ROLE OF SPECIAL MR TECHNIQUES IN DISCRIMINATION BETWEEN CAPSULAR STAGE BRAIN ABSCESSES, NECROTIC AND CYSTIC BRAIN LESIONS

THESIS
SUBMITTED FOR THE PARTIAL FULFILLMENT OF THE
MD DEGREE IN
RADIODIAGNOSIS

BY

KAREEM MOHSEN MOUSSA
M.B.B.CH., M.SC.
FACULTY OF MEDICINE, CAIRO UNIVERSITY

SUPERVISED BY

DR. IHAB ISMAIL ALI
PROFESSOR OF RADIODIAGNOSIS
FACULTY OF MEDICINE
CAIRO UNIVERSITY

DR. AMR MAHMOUD SAFWAT
PROFESSOR OF NEUROSURGERY
FACULTY OF MEDICINE
CAIRO UNIVERSITY

DR. MOHAMED ABD-ELFATTAH HASSAAN
ASSISTANT PROFESSOR OF RADIODIAGNOSIS
FACULTY OF MEDICINE
CAIRO UNIVERSITY

FACULTY OF MEDICINE
CAIRO UNIVERSITY
2012

ACKNOWLEDGEMENTS

First and foremost, thanks to Allah, the most beneficial and most merciful.

I am greatly indebted to Dr. Ihab Ismail, Professor of Radiology, Cairo University, I am honored and pleased to have had the opportunity to learn from his creative advices and expanded experience. His constant support, encouragement and willingness to teach and educate have pushed me forward throughout this work.

I wish to thank Dr. Amr Safwat, Professor of Neurosurgery, Cairo University, whose supervision, great assistance and precious advices have been of great help in presenting this work.

I am equally grateful to Dr. Mohamed Abd-Elfattah, Assistant Professor of Radiology, Cairo University, for his excellent supervision, sincere encouragement, valuable criticism, enlightening suggestion and kind guidance throughout the whole work.

To my fellow colleagues in the Radiology department, I would like to say "thank you all" for all the efforts you have put and for your support. Without you this work would have never come to life.

ABSTRACT

Brain abscesses and brain tumours may have similar clinical presentations. Also, the differential diagnosis of brain abscesses versus cystic or necrotic tumours may be difficult based on computed tomography or magnetic resonance (MR) imaging findings. However, the strategies of management for abscess and neoplasm are very different, and it is especially imperative to have a correct diagnosis before any surgical intervention of cystic brain lesions. The MR special techniques, e.g. diffusion-weighted imaging (DWI) and MR spectroscopy (MRS), are useful as additional diagnostic modalities for differentiating brain abscesses from cystic or necrotic brain tumours. DWI shows high signal intensity in most cases of pyogenic abscesses and low signal intensity in most cases of cystic or necrotic tumours. MRS shows characteristic metabolites in pyogenic abscesses, distinct from those in cystic or necrotic tumours.

Key words

- Brian abscess
- Cystic or necrotic brain tumours
- Magnetic resonance imaging
- Diffusion weighted images
- Apparent diffusion coefficient
- Magnetic resonance spectroscopy

CONTENTS

LIST OF FIGURES

Basic physical principles of diffusion weighted images

Basic physical principles of magnetic resonance spectroscopy

In vivo MR spectroscopy

Role of diffusion weighted imaging and MR spectroscopy in differentiating brain abscess from necrotic and cystic brain tumours

Results

Case Presentation

Case 1

Case 2

Case 3

Case 4

Case 5

Case 6

Case 7

Case 8

Case 9

Case 10

Summary and Conclusion

LIST OF TABLES