

MAGNETIC RESONANCE IMAGING OF ORBITAL DISEASES

essay

*submitted in partial fulfillment of master degree in
ophthalmology*

Presented by

Assaf
Ahmed H. Assaf

M.B.B.Ch.

Supervised by

Prof. Dr. Hamed A. Rabie

Professor of Ophthalmology - Ain Shams University

Assist. Prof. Dr. Zafer F. Ismail

**Assistant Professor of Ophthalmology - Ain Shams
University**

Dr. Khalid E. Allam

Lecturer of Radiology - Ain Shams University

Ophthalmology Department

Faculty of medicine- Ain Shams University

Cairo - EGYPT

1996

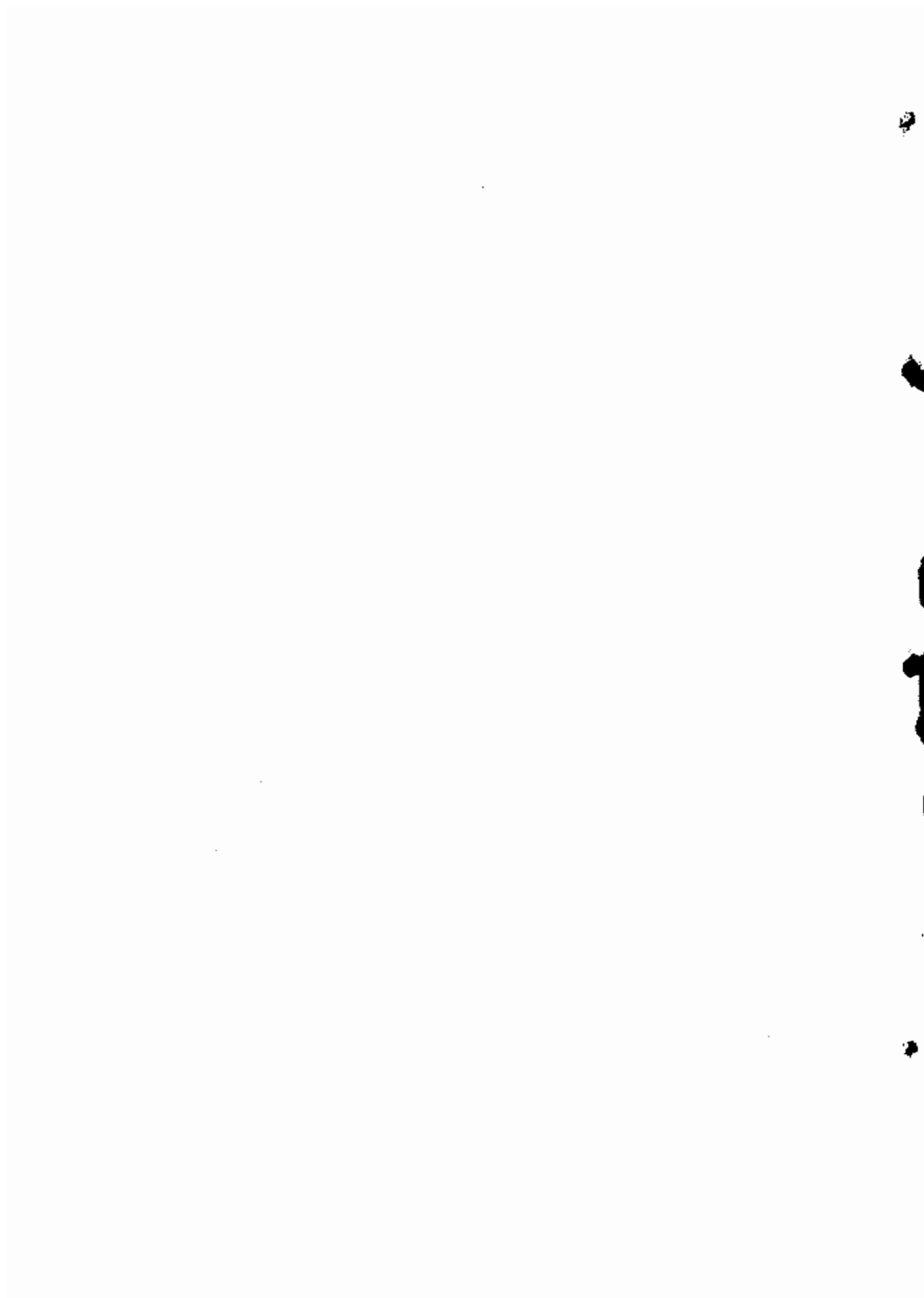




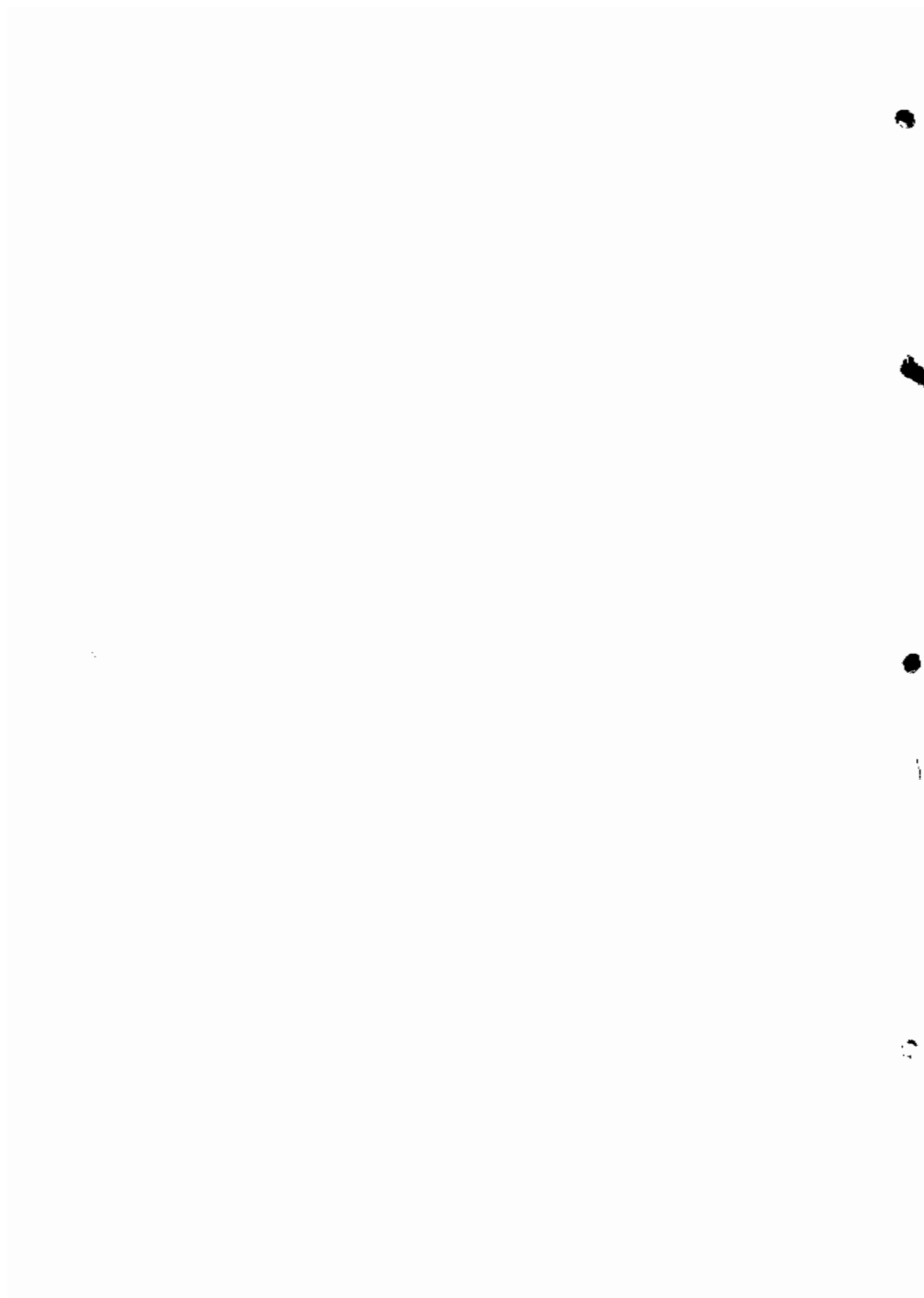
بسم الله الرحمن الرحيم

"وقل رب زدني علما"

صدق الله العظيم



This work is dedicated to my family



ACKNOWLEDGMENTS

First and foremost, I am extremely grateful to Prof. Dr. HAMID RABIE and Assist. Prof. Dr. ZAFER ISMAIL for taking the time and care to review this work and helping me with their priceless guidance.

I would also like to thank Dr. KHALID ALLAM for supplying me with material without which this research could have never been written.

Lastly I would like to acknowledge Dr. Osman Zico who drew my attention on MR as a promising investigative tool in Ophthalmology, and Dr. Mamdouh El-Kafrawy for his very helpful suggestions and encouragement to pull this work through its final phases.



CONTENTS

CHAPTER 1:

INTRODUCTION & AIM OF THE WORK 1

CHAPTER 2:

TECHNIQUES OF MAGNETIC RESONANCE IMAGING 5

<i>Magnetic Resonance versus Computed Tomography</i>	6
<i>Limitations of Magnetic Resonance Imaging</i>	7
<i>Contraindications of Magnetic Resonance Imaging</i>	7
<i>Basics of Magnetic Resonance Imaging</i>	9
<i>Imaging Parameters</i>	11
<i>Local Coils</i>	15
<i>Fat Suppression Techniques</i>	16
<i>Use of Contrast Material</i>	17
<i>Further Applications</i>	18
<i>Mapping Brain Function</i>	19
<i>Spectroscopy</i>	20

CHAPTER 3:

MAGNETIC RESONANCE IMAGING IN ANATOMY OF THE ORBIT 22

<i>The Eye Globe</i>	22
<i>The Extraocular Muscles</i>	28
<i>Nerves of The Orbit</i>	31
<i>Vessels of The Orbit</i>	34
<i>Lacrimal Gland</i>	36
<i>The Bony Orbit</i>	37

CHAPTER 4:

MRI OF VARIOUS ORBITAL LESIONS

39

I. INTRAOCULAR LESIONS

(A) Childhood lesions

<i>1-Retinoblastoma</i>	40
<i>2-Coat's Disease</i>	49
<i>3-Persistent Hyperplastic Primary Vitreous</i>	53
<i>4-Retinopathy of Prematurity</i>	58
<i>5-Toxocaral Endophthalmitis</i>	60

(B) Adulthood lesions

<i>1-Choroidal Melanoma</i>	65
<i>2-Choroidal Osteoma</i>	72

II. OPTIC NERVE AND SHEATH LESIONS

74

<i>1-Optic Nerve Glioma</i>	74
<i>2-Optic Nerve Sheath Meningioma</i>	78
<i>3- Optic Neuritis</i>	82

III. INTRACONAL LESIONS

84

<i>1-Cavernous Hemangioma</i>	84
<i>2-Lymphoma</i>	85
<i>3-Orbital pseudotumor</i>	87
<i>4-Orbital varix</i>	88

IV. EXTRAOCULAR MUSCLES LESIONS

92

<i>1-Thyroid Ophthalmopathy</i>	92
<i>2-Rhabdomyosarcoma</i>	95

V. EXTRAOCULAR LESIONS

97

<i>1-Lacrimal Gland Masses</i>	97
<i>2-Dermoid and Epidermoid Cysts</i>	100
<i>3-Orbital Cellulitis</i>	103
<i>4-Lacrimal System Drainage System</i>	104

CHAPTER 5:

SUMMARY & CONCLUSION	107
---------------------------------	------------

CHAPTER 6:

REFERENCES	112
-------------------	------------

CHAPTER 7:

ARABIC SUMMARY	
-----------------------	--

1

2

3

4

LIST OF FIGURES

fig. 1	flexible binocular surface coil	p.15
fig. 2	visual pathway	p.23
fig. 3	normal orbit	p.27
fig. 4	normal orbit	p.31
fig. 5	normal orbit	p.37
fig. 6	retinoblastoma	p.41
fig. 7	retinoblastoma	p.43
fig. 8	retinoblastoma	p.45
fig. 9	retinoblastoma	p.47
fig. 10	retinoblastoma	p.48
fig. 11	Coats' disease	p.49
fig. 12	Coats' disease	p.52
fig. 13	Coats' disease	p.53
fig. 14	PHPV	p.55
fig. 15	PHPV	p.56
fig. 16	PHPV	p.57
fig. 17	PHPV	p.57
fig. 18	ROP	p.60
fig. 19	toxocaral endophthalmitis	p.63
fig. 20	toxocaral endophthalmitis	p.63
fig. 21	toxocaral endophthalmitis	p.64
fig. 22	amelanotic melanoma	p.66
fig. 23	choroidal melanoma	p.67
fig. 24	choroidal melanoma	p.67

fig. 25	choroidal melanoma	p.69
fig. 26	optic glioma	p.76
fig. 27	optic glioma	p.76
fig. 28	optic glioma	p.77
fig. 29	optic meningioma	p.80
fig. 30	optic meningioma	p.81
fig. 31	cavernous hemangioma	p.86
fig. 32	cavernous hemangioma	p.90
fig. 33	orbital varix	p.91
fig. 34	endocrine ophthalmopathy	p.94
fig. 35	rhabdomyosarcoma	p.96
fig. 36	adenoid carcinoma	p.99
fig. 37	dermoid cyst	p.102
fig. 38	dacryocystitis	p.106
fig. 39	mucocoele	p. 107