

ROLE OF ADVANCED MAGNETIC RESONANCE IMAGING TECHNIQUES IN DISTINCTION BETWEEN CEREBRAL ABSCESES AND HIGH-GRADE NEOPLASMS.

Mahmoud Lotfy El Sheikh, Tarek Ahmed Rayan,* Mohamed HossamEldin Khalifa, Aml Shawky Ismail, Yosra Mohamed Ashraf Mahmoud Ibrahim.

Department of Radiodiagnosis and Intervention, Department of Neurosurgery,* Faculty of Medicine, University of Alexandria.

Introduction

Distinguishing between cerebral abscess and rim-enhancing tumor is a problem that is encountered frequently by radiologists. Conventional contrast-enhanced MRI reveals ring enhancement of a brain abscess that is similar to the ring enhancement of a necrotic high-grade glioma or metastasis.

Advanced MRI techniques (DWI, MRS and DSC MR perfusion) may be used to differentiate between cerebral abscesses and high grade brain neoplasms.

DWI is an advanced MRI technique that provides the physiological nature of the disease based on motion of water molecules across cell membrane.

DWI allows assessment of the cellularity of the lesion non-invasively, as cellular and subcellular elements significantly impede the mobility of water molecules, thus densely cellular lesions show restricted diffusion and hence low ADC values.

Magnetic Resonance spectroscopy (MRS) is a non-invasive diagnostic test for measuring biochemical changes in the brain, it MRS is capable of differentiating normal from pathologic brain.

Dynamic susceptibility contrast (DSC) perfusion MRI is a technique that allows derivation of relative cerebral blood volume (rCBV) maps on the basis of the susceptibility effect related to passage of MRI contrast material through tissue.

It provides noninvasive physiologic measurements of tumor vascularity and relative cerebral blood volume (rCBV) maps, which can be used to identify and quantify areas of neovascularization.

We try to evaluate the role of advanced MRI techniques (DWI, MRS, DSC PERFUSION) to reach a final diagnosis in a case of brain abscess versus a cystic or necrotic tumor.

METHODS

All studied patients will be subjected to the following:

- Full detailed history taking and thorough clinical examination
- Conventional MRI of the brain.

MRI sequences consisted of unenhanced axial, sagittal and coronal T1-weighted images; axial T2-weighted images; contrast-enhanced axial.

- Dynamic susceptibility perfusion contrast enhanced MRI.
- Spin-echo echo-planar DWI.
- Spectroscopic images

Results

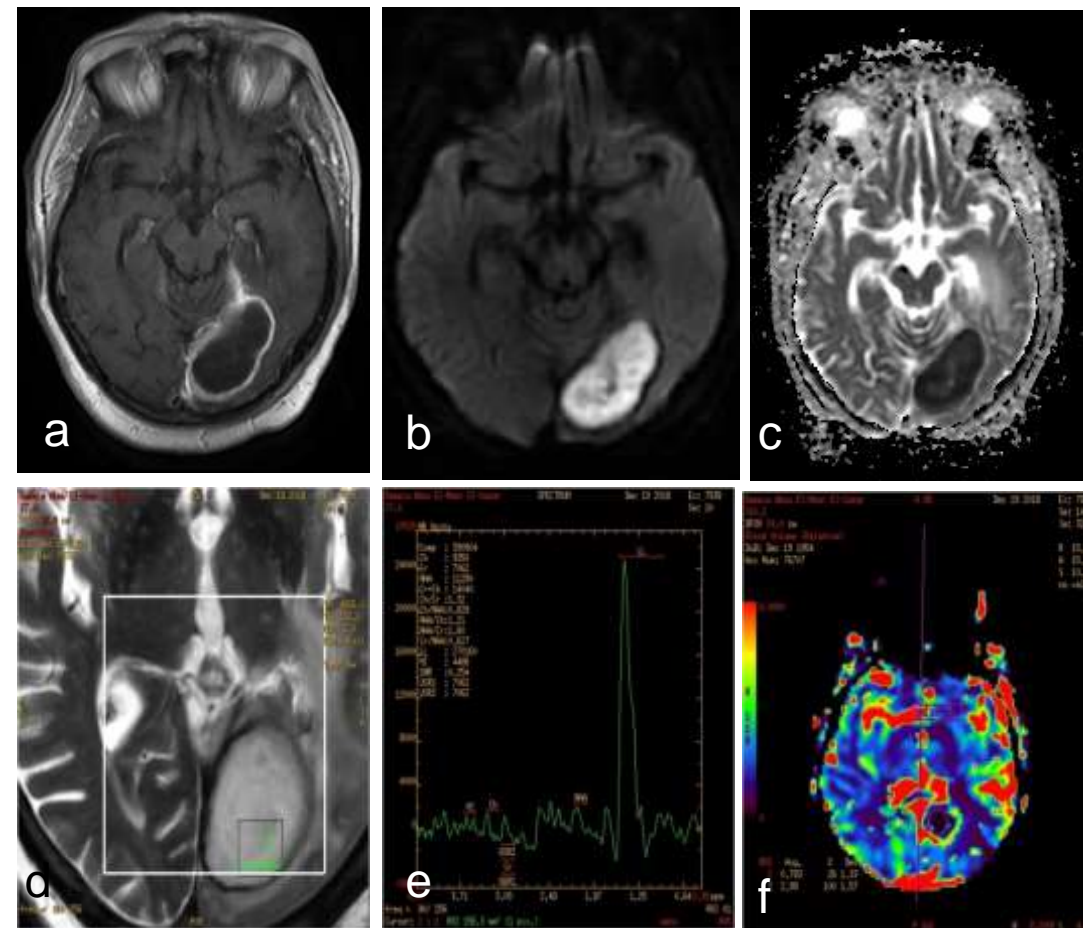


Figure 1:

a) Axial T1 GAD revealed intense peripheral rim enhancement

b-c) DWI and ADC show evident diffusion restriction within the core of the lesions

d-e) Intermediate echo spectroscopy curve shows relatively depleted Cho, Naa&Cr levels with very high lipid/lactate peak

f) color perfusion map for the same lesion shows area of hypo-perfusion..... *collectively the findings are in favor of pyogenic cerebral abscess*

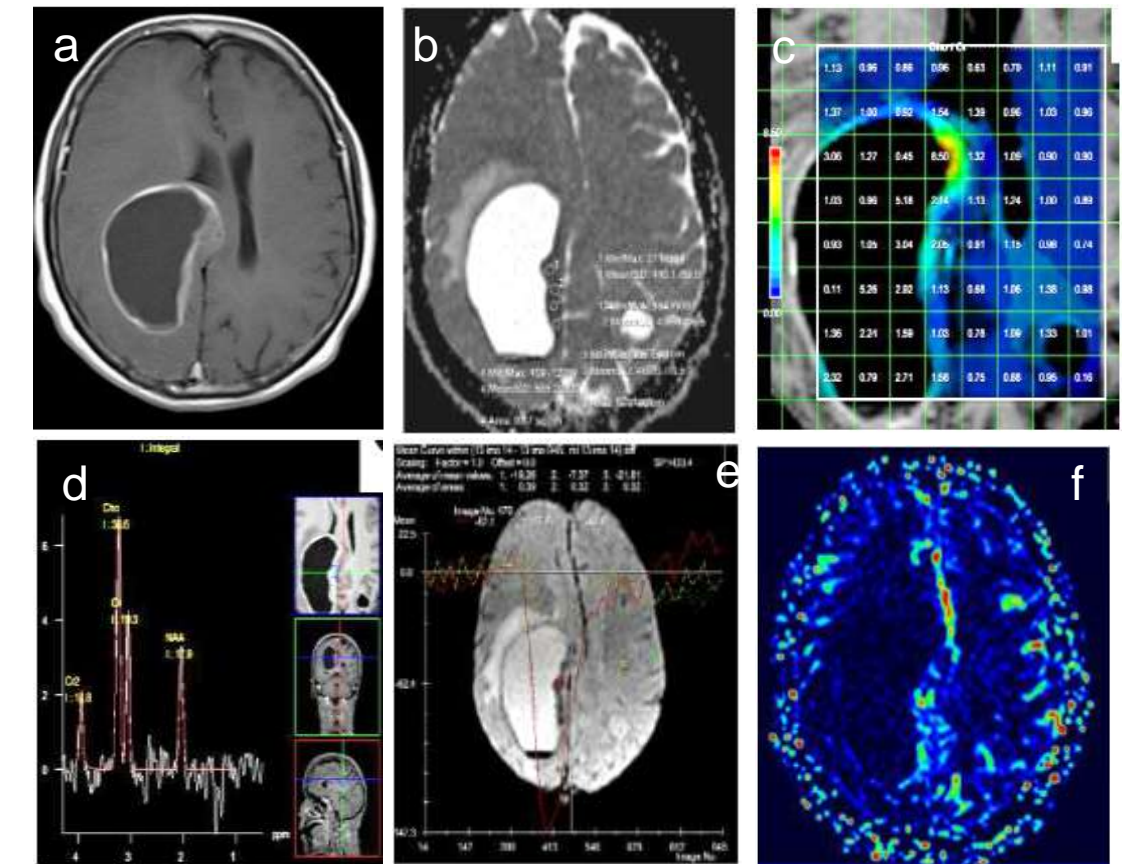


Figure 2: **a)** Axial T1 GAD revealed intense peripheral rim enhancement

b) ADC image show foci of diffusion restriction at the lesion's medial wall.

c-d) Color intermediate echo spectroscopic map and curve show foci of high Cho/Cr

e-f) PWI & perfusion curve show signal drop of the lesion's wall, color perfusion map shows area of hyper-perfusion..... *Collectively the findings are in favor of metastatic deposits*

Conclusion

Advanced magnetic resonance imaging (MRI) techniques, such as MRspectroscopy, diffusion and perfusion MR imaging techniques can give important in vivo physiologic and metabolic information.

Advanced neuro-imaging had an important role in differentiation of the neoplastic and non-neoplastic lesions.

Advanced neuro-imaging should be used routinely as a valuable noninvasive tool besides conventional MRI whenever available to reach a final diagnosis.

Aim of the work

The aim is to study the role of advanced MRI techniques (DWI, MRS, DSC PERFUSION) in distinction between cerebral abscesses and high-grade brain neoplasms.

Patient and Methods

PATIENTS

The current study will be conducted on fifteen patients referred to the Radiology Department, Alexandria Main University Hospital for further MRI assessment.