

TO ASSESS VARIOUS BRAIN LESIONS ON MRI

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Abstract

Background- The danger of intracranial pathology is that expansion in an enclosed space leads to brain compression causing ischemia, swelling and loss of function that can be permanent and possibly fatal.

Methods- This was a simple observational prospective study carried out at the Department Of Radio-Diagnosis And Modern Imaging, S.P.M.C. & A.G. Of P.B.M. Hospitals, Bikaner. All the patients presented for MR brain study with some neurological complaints and showed positive findings on MRI were included in this study.

Results- out of total 120 stroke cases, there were 33 cases of acute arterial infarct, 4 of HIE, 6 cases of ICH, 76 of subacute arterial infarct and 1 case of venous infarct. Similarly, out of total 17 cases of tumors, 9 cases were of meningioma, 4 of lymphoma, 2 of glioma and metastasis each. Out of total 9 cases of infections, there were 3 cases of abscess, 2 of encephalitis and 4 of tubercular meningitis. There were 1 case of pontine myelinolysis, 2 cases of ADEM and 1 cases of diffuse axonal injury in this study.

Conclusion- Stroke comprised the majority of lesions at 120 cases (80% of the total cases studied).

Keywords: MRI, Brain, lesion.

Introduction

The danger of intracranial pathology is that expansion in an enclosed space leads to brain compression causing ischemia, swelling and loss of function that can be permanent and possibly fatal. Seizures greatly increase the cerebral metabolic rate for oxygen. They are also associated with regional ischemia that can lead to cell death and loss of cognitive and functional abilities. Compromised integrity of the membranes covering the CNS (e.g. meningomyelocele) presents a significant risk for infection, as well as cerebrospinal fluid loss and hypothermia⁽¹⁾.

Intracranial lesions can occur in all age groups. In children, intracranial lesions are common in posterior fossa region. MRI and Diffusion weighted imaging help us in classification and characterization of the lesions. With advent of DWI and its ADC values, the diagnosis, classification, characterization and location of the lesion is made more precise and accurate⁽²⁾.

Materials and Methods

Source of Data:

This was a simple observational prospective study carried out at the **DEPARTMENT OF RADIO-DIAGNOSIS AND**

MODERN IMAGING, S.P.M.C. & A.G. OF P.B.M. HOSPITALS, BIKANER. All the patients presented for MR brain study with some neurological complaints and showed positive findings on MRI were included in this study.

Study Area:

Department of Radio-Diagnosis and Modern Imaging, S.P.M.C. & A.G. of P.B.M. Hospitals, Bikaner.

Sample Size:

The study group consisted of 150 patients.

Duration of Study:

12 Months from August 2018 to July 2019.

Inclusion Criteria:

- All patients presented with neurological symptoms and with findings on DWI.
- Both indoor and outdoor cases were included across all age groups, gender and religion etc.

Exclusion Criteria:

- Patients with no findings on DWI.

Technique and Tool:

The study involves obtaining axial DWI images with b values 0 to 1000. In some patients, when required, coronal images with same b values and additional axial images with b value 0 to 2000 were also obtained.

Machine: PHILIPS ACHIEVA 1.5 TESLA MRI.

Coil: Head matrix coil.

Scan parameters:

TR	3400
TE	102
Number of averages	4
Section thickness	5 mm
Pixel bandwidth	964 HZ/Px
FOV	230
b value	0, 1000, 2000

Sequences:

DWI sequences with above mentioned parameters is used with automated reconstruction of ADC maps in axial planes. In some patients when necessary images in coronal planes were also obtained. Other conventional MRI sequences like axial T1, T2, FLAIR were also obtained.

Data Collection:

The indication, clinical findings, prior imaging findings and DWI findings of all patients were recorded and DICOM images were saved in CD format for future reference. Follow up and final diagnosis were obtained by appropriate lab investigations and histopathological correlations whenever available.

Statistics applied:

The obtained data was assessed as per the different demographic groups and diagnosis. The observations depending on the differences on ADC values are made.

Observations**Table 1:** Age wise distribution of study group

Age group	No. of cases	Percentage
0-10years	8	5.3
11-20years	7	4.67
21-30 years	6	4
31-40 years	6	4
41-50 years	18	12
51-60 years	27	18
61-70 years	40	26.67
71-80 years	24	16
81-90 years	12	8
>90 years	2	1.33
Total	150	100
Mean±SD	56.7±2.19	

Here, majority of patients (26.6%) were from age group 61-70 years followed by 18% from age group 51-60 years, 16% from 71-80 years, 8% from 81-90 years, 5.3% were less than 10 years, 4.67% from 11-20 years, 4% from 21-30 and 31-40 years each and 1.3% patients were having age greater than 90 years. The mean age of patients was 56.7±2.19 years.

Table 2: Gender wise distribution of study group

Gender	No. of cases	Percentage
Male	96	64
Female	54	36
Total	150	100

The present study included 96(64%) males and 54(36%) females with male to female ratio of 1.78:1.

Table 3: Distribution of cases according to MRI diagnosis

Diagnosis	No. of cases	%	
Stroke (120)	Subacute arterial infarct	76	50.67
	Acute arterial infarct	33	22
	ICH	6	4
	HIE	4	2.67
	Venous infarct	1	0.67
Tumors (17)	Meningioma	9	6
	Lymphoma	4	2.67
	Glioma	2	1.3
	Metastasis	2	1.3
Infections (9)	TBM	4	2.67
	Abscess	3	2
	Encephalitis	2	1.3
Others (4)	ADEM	2	1.3
	Pontine myelinolysis	1	0.67
	Diffuse axonal injury	1	0.667
Total	150	100	

Here, out of total 120 stroke cases, there were 33 cases of acute arterial infarct, 4 of HIE, 6 cases of ICH, 76 of subacute arterial infarct and 1 case of venous infarct. Similarly, out of total 17 cases of tumors, 9 cases were of meningioma, 4 of lymphoma, 2 of glioma and metastasis each. Out of total 9 cases of infections, there were 3 cases of abscess, 2 of encephalitis and 4 of tubercular meningitis. There were 1 case of pontine myelinolysis, 2 cases of ADEM and 1 cases of Diffuse axonal injury in this study.

Discussion

Diffusion weighted MRI provides image contrast that is different from that provided by conventional MRI sequences. It provides a technique for mapping proton contrast that reflects the microvascular environment. This imaging technique is sensitive to early ischemic insult. DWI is performed with a pulse sequence capable of measuring water translation over short distances. This water diffusion is much slower in certain pathological conditions as compared with normal brain.

Here, out of total 120 stroke cases, there were 33 cases of acute arterial infarct, 4 of HIE, 6 cases of ICH, 76 of subacute arterial infarct and 1 case of venous infarct. Similarly, out of total 17 cases of tumors, 9 cases were of meningioma, 4 of lymphoma, 2 of glioma and metastasis each. Out of total 9 cases of infections, there were 3 cases of abscess, 2 of encephalitis and 4 of tubercular meningitis. There were 1 case of pontine myelinolysis, 2 cases of ADEM and 1 cases of Diffuse axonal injury in this study.

Reddy and Madhu⁽³⁾ studied age of the patients with intra cranial lesions and found ranged from 6 years to 80 years. In this study, majority of patients (23.6%) were from age group 51-60 years followed by 19.1% from age group 61-70 years.

Our study comprised of 150 cases which showed positive findings on DWI. The age group of the patients ranged from 15 day to 100 years (mean 56.7 ± 2.19). Majority of patients (26.6%) were from age group 61-70 years followed by 18% from age group 51-60 years.

Out of 150 patients, 96(64%) were males and 54(36%) were females. The male to female ratio was 1.7:1.

In study by Chakra et al⁽⁴⁾ found 52 cases of infarcts. Out of these, 30(57.7%) were acute infarcts, 18(34.6%) were chronic infarcts and 4(7.6%) were subacute infarcts.

Kumar et al⁽⁵⁾ found that infarcts constituted the major part of the disease. Of these, acute infarcts which presented within 24 hours of onset of ictus represented

70%, hyperacute infarcts (9.41%), subacute infarcts (10.5%) and chronic infarcts (9.41%) were less common.

Reddy et al⁽⁴⁾ found that infarcts constituted 56(50.9%) cases of the total cases in this study. Of these, 34(60.7%) were acute infarcts, 19(33.9%) were chronic infarcts and 3(5.3%) were subacute infarcts. The age group of patients with infarcts ranged from 24 years to 80 years. There were 35(62.5%) males and 21(37.5%) females among these cases.

Conclusion

Stroke comprised the majority of lesions at 120 cases (80% of the total cases studied). Of these subacute arterial infarcts constituted 76 cases (69.1%), 33(30%) were acute arterial infarcts and 1(0.9%) was venous infarct.

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