A cross sectional study of prevalence, clinical profile and CT scan features of intracranial space occupying lesions

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ABSTRACT

Introduction: Intracranial space occupying lesion (ICSOL) are infective and non-infective conditions, which can infect and occupy space in brain parenchyma. These ICSOL produce characteristic symptom and signs. If these symptom and signs are identified at an early stage of disease, more than half of these ICSOL are amenable to treatment.

Objective: Our study was done to identify the incidence of ICSOL in our city, along with the various co factors such as the gender, age socioeconomic condition and other risk factors. We also determined the prognosis of various ICSOL and

Materials and Methods: Patients admitted in RKDF Medical College and Hospital, Bhopal in the department of Medicine, Neurology and Neurosurgery department with history and clinical features suggestive of intracranial space occupying lesion.

Results: The study sample size included 30 patients, Of the 30 patients studied, 17 were male and 13 were female patients. Infective ICSOL was found to be more common in young age, while non infective was more common in old age. Common infective(16) causes, were Neurocysticercosis, Tuberculoma, Toxoplasmosis and Brain abscess. Non infective ICSOL accounted for 14 cases. Common non infective ICSOl were Glioma meningioma had the second highest incidence.

Conclusion: The prevalence of ICSOL was found to be around 0.01%. Infective SOL was found to be more common in males during second and third decade. While Non infective SOL was found to be more common in females during sixth and seventh decade. ICSOL were associated with features of raised ICT, seizure or focal neurological deficit. Radiologically, they were characterized by multiple or single well circumscribed ring-enhancing lesion.

Aims and Objectives: 1: To find out the prevalence of intracranial space occupying lesion (ICSOL) and different causes of intracranial space occupying lesion in RKDF Medical college hospital and research center Bhopal during one year period between 01/03/2018 - 28/02/2019. 2: To find out the clinical features and CT Scan features of various intracranial space occupying lesion and their correlation (CT/Clinical).

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1. Introduction

Intracranial space occupying lesion (ICSOL) is a broadly used term for various infective and non-infective conditions, which can infect, infest and occupy space in brain parenchyma.

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These intracranial space-occupying lesions, by their presence in Brain parenchyma produce characteristic symptom and signs. If these symptom and signs are identified at an early stage of disease, more than half of these intracranial space-occupying lesions are amenable to treatment.

Following are the various causes of intracranial space occupying lesion:
a) Infective  
b) Non infective

1.1. Infective

Table 1: Bacteria

<table>
<thead>
<tr>
<th>Bacteria</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mycobacterium tuberculosis.</td>
<td>Haemophilus species.</td>
</tr>
<tr>
<td>Mycobacterium avium Intra cellulare.</td>
<td>Bacteroides</td>
</tr>
<tr>
<td>Treponema pallidum</td>
<td>Fusobacterium</td>
</tr>
<tr>
<td>Nocardia.</td>
<td>Enterobacteriaceae.</td>
</tr>
<tr>
<td>Listeria monocytogenes.</td>
<td>Pseudomonas aeruginosa.</td>
</tr>
<tr>
<td>Aerobic streptococci milleri.</td>
<td>Staphylococcus aureus.</td>
</tr>
<tr>
<td>Anaerobic streptococci.</td>
<td>Actinomyces.</td>
</tr>
</tbody>
</table>

Table 2: Fungi

<table>
<thead>
<tr>
<th>Fungi</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cryptococcus neoformans.</td>
<td>Mucormycosis.</td>
</tr>
<tr>
<td>Candida albicans.</td>
<td>Coccidioidomycosis</td>
</tr>
<tr>
<td>Aspergillosis</td>
<td></td>
</tr>
</tbody>
</table>

1.1.1. Parasites

Toxoplasma gondii. Cysticercosis

1.2. Non infective: Tumor & Gliomas

Table 3:

<table>
<thead>
<tr>
<th>Gliomas</th>
<th>Meningioma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glioblastoma multiforme</td>
<td>Pituitary adenoma</td>
</tr>
<tr>
<td>Astrocytoma</td>
<td>Neurinoma (schwannoma)</td>
</tr>
<tr>
<td>Ependymoma</td>
<td>Metastatic carcinoma</td>
</tr>
<tr>
<td>Medulloblastoma</td>
<td>Primary CNS Lymphoma</td>
</tr>
<tr>
<td>Oligodendrocytoma.</td>
<td>Craniohypophygioma</td>
</tr>
<tr>
<td>Dermoid</td>
<td>Teratoma</td>
</tr>
<tr>
<td>Epidermoid</td>
<td>Angiomas</td>
</tr>
<tr>
<td>Sarcomas</td>
<td>Pinealoma</td>
</tr>
<tr>
<td>Chordoma</td>
<td>Granuloma</td>
</tr>
</tbody>
</table>

The intracranial space-occupying lesion produces characteristic sign and symptoms:

1.3. Symptom and sign of raised intracranial pressure

Headache. Vomiting  
Nausea Papilledema.

1.4. Symptom and sign of intracranial space occupying lesion.

Seizures  
Focal neurological deficit

1.5. Others

Fever  
Nuchal rigidity.

Among these intracranial space occupying lesion, following are important causes at intracranial space occupying lesion.

1.6. Infective

1. Brain abscess  
2. Neurocysticercosis  
3. Toxoplasmosis  
4. Tuberculom

1.6.1. Non infective

Glioma  
Meningiomas

2. Material and Methods

In this study we have selected Patients who were admitted in RKDF Medical College and Hospital, Bhopal in the department of Medicine, Neurology and Neurosurgery department between 01/03/2018 - 28/02/2019 for a period of one year, with history and clinical features suggestive of intracranial space occupying lesion. Alternatively, we have taken those Patients who were referred from periphery clinic of RKDF Medical College Bhopal to the department of Medicine; Neurology and Neurosurgery were also taken in our study. There detail presenting complain, duration of illness, past medical illness, age, sex, socioeconomic detail, and other demographic history was taken in prescribed format.

2.1. Inclusion criteria

1. Patients with history suggestive of intracranial space occupying lesion.  
2. Patients with signs of raised intracranial tension, headache, focal Neurological deficit (such as hemiplegia, monoplegia, motor-sensory Deficit etc.) And seizure.  
3. All these patients with symptom and signs of intracranial space occupying lesion were subjected for CT scan study.

2.2. Exclusion criteria

1. Patients with underlying CNS disorder.  
2. Patients with neurodegenerative disorder, cerebrovascular accident such as Intracranial hemorrhage, Intracranial Infarct, cerebral venous thrombosis, trauma and other chronic disorder not related to SOL.
2.3. Methods of collection of data
Patients who fulfilled inclusion criteria were studied in
details with respect to detail history, physical signs,
laboratory investigations and CT scan.
Patients with symptoms and sign suggestive of intracranial
space occupying lesion underwent CT scan. Depending
upon the nature of intracranial space occupying lesion these
patient underwent further investigation. For example
* Serum for Toxoplasma antibody.
* Serum and CSF antibody for Tuberculosis and
Cysticercosis etc.

3. Results
The study sample size included 30 patients.

3.1. Patients characteristics of our study
In our study, there were 30 patients, 17 were male and 13
were female patients.
Maximum numbers of patients were between 20-30years
in case of infective intracranial space occupying lesion
Maximum numbers of patients were between 51-70years
in case of infective (tumor) intracranial space occupying
lesion.

3.2. Infective Icsol
In this study, Infective intracranial space occupying lesion
accounted for 16 cases [>50%]. Among the infective
causes, Neurocysticercosis has the highest incidence and
brain abscess has the lowest incidence. There were 6
cases of Neurocysticercosis, 5 cases of Tuberculoma, 3 cases of
Toxoplasmosis and 2 cases of Brain abscess. The incidence
of Neurocysticercosis, Tuberculoma and Brain Abscess was
higher in males while the incidence of Toxoplasmosis was
found to be higher in females.

3.3. Clinical features of our study
Neurocysticercosis: There were six patients (37.5%)
of Neurocysticercosis. All cases of Neurocysticercosis
presented with seizure, 4 patients had focal seizure and two
patient had generalized seizure and headache.
Tuberculoma: There were five patients (31.2%)
of Tuberculoma. Three patient had features of raised
intracranial tension i.e.; Headache vomiting. Two patients
had generalized seizure. One patient had left side cerebellar,
trigeminal, abducent and facial nerve involvement. The
lesion was in pons. One patient had Hemiparesis and raised
ICT features.
Toxoplasmosis: There were three patients (13.7%) of
Toxoplasmosis. Two patients presented with Hemiparesis,
between these two patients, one patient had features of
raised ICT. Third patient presented with features of raised
ICT. All three patients were positive for HIV I/II by ELISA
—method. All three patients serum was positive for IgG
antibody for Toxoplasmosis.

Brain Abscess: There were two patients (12.2%) of Brain
abscess. Both patients had features of raised ICT. Both
patients were less than 20years. One patient had focal
seizures. Both patients cytology showed staphylococcal
organism.

CT scan of infective intracranial space occupying lesion
1) Neurocysticercosis: Among the six cases of
Neurocysticercosis three of them were solitary and three
of them were multiple. They were characterized by well-
circumscribed ring enhancing lesion. Two of the cases had
perilesion edema and mid line shift [mass effect]. Multiple
calcifications were present in one case.
2) Tuberculoma: All five cases had a solitary lesion.
Four of the cases had supratentorial and was infratentorial
[pons] location. Two of these cases had a lesion in frontal
region and two of them were in parietal region by irregular
contrast enhancing lesion. Two of the cases had peri
lesion edema and mid line shift None of the patients had
hydrocephalus or other complication.
3) Toxoplasmosis: Among three cases of toxoplas-
omosis, two of them had multiple lesion and one was
solitary. Two patients had a lesion in basal ganglion region
and one of them was in fronto thalamic region. They
were characterized by irregular ring enhancing lesion. Two
patients had perilesion edema with midline shift. None had
hydrocephalus or other complication.

4) Brain Abscess: Between two cases, one had solitary
lesion and one had multiple lesion. Both of them were
located in temporoparietal region. They were characterized
by well circumscribed contrast enhancing lesion with peri
lesion edema and midline shift. None had hydrocephalus.

3.4. Non infective icsol [tumors]
Non infective ICSOL accounted for 14 cases (47%). Among
tumors,
Glioma had the highest incidence and meningioma
had the second highest incidence. There were eight cases
of glioma (50%). There were three cases of menin-
gioma(21.4%). There was one case of acoustic neuroma,
pituitary tumor apoplexy, and epidermoid accounting for
7.1% for each of them. The incidence was found to be higher
in females. [male: female: 6:8].

3.5. Clinical features
Among 13 cases 12 patients presented with features of
raised ICT: Headache and seven of them had projectile
vomiting. Six patients came with hemiplegia / monoplegia.
Five patients had cranial nerves involvement [three facial,
one vestibulo-cochlear, one abducent]. Two of these patients
with cranial nerve involvement also had cerebellar signs.
Three patients had seizures [two focal, one generalized].
In our study, the prevalence of intracranial space occupying lesion was found to be 0.01 percent. Infective intracranial space occupying lesion were responsible for 53% of the cases while non infective were responsible for 47% of the cases. Among non infective causes, Glioma was responsible for 57% of the cases in our study, while reported incidence of Glioma is 45% in western countries. Among infective causes, in our study Neurocysticercosis was found to be more common in males during second and third decade. All these cases presented with history of seizure; two generalized and four focal seizure. Among the six cases, three of them had multiple lesion and three of them had solitary lesions.

Tuberculoma was found to be more common in males during the second and third decade. Three patients presented with features of raised intracranial tension. All five patients had solitary lesion.

Toxoplasmosis was found to be more in females during the third decade. All of them presented with features of raised intracranial tension and two of them had hemiparesis. All patients were HIV positive. The lesion was characterized by irregular ring enhancing lesion.

Brain abscess was found to be more common in males during first and second decade. Both the patient presented with features of raised ICT with constitutional symptoms. One patient had solitary lesion while the other patient had multiple lesions.

There were 14 cases of non infective ICSOL. There were 8 cases of Glioma, 3 cases of Meningioma one case each of Acoustic Neuroma, Pituitary apoplexy and Epideromoid tumor. They were found to be higher in females during sixth and seventh decade who Presented with features of raised ICT and space occupying lesion.
5. Conclusion
The prevalence of intracranial space occupying lesion was found to be around 0.01%.

Infective SOL was found to be more common in males during second and third decade.

Non infective SOL was found to be more common in females during sixth and seventh decade.

Clinically infective SOL were inconsistently associated with features of raised ICT, seizure or focal neurological deficit. They were round to be associated HIV (Toxoplasmosis) or pulmonary tuberculosis 'Tuberculoma). Radiologically, they were characterized by multiple or single well circumscribed ring-enhancing lesion.

Among patients with tumors, 90% of the patient had headache and 50% of the patient had focal neurological deficit. Radiologically, they were characterized by irregular contrast enchanting lesion.

6. Source of funding
None.

7. Conflict of interest
None.

8. References

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