|| ISSN(online): 2589-8698 || ISSN(print): 2589-868X ||
International Journal of Medical and Biomedical Studies
Available Online at www.ijmbs.info
NLM (National Library of Medicine ID: 101738825)
Index Copernicus Value 2019: 79.34
Original Research Article
Volume 5, Issue 11; November: 2021; Page No. 106-108

IMAGING OF INTRACRANIAL SPACE OCCUPYING LESIONS

[1]Dr. Saroj Kumari, [2]Dr. Raghav Kumar

[1,2] Assistant Professor, Department of Radiodiagnosis, SMS Medical College & Associate Group of Hospitals, Jaipur

Article Info: Received 02 October 2021; Accepted 19 November 2021
DOI: https://doi.org/10.32553/ijmbs.v5i11.2309
Corresponding author: Dr. Raghav Kumar
Conflict of interest: No conflict of interest.

Abstract

Introduction: With advanced MRI techniques such as perfusion, diffusion, and spectroscopy, it is now possible to differentiate between various intracranial lesions.

Materials and Methods: This prospective cohort study was conducted on 50 patients referred by various clinical departments with clinical suspicion of intracranial space occupying lesions, evaluated by computed tomography & magnetic resonance imaging.

Result: Solitary lesions were present in 35 patients (70%) & multiple lesions in 15 patients (30%). 68.00% lesions were Supratentorial & 32.00% infratentorial in location. Most common supratentorial location in adults was frontal lobe 40% followed by parietal lobe 30%. Most common supratentorial locations in children were frontal lobe. Infratentorially, cerebellum & posterior fossa were found to be most common location in adults & children respectively. Supratentorial lesions were most common both in adults & children. 60% lesions were intraaxial & 40 % extra axial in location. In adults, intraaxial lesions were more common than in children.

Conclusion: Intracranial space occupying lesions comprise of a diverse group of lesions. With the introduction of CT & MRI scanning, imaging of lesions has acquired a new dimension whereby excellent anatomical detail in axial, sagittal & coronal planes as well as lesion characterization has become possible.

Key words: Brain, CT, MRIs

Introduction

Distributions of tumor types vary substantially by age group and among the developing/developed countries. Data from several national cancer registries support differences in the epidemiology of brain tumors in children versus adults. High-grade glioma (30.5%) and meningioma (29.4%) are the most common types of adult primary brain tumors (data taken from the Swedish cancer registry). Males also generally have higher rates of primary malignant brain tumors while females have higher rates of non-malignant tumors, primary meningiomas.[1]

During the last few years, the role of magnetic resonance imaging (MRI) as a diagnostic tool in neuroradiology is well-established. With advanced MRI techniques such as perfusion, diffusion, and spectroscopy, it is now possible to differentiate between various intracranial lesions. The differential diagnosis of intra cerebral necrotic tumors and the cerebral abscess is frequently difficult on conventional MRI as both can present as ring enhancing lesions.[2] The necrotic component of brain tumor (glioblastoma multiforme [GBM] and metastases) show marked hypo intensity on diffusion-weighted image (DWI) due to increased free water. The DWI must allow differentiation between necrotic tumors and cerebral abscess.[3]

The diffusion restricted signal helps in glioma grading on the basis of increasing tumor cellularity. Magnetic resonance spectroscopy (MRS) is highly sensitive in differentiating low-grade from high-grade gliomas, perilesional tumor infiltration and more specific in characterizing abscess with lipid/lactate, amino acid peaks. Provides additional information over conventional study to differentiate extra axial tumors as meningeoma with alanine peak. Not only the common tumors are well-differentiated by MRI, but also space occupying lesions (SOL) of infective etiology, rare tumors, tumor mimicks as tumefactive demyelinating lesions and congenital lesions prevalence and imaging features are diagnosed by MRI.[4]

Materials and Methods

This prospective cohort study was conducted on 50 patients referred by various clinical departments with clinical suspicion of intracranial space occupying lesions, evaluated by computed tomography & magnetic resonance imaging. After taking informed consent, a detailed clinical history was recorded of each patient & relevant clinical examination was done.

Inclusion criteria-

Presence of ICSOL on neuroimaging (CT/MRI).

Exclusion criteria-

- Traumatic & non traumatic intracranial hematoma,
- Infarct & demyelinating lesions,
- Lesion size less than 2 cms
- Bony lesions of skull

Methods

Requested neuroimaging was done with prior explanation of the radiological investigation & informed written consent of the patient/relatives. CT was performed on Philips ingenuity core 128 multislice unit with axial, coronal and sagittal reconstructions of desired thickness of acquired data. CECT scans were performed after bolus injection of low osmolalaity nonionic iodinated contrast material. MRI scans were performed on 1.5T GE signa HDe 8 channel unit with acquisition of spin echo T1, T2, T2 Flair, SWI in desired planes and axial EPI- DWI & ADC maps. CEMRI was done post IV gadolinium (dose 0.1mmol/kg) injection with acquisition of TIW scans in three orthogonal planes. Imaging findings were evaluated & tabulated & correlated with the clinical findings & histopathological findings (wherever available) subsequently.

Data analysis

Data were initially summarized into means, standard deviations (SD); mean±SD and percentages in a form of comparison tables and graphs.

Results

Table 1: Demographic profile

Mean age	**43.16 ± 13.65 years**
Male : Female	30 : 20
Supratentorial : Infratentorial	34 : 16

Out of total 50 patients enrolled for study most patients were in age range of 28– 60 years & the mean age was 43.16 ± 13.65 years. 30(60.00%) patients were male & 20 (40.00%) patients were females.

The main presenting symptoms were headache in 29 patients, loss of consciousness in 17 patients, 7 patients each were having seizure & vomiting. The most common clinical signs were altered sensorium in 23 patients, behavioural changes in 16patients (32%) & visual field defects in 12 patients (24%).

Solitary lesions were present in 35 patients (70%) & multiple lesions in 15 patients (30%). 68.00% lesions were Supratentorial & 32.00% infratentorial in location. Most common supratentorial location in adults was frontal lobe 40% followed by parietal lobe 30%. Most common supratentorial locations in children were frontal lob. Infratentorially, cerebellum & posterior fossa were found to be most common location in adults & children respectively. Supratentorial lesions were most common both in adults & children. 60% lesions were intraaxial & 40 % extra axial in location. In adults, intraaxial lesions were more common than in children.

70% patients were having neoplastic lesions & 30 % patients had non-neoplastic lesions. Neoplastic lesions included metastases 20%, Astrocytomas 14%, Meningiomas 10%, Pituitary adenoma 10 %, Glial tumors 6%, Schwannomas 4%, Hemangioblastomas 2%, Oligodendrogliomas 2% & Craniopharyngioma 2 % whereas Non-Neoplastic lesion included Arachnoid cysts 10%, Abscesses 8%, Hydatid cysts 6%, Tuberculoma 4% & Cavernoma 2%.

CECT was done in 40 patients, out of which majority (60%) were having hypodense lesions & most common associated finding was mass effect (80%). CECT was done in 10 patients out of which 8 patients (80%) were having ring like pattern of enhancement. Unenhanced MRI, was done in 50 patients and majority of the lesions appeared hypointense on T1WI (70%), hyperintense on T2WI (70%) & hyperintense on FLAIR (30%) sequences with mass effect (70%) as most common associated findings.

Discussion

The term ICSOL is generally used to identify any lesion whether neoplastic or inflammatory in origin which increases the volume of intracranial contents & leads to a rise in intracranial tension (ICT). The presentation of ICSOL has changed radically with increased availability of modern imaging techniques like CT & MRI.The age ranges from 1-90 yrs in present study. The peak incidence was in 5th decade followed by 3rd decade with male predominance was correlated with Madan AH et al study[5].

In most of the cases in our study, more than one symptoms & signs were present. The commonest symptom was headache 56%. The similar observation was seen in study by Benjarge PV & Kulkarni[6] in which 55 patients had headache out of 80 patients and by Mahmoud MZ [7] in which 43% patients presented with headache. The second most common presenting complaint in our study was loss of consciousness in 32 % whereas 16.2% & 14% patients in Benjarge PV & Kulkarni A [6] & Mollah N et al study[8] respectively had similar complaints. In our study, 12 % patients were having seizure & vomiting. Seizures & vomiting were the third commonest symptom observed in 46.25% out of 80 patients in Benjarge PV & Kulkarni A study [6] whereas Mollah N et al found vomiting in 52% & seizures in 36%.[8]

The most common clinical signs were altered sensorium in 44 % which was high as compared to Mollah N et al study[8], only 6% had altered sensorium. The second most common

presenting sign in our study was behavioural changes in 32%, which was high as compared to Benjarge PV & Kulkarni A study [6] abnormal behaviour was observed in 8.75% cases.

In our study, 70% lesions were supratentorial & 30% infratentorial in location, which were corresponding to study by Chander R et al [9], having 79% supratentorial & 21% infratentorial lesions. Supratentorial was most common location both for adults & children.

Conclusion

Intracranial space occupying lesions comprise of a diverse group of lesions. With the introduction of CT & MRI scanning, imaging of lesions has acquired a new dimension whereby excellent anatomical detail in axial, sagittal & coronal planes as well as lesion characterization has become possible.

References

1. Bondy ML, Scheurer ME, Malmer B, Barnholtz-Sloan JS, Davis FG, Il'yasova D, et al. Brain tumor epidemiology: Consensus from the brain tumor epidemiology consortium. Cancer 2008; 113 7 Suppl:1953-68.
2. Al-Okaili RN, Krejza J, Wang S, Woo JH, Melhem ER. Advanced MR imaging techniques in the diagnosis of intraaxial brain tumors in adults. Radiographics 2006; 26 Suppl 1:S173-89.
3. Gigineishvili D, Gigineishvili T, Tsiskaridze A, Shakarishvili R. Incidence rates of the primary brain tumours in Georgia – A population-based study. BMC Neurol 2014; 14:29.
4. Larjavaara S, Mäntylä R, Salminen T, Haapasalo H, Raitanen J, Jääskeläinen J, et al. Incidence of gliomas by anatomic location. Neuro Oncol 2007; 9:319-25.
5. Madan AH, Chaurasia SB, Wankhede KU, Kumre DG. Clinical study of intracranial space occupying lesions & its ophthalmic manifestations. International Journal of Recent Trends in Science & Technology 2015; 14(1):127-30. doi: 06.02.2015.
6. Benjarge PV, Kulkarni A: Clinical profile of intracranial space occupying lesions of the brain. MedPulse – International Medical Journal 2014;1(6):288-92. doi:20.06.2014.
7. Mahmoud MZ. Intra Cranial Space Occupying Lesions In Saudi Patients Using Computed Tomography. Asian J Med Radiol Res 2013; 1(1):25-8. Available from: http://www.researchgate.net/publication/236869508
8. Mollah N, Baki A, Afzal N, Hossen A. Clinical & Pathological Characteristics of Brain Tumor. BSMMU J 2010; 3(2):6871. Available from:http://www.ijoimr.com/siteadmin/article_issue/14369567382_Bipin%20chavda_Patho.pdf.