INTRODUCTION

The most frequently occurring brain tumors are the neuroepithelial tumors and gliomas. In most cases, morphological imaging is able to differentiate low grade from diffusely invasive or frankly malignant lesions, which tend to show significant perilesional edema and intense contrast enhancement. Dean et al. demonstrated that the two most important predictors of the degree of malignancy of a tumor are mass effect and necrosis [1]. Nevertheless, not all high-grade glial tumors exhibit necrosis or mass effect and approximately 40% of them are not enhancing. The issue becomes more complex if we consider two other factors: first, the high frequency of cerebral metastases occurring in around 15–25% of all patients with malignancies and second, the rising incidence over the past two decades of primary cerebral lymphomas as a result of the increasing number of immunocompromised subjects due to organ transplantations and AIDS. The World Health Organization (WHO) classifies high-grade gliomas as the most dangerous primary intra-axial brain tumors in adults, with glioblastoma multiforme constituting the majority of cases (GBM, WHO Grade IV astrocytoma). The majority of WHO Grade II gliomas are much less common and low-grade gliomas [1]. The majority of primary extra-axial brain tumors, or meningiomas, account for 20% of all cases of brain tumors [2,3].

The incidence of gliomas, which make up about 51% of all tumors of the central nervous system, is rising, especially in older patients [4]. In particular, magnetic resonance imaging (MRI) has become the imaging technique most frequently used to assess gliomas, and it continues to play an increasingly diverse role in the identification, characterization, and treatment of gliomas. The standard MRI with contrast study is still the go-to method for glioma imaging both before and after surgery. In addition to traditional MRI methods, a number of novel methods have established themselves in clinical practice. The anatomical information offered by traditional MRI sequences is not the only benefit of these new techniques. Diffusion-weighted imaging is one of the new MRI techniques. At present, DWI is mainly used to diagnose epidermoid cysts, infarcts, and intracranial abscesses. There are not many studies that try to link the results of diffusion-weighted MRI with the tumor’s histopathological grade. The present study aims to evaluate this and determine whether diffusion-weighted MRI can be used to determine the glioma grade more accurately. The accurate differentiation between high-grade and low-grade gliomas is crucial for therapeutic management and prognosis [5].

The technique can be performed as a complement to conventional MR using the same contrast material and with only a minimal increase in examination times. Should DWI prove superior to conventional imaging, they could be used to monitor patients undergoing treatment to obtain an earlier evaluation of response to chemo- or radiotherapy and guide the clinician’s treatment choices.

METHODS

Study design

The present study was a duration-based cross-sectional study, done at the department of Radiodiagnosis, Geetanjali Medical College and Hospital, Udaipur, during the term February 2021–July 2022.

Inclusion criteria

1. Adults (≥18 years)
2. Both sexes
3. All patients with incidentally diagnosed cerebral masses by any other modality.

Exclusion criteria

1. MRI contraindicated patients (cardiac pacemaker, cochlear implant, claustrophobic patients etc.)
2. All patients who had allergy to previous contrast study.
3. Non-neoplastic lesions.
4. Previous treatments on the tumors (surgery, chemotherapy, and radiotherapy).
5. Incorrect examination technique.

Procedure

Each subject was worked up and investigated according to the set protocol as follows:
Well-informed written consent was taken.

History of patients presenting with cerebral masses was noted.

A complete clinical history of the patient with reference to the motor and sensory symptoms was noted. Scanning was done with MRI 3 tesla (SIGNA ARCHITECT) machine in the supine position with proper positioning and immobilization of the body. Pre-contrast scanning was done using T1WI, T2WI, FLAIR sagittal, STIR sagittal, T1WI, and T2WI axial. Contrast was given as and when required, post-contrast T1WI sag and axial and coronal images were obtained. Whenever required, thinner sections were obtained in the region of interest. Special MRI sequences such as FLAIR and STIR were routinely obtained.

Statistical analysis

The data were entered in MS Excel Software version 20 and analyzed using SPSS, IBM Comp, version 21. Descriptive analysis of the data was performed presenting the results as frequency and percent for qualitative variables and as mean and standard deviation for age. The relation between qualitative variables was evaluated by Chi-square test and Fisher’s exact test if needed. The descriptive data were expressed in proportions, mean, and frequency tables. The categorical data were analyzed using Chi-square test. The quantitative data were analyzed using independent student’s t-test. p<0.05 was considered statistically significant.

RESULTS

This cross-sectional study was conducted on patients who underwent MRI evaluation of the brain presenting with headache, seizures, personality changes, memory loss, sensory loss at Geetanjali Medical College and Hospital, Udaipur. In our study, maximum 8 cases were seen of RTF region and LTF region, 6 cases of RTP region, and 5 cases of right temporal RTT region. On MRI, we observed 17 cases of glioma; 11 cases of meningioma; 6 cases of GBM; and 3 cases each of astrocytoma, lymphoma, and oligodendroglioma. 6 cases of GBM and 5 cases of gliomatosis cerebri had MRI grading of 4, and 8 cases of glioma and 5 cases of meningioma had MRI grading 3. Extensive and moderate contrast was given in 37 (74%) of cases. The mean lowest ADC of the tumor region was significantly higher for Grade I than for Grade IV lesions (1132.0±91.34 vs. 665.15±88.08, p=0.001) (Table 3). Patients were dichotomized into those with high-
There are no conflicts of interest.

CONFLICTS OF INTEREST

I thank Dr. Ravinder Kundu for his expertise and assistance throughout all aspects of our study and Dr. Sabina Shams who provided a factual review and helped edit the manuscript.

ACKNOWLEDGMENT

There are no conflicts of interest.

## Table 1: Location-wise distribution of cases

<table>
<thead>
<tr>
<th>Location</th>
<th>No. of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>B/L F region</td>
<td>8</td>
</tr>
<tr>
<td>B/L FP region</td>
<td>4</td>
</tr>
<tr>
<td>B/L P region</td>
<td>1</td>
</tr>
<tr>
<td>Basal ganglia</td>
<td>1</td>
</tr>
<tr>
<td>LT Cerebellar hemisphere</td>
<td>3</td>
</tr>
<tr>
<td>LT F region</td>
<td>8</td>
</tr>
<tr>
<td>LT FP region</td>
<td>4</td>
</tr>
<tr>
<td>LT P region</td>
<td>2</td>
</tr>
<tr>
<td>LT PO region</td>
<td>1</td>
</tr>
<tr>
<td>LT T region</td>
<td>4</td>
</tr>
<tr>
<td>RT Cavernous sinus</td>
<td>1</td>
</tr>
<tr>
<td>RT Cerebellar hemisphere</td>
<td>1</td>
</tr>
<tr>
<td>RT F region</td>
<td>8</td>
</tr>
<tr>
<td>RT FP region</td>
<td>1</td>
</tr>
<tr>
<td>RT PO region</td>
<td>1</td>
</tr>
<tr>
<td>RT T region</td>
<td>6</td>
</tr>
<tr>
<td>RT TT region</td>
<td>5</td>
</tr>
<tr>
<td>Septum pellucidum with extension into lateral ventricles and foramen of Monro</td>
<td>1</td>
</tr>
</tbody>
</table>
FINANCIAL SUPPORT AND SPONSORSHIP
Nil.

REFERENCES