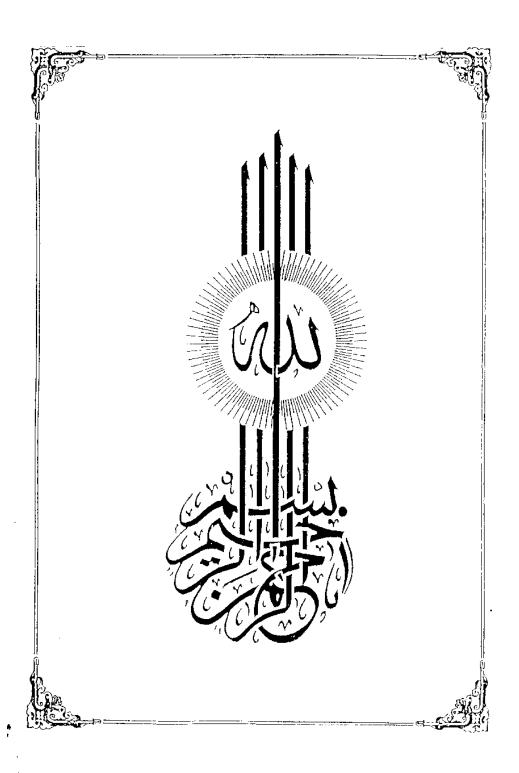
Prof. Dr. Hosam Khalil El-Hoseiny

Professor of Neurosurgery
Faculty of Medicine-Ain Shams University

Prof. Dr. Nahed Samy Saied Khamis

Professor of Pathology
Faculty of Medicine-Ain Shams University

Faculty of Medicine Ain Shams University 1998



سدالله الرحمن الرحيم قالوا سبحانك لا علم لنا إلا ما علماننا، إنكأنت العليم المكيم صدق الله العظيم صدق الله العظيم

#### Acknowledgment

Before all, thanks to GOD.

I would like to express my profound gratitude and sincere thanks to Prof. Dr. Salwa Ibrahim El-Haddad, Professor of Pathology, Faculty of Medicine, Ain Shams University. This work wouldn't have been completed without her generous advice, continuous guidance and kind supervision. Her practical and scientific support is never to be forgotten.

I also wish to express my great indebtedness to Prof. Dr. Nahed Samy Khamis, Professor of Pathology, Faculty of Medicine, Ain Shams University for her kind encouragement and precise instructions throughout this thesis.

To Prof. Dr. Hosam Khalil El-Hoseiny, Professor of Neurosurgery, Faculty of Medicine, Ain Shams University, I owe a lot of thanks for his unlimited help and motivation especially the clinical part of this study.

Also, my thanks go to Prof. Dr. Zeinab Kamar, Professor of Pathology, Faculty of Medicine, Ain Shams University for her kind supervision on the procedures of immunostaining which is a corner stone in my work.

Last but not least, I can't forget the valuable cooperation, kind help, fruitful suggestions of Prof. Dr. Bernd Scheithauer, Head of Neuropathology Dept. Mayo Clinic, U.S.A., also he had helped me in photographing some of our cases presented to him, in addition to his evaluation of the immunostaining technique.

## List of contents

	Page	
Introduction and Aim of the Work	1	
Review of Literature	3	
<ul> <li>Anatomy and histology of the meninges</li> </ul>		
Epidemiology of meningioma	8	
Aetiology of meningioma	11	
<ul> <li>Location</li> </ul>	14	
<ul> <li>Clinical Presentation and diagnostic imaging techniques</li> </ul>	18	
<ul> <li>Histogenesis of meningiomas</li> </ul>	29	
Classification of meningeal tumours	33	
<ul> <li>Principles of immunostaining</li> </ul>	68	
Different measurements of cell proliferation	75	
<ul> <li>The use of MIB-1 in meningiomas</li> </ul>	82	
<ul> <li>Recurrent meningioma and the use of proliferative</li> </ul>	86	
markers	89	
• Treatment		
Factors implicated prognosis	92	
Material and Methods	94	
Results	99	
Discussion		
Summary and Conclusion		
References		
Arabic Summary		



### **List of Abbreviations**

ABC: Avidin Biotin Complex

AgNORs: Silver stained nucleolar organizer regions

BUdR: Bromodeoxyuridine labelling index

CEA: Carcinoembryonic antigen

CT: Computed tomography

EMA: Epithelial membrane antigen

G: Gap

Mitosis

MAb: Monoclonal antibody

M:

MRI: Magnetic resonance imaging

PAP: Peroxidase-antiperoxidase method

PAS: Periodic acid schif

PCNA LI: Proliferating cell nuclear antigen labelling index

PET-FDG: Positron emission tomography using fluro-2-deoxy-

D-glucose

PI: Proliferative index

PNETs: Primitive neuroectodermal tumors

S: Synthesis



# Legend for figures

No	i iguiç	Page
1	rachnoid granulation and its relation to the superior	r 6
2	sagittal sinus	
4	Various locations of meningioma and their relative occurrence	15
3		
Ů	<ul><li>[a] Chordoid meningioma with adipose metaplasia</li><li>[b] Haemangiopericytoma</li></ul>	46
4	Meningioma (EM)	58
5		68
6	Direct peroxidase-conjugated antibody method Two-step indirect method	69
7	Three step indirect method	70
8	Soluble enzyme-immune complex	71
9	Avidin Riofin Complex (ARC)	73
10	Avidin Biotin Complex (ABC) method	75
11	Cell populations and the phases of the cell cycle Sex distribution among the studied cases	100
12	Tumor location distribution among the studied cases	101
13	INTERCORT biotomolikalanda	103
	among the studied cases	106
14	Transitional meningioma	
15	Meningothelial meningioma	106
16	Psammomatous meningioma	106
17	Angiomatous meningioma	107
18	Fibroblastic meningioma	107
19	Microcystic meningioma	108
20	Atypical meningioma	108
21	Atypical meningioma	109
22	Atypical meningioma	109
23	Malignant meningioma	110
24	Malignant meningioma	110
	- Signific	111

25	Malignant meningioma	111
26	Malignant meningioma	112
27	MIB-1 immunostaining of a meningioma nuclei	115
28	MIB-1 immunostaining of a lymphoma (positive	115
	control)	116
29	Classical meningioma stained with MIB-1 MAb (low	110
	PI)	110
30	Classical meningothelial meningioma stained with	116
	MIB-1 MAb (low PI)	447
31	Atypical meningioma stained with MIB-1 MAb (high	117
	PI)	
32	Malignant meningioma stained with MIB-1 MAb	117
	(high PI)	
33	Mean level of MIB-1 SI in the main three	118
	histopathological groups	
34	Mean level of MIB-1 SI in non recurrent and	119
- '	recurrent groups of benign meningiomas	

#### List of tables

No.	- Table	Page
1	Incidence of meningiomas	9
2	Clinical presentations and radiographic features	24
	sccording to tumor location	
3	Histopathological classification scheme of Russel and Rubinstein	33
4	World Health Organization (WHO) classification of	34
	tumours of meninges (1993)	0.
5	Previous WHO classification of tumors of the	35
	meninges (1979)	
6	Meningioma variants and their differential diagnosis	51
7	Levels of MiB-1 SI in the main three	113
_	histopathological subtypes	
8	Levels of MIB-1 St in the non-recurrent and	114
_	recurrent groups	
9	Correlation between MIB-1 SI and age	120
10	Correlation between MIB-1 SI and sex	120
11	Correlation betweem MIB-1 SI and tumour location	121
12	Correlation between the main three variants of	121
40	meningioma according to MIB-1 SI	
13	Comparison between benign and atypical groups	122
	regarding MIB-SI	
14	Comparison between benign and malignant groups	122
	regarding MIB1-SI	
15	Comparison between atypical and malignant groups	123
	regarding MIB-SI	120
16	Comparison between non-recurrent and recurrent	123
47	groups regarding MiB-1 St	.20
17	Comparison between different grades of	123
	meningioma regarding MIR-1 SI	

