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A STUDY ON OCULAR MANIFESTATIONS IN INTRACRANIAL SPACE OCCUPYING LESIONS"

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ABSTRACT

AIM: To study the various Ocular manifestations in Intracranial Space Occupying Lesions(SOL). Objectives are: 1) To determine the occurrence of ocular manifestations, 2) To correlate ocular manifestations and site, 3) To find visual field changes associated with Intracranial SOLs. **MATERIAL AND METHODS:** The study was conducted for a period of one year. A total 52 confirmed cases of Intracranial Space Occupying Lesions (SOLs) on the basis of clinical diagnosis of brain tumor by magnetic resonance imaging (MRI) and World Health Organization (WHO) classification of Primary Brain Tumors in the year 2016. **RESULTS:** In our study ocular manifestations were found in all cases of SOLs. Out of 52 patients, 51 patients had ocular problems & one patient did not have. Thus the incidence of ocular manifestations in Intracranial SOLs found to be 98.1%. In this study, the age of the patients ranged from 15-65 years. Maximum preponderance was seen in age group of 36-45 years, around 36.5% patients. The mean age of the patients is 40.4years. Out of 52 patients, 30 were males & 22 were females. Male preponderance was seen more around 57.69%.In this study, ocular manifestations involving in right eye in 18 pts, left eye in 16 pts, while bilateral involvement was seen in 18 patient. Thus ocular manifestations were found in 70 eyes of 52 patients. In the present study, visual acuity deterioration is maximum in range of more than 6/60, involving 42.3%. The RAPD is seen in right eye as 23.1%, in left eye as 19.2% & bilaterally in 19.2% of patients. In this study, perimetry (field of vision) was normal in 25% and lost in 11.5%, while abnormality detected in 5.8%. The study showed Optic atrophy in 15.4% patients where 38.5% were normal. In this study, tumors are mostly seen arising from frontal lobe around 32.7% of the patients. **CONCLUSION:** Visual impairment occurs in numerous patients with intracranial SOLs and may be the presenting symptom. Patients with intracranial SOLs may develop disturbances of visual sensory function and disorders of ocular system. These disturbances may precede or occur coincidentally with neurologic manifestations.

KEYWORDS : Visual acuity , Tonometry, Perimetry ,MRI

INTRODUCTION:

Intracranial Space Occupying Lesions (SOLs) are growth within skull. These expand in volume to displace normal neural structure and lead to increase in **intracranial pressure** leading to compression of surrounding structures. In India, with increasing incidence, ranging from 5 to 10 per 100,000 population & accounts for 2% malignancies[1,2]. In India it has been reported a decade earlier than the western countries[3].

Intracranial tumors may manifest with serious ocular signs & symptoms and in addition to neurological complication due to increased intracranial pressure, brain compression, cranial nerve impairment, direct or indirect impair circulation, which lead to functional loss. Therefore prompt diagnosis of SOLs will lead to early treatment & avoidance of complications. Usually, intracranial tumors can established in the presence of usual signs & symptoms but sometime these may lead to misinterpretation and may lead to misdiagnosis[4,6].

Brain tumors are categorized as primary or metastatic. Primary tumors which start within the brain, and secondary tumors, which have spread from elsewhere, are also known as brain metastatic tumors. In adults the gliomas, represent 75% of primary malignant brain tumors and among them more than half are glioblastomas[2]. Many non-neoplastic disease may mimic as space occupying lesions[7]. So, an accurate and timely diagnosis is principle tool in neurooncology[8]. The incidence of a new brain tumor is 6.4 per 100,000 persons per year with an overall five year survival rate of 33.4%. The peak prevalence is between 55to64 years of age, with a little higher incidence in men than comparative to women. There is an approximate 0.6% lifetime risk of being diagnosed with brain tumors[9]. Initial ocular symptoms are progressive loss of vision with or without optic nerve atrophy, visual field defects & extra ocular nerve palsies[10-13].

MATERIAL AND METHODS: The study was conducted for a period of one year and a total number of 52 patients were diagnosed on the basis of clinical diagnosis of brain tumor by MRI and WHO classification on Primary Brain Tumors in the year 2016.Maximum cases were admitted in Neurosurgery Department and referred to RIO for ocular evaluation. The nature of study was explained to the patients and their attendants. Valuable consent was taken.

INCLUSION CRITERIA

1. Both male and female gender
2. Age group of 15 to 65 years
3. Patients who are confirmed cases Intracranial SOLs.
4. Preoperative cases are taken in this study.

EXCLUSION CRITERIA:

1. Papilloedema due to spinal cord tumors and other systemic diseases.
2. Age less than 15 years and more than 65 years.
3. Any history of ocular truma or head injury in the past.
4. Established cases of Primary Optic Atrophy due to glaucoma.
5. Patients who are contraindicated to undergo MRI.
6. Post –operative & Infective causes of SOLs were excluded from the study.

RESULTS AND OBSERVATION

The data collected on various aspects of this study were compiled and subjected to statistical analysis.

TABLE: INCIDENCE OF OCULAR MANIFESTATION IN INTRACRANIAL SOLS

CATAGORY	NUMBER OF PATIENTS	PERCENTAGE
PATIENTS WITH OCULAR MANIFESTATIONS	51	98%
PATIENTS WITHOUT OCULAR MANIFESTATIONS	1	1.9%

Ocular manifestations were found in all cases of Intracranial SOLs, out of 52 patients,51 patients had ocular problem except one. Thus the incidence of ocular manifestations in Intracranial SOLs in this study found to be 98.1%.

TABLE: AGE DISTRIBUTION OF OCULAR MANIFESTATION IN INTRACRANIAL SOLS.

AGE IN YEARS	NUMBER OF PATIENTS	PERCENTAGE
15-25 years	15	28.8%
26-35 years	8	15.4%
36-45 years	19	36.5%
46-55 years	6	11.5%
56-65 years	4	7.7%

In the present study, the **age** of the patients ranged from 15-65 years. Maximum preponderance was seen in age group of 36-45 years, around 36.5% patients. The mean age of the patients is 40.4 years. In **sex** distributions, out of 52 patients, 30 were males and 22 were females. Male prepondence was more around 57.69%. Male to female ratio is 1:0.74.

TABLE: LATERALITY OF THE EYE INVOLVED IN OCULAR MANIFESTATIONS IN INTRACRANIAL SOLS.

LATERALITY	NUMBER OF PATIENTS	PERCENTAGE
RIGHT EYE	18	34.6%
LEFT EYE	16	30.8%
BILATERAL	18	34.6%

In the present study, ocular manifestations involving in right eye in 18 patients, left eye in 16 patients, while the bilateral involvement was seen in 18 patients. Thus ocular manifestations were found in 70 eyes of 52 patients.

TABLE: AFFECT ON VISUAL ACUITY

VISUAL ACUITY	NUMBER OF PATIENTS	PERCENTAGE
LESS THAN 6/60	12	23.1%
MORE THAN 6/60	22	42.3%
HAND MOVEMENT	4	7.7%
PERSEPTION OF LIGHT POSITIVE	6	11.5%
PERSEPTION OF LIGHT NEGATIVE	6	11.5%
NORMAL (6/6)	2	3.8%

In this study, visual deterioration is maximum in the range of more than 6/60, involving 42.3% patients.

TABLE: OCCURANCE OF RARD

RAPD	NUMBER OF PATIENTS	PERCENTAGE
RIGHT EYE	12	23.1%
LEFT EYE	10	19.2%
BILATERAL	10	19.2%

In this study the RAPD seen in right eyes as 23.1% of the patients, in left eye as 19.2%, bilaterally in 19.2% of patients.

TABLE: EFFECT ON PERIMETRY AND FIELD OF VISION

TESTS	NORMAL.IN NUMBER OF PATIENTS	ABNORMAL, NUMBER OF PATIENTS
PERIMETRY	15 (28.8%)	3 (5.8%)
FIELD OF VISION BY CONFRONTATION TEST	13 (25%)	6 (11.5%)

In the present study Perimetry was found normal in 28.8% of patients. Field of vision was normal in 25% and lost in 11.5%, while abnormality detected in perimetry were around 5.8% which include junctional sctoma (1), atypical field defect(1), bitemporal heminanopia (1).

TABLE: SHOWING THE FUNDUS FINDINGS

FUNDUS FINDINGS	NUMBER OF PATIENTS	PERCENTAGE
NORMAL	20	38.5%
OPTIC ATROPHY	8	15.4%
PAPILLOEDEMA	24	46.1%

In the present study optic atrophy was seen in 15.4% patients with 46.1% patients having papilloedema, 38.5 were normal. The higher number of blind or visual impaired due to primary optic atrophy as a result of compression from pituitary adenoma and meningioma which were the common tumors' seen in this study as well as due to late presentation of patients.

TABLE: ANATOMICAL SUB SITES FOR INTRACRANIAL SPACE OCUPYING LESIONS

TOPOGRAPHY	PERCENTAGE OF ANAMICAL SITE INVOLVMENT	TOPOGRAPHY	PERCENTAGE OF ANATOMICAL SITE INVOLVMENT
Cerebrum except lobes & ventricles	5 (9.6%)	Cerebral ventricle	1 (1.9%)
Frontal lobe	17 (32.7%)	Cerebellum	10 (19.2%)
	4 (7.7%)	Brain stem	1 (1.9%)
Perietal lobe	3 (5.8%)	Overlapping lesion of brain	11 (21.2%)

In the present study tumors mostly seen arising from frontal lobe around 32.7% of the patients, in cerebellum around 19.2%, overlapping areas of brain as 21.2%, cerebrum except lobes & ventricles are 9.6%, temporal lobe as 7.6%, parietal lobe as 5.8%, cerebral ventricle as 1.9%, brain stem 1.9%.

DISCUSSION:

Intracranial tumors are second most common cause leading to death from neurological disease[11]. In developing countries, visual loss from optic atrophy has been described due to delayed presentation[14-15].

INCIDENCE: The present study conducted, arrive to the point that incidence of ocular manifestation in intracranial SOLs around 98.1%. Literature regarding incidence of ocular manifestations in intracranial SOLs were not carried out. The reason for higher percentage of incidence is may be due to—1) The study group was **small** 2) Most of the patients were indoor patients where chances of ocular involvement is more.

Age: **NN Tagoe et al.(2015)** studied in 26 patients where age ranged from 3 to 69 tears (mean/SD 42.6years±16.6) with median age group affected was around 43.5years[14]. In this study, the age of the patient range from 15 to 65 years, maximum in the age group around 36-45 years, including 36.5 of patients. Mean age of presentation came 40.4 years and median age of presentation is 40.5 years. The literature in support of the present study is **Dutton et al., Kitthaweesin K et al and NN Tagoe et al.**

HEADACHE: NN Tagoe et al (2015) found that, majority (28, 77.8%) of patients included in their reported headache at presentation[16]. This is a recognized symptom manifest in 43% to 99% of patients with space occupying lesions[16,17,18,19,20,21,22].

DIMUNITION OF VISION: NN Tagoe et al.(2015) a larger study, where the commonest symptom was visual blur(30,83.3%)14. Monocular blindness 33 of 72 (45.8%) eyes was commoner than bilateral blindness[14]. Majority, out of 72 eyes, 45(62.5%) were either visually impaired or blind. Visual loss in pituitary adenoma and meningioma turns to be insidious[6,20]. In the present study it was seen that visual blurring seen in 50(96.2%), with visual acuity less than 6/60 in 12 patients (23.1%). The normal visual acuity in 2 cases(3.8%), with perception of light positive in 6(11.5%), PL negative in 6(11.5%).

NEURO-OPHTHALMIC FINDINGS: Sefi-Yurdakul Net al(2015) revealed normal optic disc in both eyes of 6 patients(33.3%), oedema or atrophy in 12 patients(66.7%),& 6th cranial nerve pulsy in 2 patients(11.1%)[6] NN Tagoe et al.(2015) found neuro-ophthalmic signs were optic atrophy(26,74.3%),relative afferent pupillary defect(RAPD)(12,34.3%) & swollen optic disc(9,25%)[14].In our study, the neuro=ophthalmic findings-Visual acuity was affected in 50 patients(96.2%), RAPD in 32(61.5%), normal RRRLin16(30.8%), optic atrophy in 8(15.4%), papillodema in 24 cases(46.2%), 6th nerve involvement in 3(5.8%). Study results are supported by the subsequent literature[6,14,20].

VISUAL FIELD DEFECTS: N.N Tagoge et al.(2015) found unilateral or bitemporal hemianopia (15,41.5%) in brain tumor cases[14].**Similarly Lee JP et al.(2011**) also found that the most common field defects on presentation in 29 patients(74%) showed abnormal visual field and bitemporal field changes. In the present study it revealed that only 15(28.8%) patients perimetry found to be normal and 3 (5.8%) patients showing abnormality found to be junctional scotoma, atypical field defect, bitemporal hemianopia. Subsequently 13(25%) patient were tested & 6(11.5%) patients showing abnormal field.

ANATOMIC SUBSITE INVOLVMENT: Manigreeva et al. stated that the anatomic subsites of Primary brain tumor subsequently involved frontal, temporal, parietal lobes in 70.5% of cases[21]. In our study it was found that intracranial SOLs were seen maximum arising from the frontal lobe 32.7% and overlapping area involvement was 21.2%,which had the similarity with above study.

CONCLUSION

Visual impairment occurs in numerous patients with intracranial SOLs and may be the presenting symptom .Patients with intracranial SOLs may develop disturbances of visual sensory function & disorders of ocular system. These disturbances may precede or occur coincidentally with neurologic manifestations. MRI scanning of the

brain should be undertaken in all cases. Disorders of ocular motor system are frequently the initial sign of intracranial SOLs and often presents within months to years. Permanent blindness may occur with long standing axon compression and so neuroimaging should be done as soon as possible when optic nerve or chiasmal compression is suspected.

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