

Evaluation of Brain Pathology Using Magnetic Resonance Imaging in Saudi Arabian Population

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Abstract :

Objective: To evaluate of magnetic resonance imaging in diagnosis brain pathologies among Saudi population. Methods: The study was conducted in Department of Radiology at King Khalid hospital Tabuk , King Fahad Hospital Tabuk. The study was obtained during the period spanned From February 2017 to October 2017. By convenient sampling, 60 patients who were found to have focal brain pathology were recruited and their MRI scans findings were evaluated.

Results: Among the 51 cases of patients with brain pathologies it was found to be: 20 (39.21%) Dilated of ventricle, 6 (11.76%) corpus callosum atrophy, 6 (11.76%) Hemorrhage, 10 (19.6) edema, 5 (9.9%) mass, 2 (3.92%) Multiple sclerosis and 2 (3.92%) Cerebellar infarction. All were diagnosed using the typical enhancement. Based on the results, it could be judged that MRI scan has a great value in diagnoses and differentiating brain pathologies. Conclusion: MRI scan is a good non-invasive tool and can be used as first line imaging modality for differentiating brain pathology; therefore unnecessary biopsies can be avoided.

Keywords: Brain Pathology, Heterogeneous, MRI scan

1. INTRODUCTION

The brain is one of the most complex and magnificent organs in the human body. Our brain gives us awareness of ourselves.

Magnetic resonance imaging (MRI) of the brain is a safe and painless test that uses a magnetic field and radio waves to produce detailed images of the brain and the brain stem. An MRI differs from a computed axial tomography scan (CAT) scan because it does not use radiation. MRI can detect a variety of conditions of the brain such as cysts, tumors, bleeding, swelling, developmental and structural abnormalities, infections, inflammatory conditions, or problems with the blood vessels. It can determine if a shunt is working and detect damage to the brain caused by an injury or a stroke and the MRI is the most common and preferred diagnostic modalities for detecting suspected primary brain tumors, can localize brain tumors and evaluate edema, hemorrhage, and hydrocephalus. Also we will evaluate this procedure MRI in diagnosis brain pathologies and what is the most common type of brain pathologies and what the characteristics of the brain pathologies can distinguish in MRI.

2. MATERIALS AND METHODS

2.1 Area, Duration and MRI Machines

The study was completed at two hospitals in tabuk king Khalid central hospital, the MRI scan machine manufactured by a Germany company (Siemens 1.5 Tesla) and King Fahad central Hospital MRI scan machine manufactured by a Japanese company (Toshiba 1.5 Tesla). The study was obtained during the period from February 2017 to October 2017.

2.2 Patients

A fifty one patients: 25 (49%) were males and 26 (51%) were females (table 1). All were examined with a MRI protocol. The patient's data were registered: including (age, gender, type of Contrast enhancement, Symptomatic or A symptomatic, texture, final radiological findings). Patients were included if brain pathology was suspected clinically or if previous imaging studies depicted brain pathology with a nonspecific appearance. The patients ages were classified as ages ranged between less than 1 and more than 60 years : Frequency and percentage were detected as follows less than 1 years 8 (15%), 1-10 years were 15 (29%), 11-20 years were 6 (12%), 21-30 years were 5 (10%), 31-40 years were 6 (12%), more than 41 were 11 (22%).

2.3 MR Imaging technique

Examinations were performed on a 1.5 Tesla MRI unit (Siemens 1.5 Tesla) at king Khalid central hospital, 1.5 Tesla (Toshiba Medical Systems) at King Fahad central Hospital. With the brain protocol, the entire brain was scanned successively in T1, T2, FLAIR and DWI. After obtaining a scout view, an On the unenhanced scan, Equipment used Quadrature head coil, Immobilization foam pads and Peripheral gating if required Patient supine with his head within the head coil the longitudinal alignment light passes through the nasion Straps and foam pads are used for immobilization lies in the midline and the horizontal alignment Suggested protocol Sagittal, axial and coronal SE T1 Axial and coronal SE T2 When contrast is indicated, protocol Sagittal, coronal and axial T1 extent of the liver determined the number of required rotations in portal phase..A total of 50 mL of nonionic contrast material [GD], was injected with a power injector (into an antecubital vein).

2.4 Image Interpretation

Images were reviewed on films. Comparison of the sections at the same anatomic level in the three protocol of contrast enhancement was done. Each study was interpreted by one radiologist. The enhancement characteristics of each phase were assessed by grading the attenuation of the T1, T2, FLAIR and DWI system in Brain pathologies. The T1, T2, FLAIR and DWI images were reviewed for the presence of Brain pathologies.

2.5 Statistical analyses

All data obtained in the study were documented and analyzed using Microsoft excel 2010. Descriptive statistics, including frequency and percentage were used.

2.6 Ethical considerations

Special consideration was given to the right of the confidentiality and anonymity for all participants. Anonymity was achieved by using number for each participant to provide link between the collected information and the participants. Justice and human dignity was considered by teaching the selected participant equally when offering them an opportunity to participate in the research. Permission for conducting the study was obtained from head of the radiology department at King Khalid central hospital and king Fahad central hospital.

3. RESULTS

Table 1 Distribution of gender among sample of the study

Gender	Number	Percentage
Male	25	49%
Female	26	51%
Total	51	100%

Table 2 Distribution of pathological findings according to age groups.

Age in years	Number	Percentage
Less than 1	8	15%
1-10	15	29%
11-20	6	12%
21-30	5	10%
31-40	6	12%
More than 41	11	22%
Total	51	100%

Table 3 Distribution of diseases among asymptomatic and symptomatic subjects

With or without symptoms	Number	Percentage
Symptomatic	44	86%
A symptomatic	7	14%
Total	51	100%

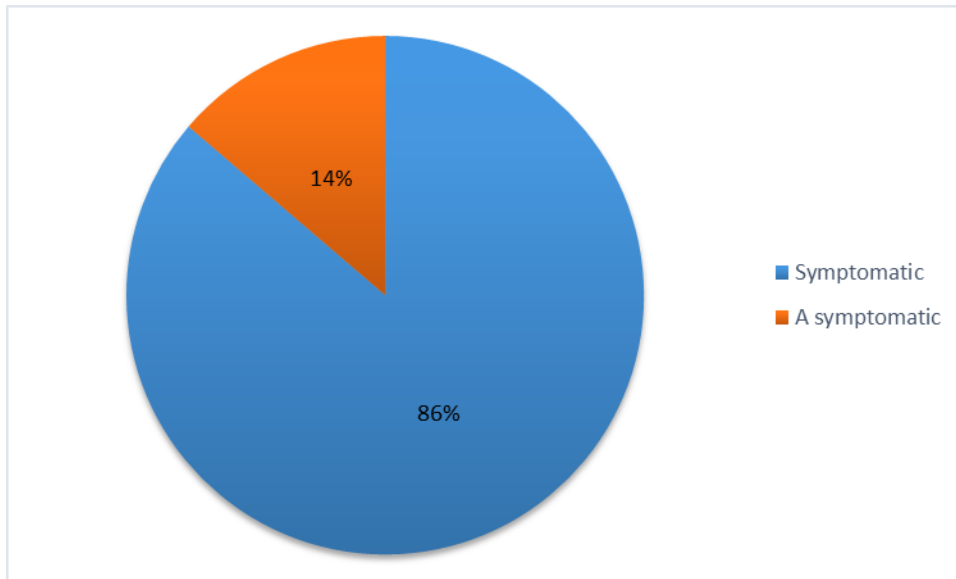


Figure 1 the percentage of diseases among asymptomatic and symptomatic subjects

Table 4 Type of Contrast enhancement used in the test

Contrast enhancement	Number	Percentage
Peripheral	7	14%
Enhanced	0	0%
Absent	44	86%
Total	51	100%

Table 5 shows distribution of texture

Brain changes	Numbers	Percentage
Homogenous	28	55%
Heterogeneous	23	45%
Total	51	100%

Table 6 shows distribution of final diagnosis.

Final diagnosis	Frequency	Percentage
Dilated of ventricle	20	39.21%
Corpus callosum atrophy	6	11.76%
Edema	10	19.6%
Hemorrhage	6	11.76%
Lesions	5	9.9%
Multiple sclerosis	2	3.92%
Cerebellar infarction	2	3.92%
Total	51	100%

4. DISCUSSION

The purpose of this study was to evaluate of magnetic resonance imaging in diagnosis brain pathologies among Saudi population. A total of 51 subject, (25 males, 26 females), this study was done in the period from April 2016 to February 2017.

The different brain findings were shown in table (1). From the table we can notice females 26 (51%) and males 25(49%)., table (2) showing below of 1 year 8 (15%) ,1-10 year 15(29%), 11-20 6(12%) year ,21-30 5(10%) 31-40 6(12%) and 41 to up 11(22%) . table (3) showing disease Symptomatic 44 (86%) and A symptomatic 7 (14%). From the table (4) we can Contrast enhancement Peripheral 7(14%) Enhanced 0(0%) Absent 44(86%). Form table (5) we can **texture** Homogenous 28 (55%) Heterogeneous 33(45%). table (6) showing Final diagnosis the Dilated of ventricle is 20 (39.21%), Corpus callosum atrophy 6 (11.76%), Edema 10 (19.6%) Hemorrhage 6 (11.76%), Lesions 5 (9.9%), Multiple sclerosis 2(3.92%), Cerebellar infarction 2 (3.92%), In study by Role of MRI in non traumatic brain (24 patients, 16%), Hemorrhage (19 patients 12%), cerebella infarction (12 patients 8%) and micro-vascular ischemic changes (10 patients 6.7%). few other causes for headache in our study was Lesions (9 patients, 4.7%), Encephalomalacia (4 patients, 2.7%), Hematoma (3 patients, 2 %), tumor (2 patients 1.4%), infection (1 patient, 0.7%), abscess (1 patient, 0.7%) and secondary in brain (1 patient, 0.7%). below 1 year (15%) [3] Neurological examinations suggest a relatively low risk for ischemic complications of the brain after CABG, but in 25-50% of patients after CABG new ischemic lesions were detected on DWI MRI [4-5]In study by Evaluation of brain lesions in patient after coronary artery bypass grafting using MRI our material, new brain lesions detected on postoperative MRI were observed in 23.5% of patients, in 9.8% of cases lesions were visible on DWI In study by We found a significant negative correlation between hippocampal texture and FDG-PET uptake in the hippocampus indicating that the structural changes measured as texture relate to a reduction of glucose metabolism and the function of the hippocampus. The correlation remained significant when de-correlating texture for volume. This confirms that some of the volume-independent information texture captures in MRI is related to the underlying disease process. To gain further insight into the pathology underlying texture, the relation between hippocampal texture and other AD biomarkers remains to be investigated. For example, the relation with the following that together with FDG-PET are the most widely studied non-MRI biomarkers of AD pathology, while the majority of new lesions were visible only on SWI. There are a lot of papers about new brain lesions detected on DWI,

5. CONCLUSION

MRI scan is an acknowledged non-invasive imaging technique and can be used as first line imaging modality for differentiating brain pathologies using this quantification method and its homogeneity in all of the scanning phases. Dilated of ventricle like is high frequency can be reliably differentiated from Ms and lesion using the sequence of MRI .It is also particularly supportive for soft tissue which can be easily overlooked on routine MRI scanning and symptomatic brain pathology is high.

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