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To Study the Role of Brain Biopsy in Arriving at Early Diagnosis and Impact on the Treatment of Patients who Underwent Biopsy for Non-Neurosurgical Indications

KEYWORDS: Brain biopsy; stereotactic; craniotomy

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ABSTRACT ***Introduction:***
Brain biopsy and excision is the standard clinical practice in neurological malignancies. However its role has not otherwise been clearly established for other neurological differentials. Recent advances in multimodal neuroimaging has revolved the diagnosis in neurological cases and the brain biopsy is not carried out routinely, either for diagnosis or confirmation of diagnosis

Aims: *To study the role of brain biopsy in arriving at early diagnosis and impact on the treatment of patients who underwent biopsy for non-neurosurgical indications.*

Methodology:
This is a prospective observational study, conducted at a tertiary care hospital, at south Delhi, from 01 Jan 15 to 310 Dec 15. We included on patients who were difficult to diagnose even after noninvasive evaluation. These patients underwent brain biopsy as per decision taken by the treating team. The patients were followed up for a period of one year. Statistical tools as appropriate were applied.

Results:
A total of 10 patients were included in this study during study period. The biopsy was helpful in arriving at a diagnosis in (9/10) cases and the biopsy result made a change in treatment modality in (6/10) cases. Only one patient had symptomatic intracerebral haemorrhage post biopsy.

Conclusions:
A brain biopsy is an important tool timely diagnosis and good neurological as well as overall outcome in patients who otherwise were not able to diagnose on neuroimaging.

Introduction:
Biopsy is the gold standard for diagnosisin most of the systemic disorders, especially the malignancies. Recent advances in multimodal neuroimaging leads to more and more cases being diagnosed noninvasively. If CNS malignancy is suspected brain biopsy and excision is standard clinical practice all over, for any other differential role of brain biopsy in the management of neurological disorders has not been clearly established. The decision to biopsy the brain tissue is not necessarily straightforward because ofbeing invasive in nature and the complications associated. The apprehension of the patient is one of the major hurdles. In this study we followed up the ten cases who underwent brain biopsy at a single centre and tried to evaluate the importance of brain biopsy in arriving at diagnosis and subsequent outcome.

Aims and objective:
This study was done to determine value of brain biopsy in arriving at early diagnosis and impact on the treatment of patients who underwent biopsy for non-neurosurgical indications.

Subjects and Methods:
1. This is a single centre observational study conducted at South Delhi hospital from 01 Jan 15 to 31 Dec 2015. It included all patients visited to Neurology Department and could not be diagnosed even after extensive evaluation by non-invasive tests and neuroimaging ,
2. These patients underwent brain biopsy for diagnostic purpose. A written consent was taken and all those patients who were unwilling to participate in the study were excluded from the study.
3. The biopsies were done stereo tactically or through a craniotomy.

Inclusion criteria
1. The patient should have definitive neurological deficit on examination.
2. Neuro imaging- Non Conclusive
3. Electro physiological studies- Non conclusive
4. Bio chemical, surgical and CSF studies were non contributory
5. Willingness for participation in study.

Exclusion Criteria
1. Unwillingness for consent
2. Difficult access for brain biopsy as opined by Neurosurgery team.

Results:
In our observational study, total of 10 patients underwent 12 brain biopsies over a period of one year. The median age of the patient was 36 years (range 27-54 years) with male female ratio of 4:1. The average days of hospitalisation for brain biopsy in our study were 3.4 days (2-5 days). Only two patients underwent biop-

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sies twice, one because of the insufficient tissue sample (from retro-orbital tissue) and another patient evacuation of the hematoma which had occurred as a complication of vasculitis. Of the total 12 biopsies 11 included brain tissue or meninges and one biopsy was from spinal cord. Ten of the 12 biopsies were conclusive (83%) and the two were inconclusive or normal. The biopsy was diagnostic in 09 patients (90%). The biopsy turned out to be normal in one patient. Biopsy led to change in the management in six patients (60%). The Diagnostic yield on biopsy in our study showed, 30% cases were suffering from CNS Gliomas, 36 % were having granulomatous lesions, 10% patients were having CNS lymphomas, Neurosarcoidosis and Neurocysticercosis each and one patient had normal biopsy. The details of biopsy outcome are tabulated in table 1.

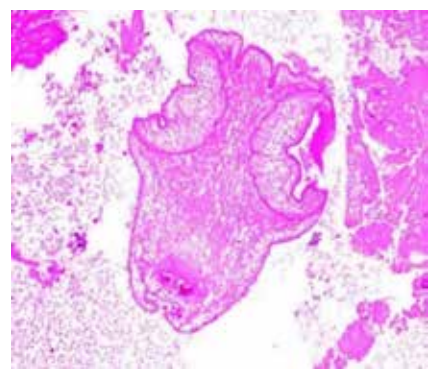
Fig 1 and 2 depicts change in protocol of management in one case who was successfully diagnosed as a case of Neurocysticercosis after biopsy who was earlier treated with anti tubercular therapy for ring enhancing lesion. One patient had post stereotactic biopsy haemorrhage and died because of haemorrhage. Two deaths (>16.6%) occurred during follow up, one patient because of tubercular meningitis itself and the other patient because of post biopsy haemorrhagic complication.

Table -1 Depicting outcome of brain biopsy results in this study

S.No	Age	Sex	Clinical Diagnosis	Histo-pathological Diagnosis	Outcome
01	34	M	ADEM	Neurosarcoidosis	Carried
02	27	M	Seizure (Inv)	Glioma	Treated
03	54	M	Tuberculosis	Neurocysticercosis	Cured
04	29	M	CVA/Lymphoma	Tuberculoma	Treated
05	40	F	PRES	CNS Glioma	Died
06	30	M	Maxillary Mass (Rt)	Inflammatory Granuloma	Cured
07	35	M	Ependymoma	Tuberculosis	Cured
08	37	M	ICSOL	Normal	Cured
09	48	M	CNS Lymphoma	Lymphoma	On treatment
10	49	F	Tuberculoma	Glioblastoma	Died

Figure 1. MRI - MRI showing multiple ring enhancing lesions and biopsy from the right cerebellar lesion shows a cystic lesion walled off by thick fibrocollagen at periphery.

Fig 2 HPE study of same case showing multinucleated giant cells along with foamy macrophages. S/O Neurocysticercosis



Discussion:-

Brain biopsy is undoubtedly helpful in making a diagnosis or revealing alternative diagnosis. The diagnostic yield in various studies in general neurology setting done till now has given very varied results, with a positive yield of 20-93%. There are no specific guidelines regarding which patient to undergo biopsy and which patient is likely to benefit [1]. In the series of Claire M. Rice, et al, brain biopsy made an immediate contribution to determination of diagnosis in 55% (31 of 56)and a confident diagnosis was eventually made in 40 of 52 patients (77%) and the management was altered as a consequence of biopsy in 63% of the patients[2]. No significant complications occurred in any of the patients and had concluded that the brain biopsy should not to be kept as last resort as it alters the management decision significantly. GeorgiosTsermoulas, et al have shown diagnostic yield of 93.5% in a case series of 124 consecutive brain biopsies over a period of 30 months and also had shown that the gender, lesion topography, biopsy method, use of intraoperative histology and enhancement did not correlate with the diagnostic yield[3].in our study the diagnostic field was 83%.Albert J. Schuette, et al, demonstrated a sensitivity of 35% with complications (haemorrhage) occurring in 4% of patients, in an observational study of 135 consecutive patientswho underwent open brain biopsies for acute to subacute progressive neurologic decline between January 1999 and September 2008[4]. H Wang, et al, tried to evaluate which patients are likely to benefit from biopsy. This study included a total of 64 patients with the clinical presentation of diffuse encephalopathy in 40 patients, focal in 13 and multifocal in 11 patients[5]. The biopsy was diagnostic in 34 patients, abnormal but non-diagnostic in 21 and was normal in 9. Diagnostic yield of the biopsies was more common in patients with focal or multifocal clinical presentations.Of thesetwenty patients (31%) had alteration in the management as a result of their brain biopsy and five patients (7.8%) had complications.

In our study the complication were seen in 16.6% 2/12

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and death accorded in 16.6% cases. However, because of correct diagnosis, successful outcome is seen in 83% with 60% cases required change in treatment protocol.

Conclusion:-

Role of brain biopsy in diagraming cases in neurology practice is well defined but underutilised. There is a need to significant our free from repeated neuroimaging diagnostic evaluation to possible stereotactic biopsy. This study has once again passed the efficiency of brain biopsy is a potent diagnostic tool with manual complications.

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