

locus coeruleus. These data suggest complex MOA of VNS in both acute and chronic phases.

In recent years, we have studied the combination of VNS and corpus callosotomy, and found the combination of both techniques in selected patients achieves better results than both techniques separately. In this paper we would discuss our tentative experience and indications.

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### Experience with short video EEG in small town (yield and cost effectiveness)



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**Background:** Semiology, type of seizure, true or pseudo-seizure (PNES – psychogenic non epileptic seizures) are often hard to differentiate clinically. Accurate diagnosis is essential for the optimum medical or surgical treatment and outcome for the patient. Most of the times, diagnosis requires inpatient video telemetry, which is both time consuming and expensive. Short video electroencephalography (SV-EEG) has been described previously and was shown to be a useful diagnostic tool in other specialist centres.

**Objective:** To determine the usefulness of SV-EEG in the diagnosis and management of various seizure types.

**Method:** After start of SV-EEG facility in Nashik, first 100 cases were selected, 1–55 years done over last 15 months.

**Results:** SV-EEG done on OPD basis for period of 1–8 h. Age – 1–62 years, M=64:F=36. Abnormal SV-EEG was reported in 75 patients. A positive SV-EEG supporting a diagnosis of true seizures occurred in 62 of patients (generalised epilepsy=15, focal epilepsy=47). PNES was diagnosed in 13 pts. Attacks recorded in these patients were 1–14. No attack or no interictal abnormality was noted in 25% of patients (n=25), resulting in an inconclusive SV-EEG. One patient had undergone anterior temporal lobectomy surgery based on this SV-EEG.

**Conclusion:** The positive rates of attacks from SV-EEG were comparable and even better to previously published results and show that SV-EEG is easily implemented in small town centres. It is cost effective method with very good diagnostic yield.

No	Inst	Age	Sex	VEEG	Abnormality	No of events	No	Inst	Age	Sex	VEEG	Abnormality	No of events
	ats			(hrs)				ats			(hrs)		
1 SD	10	MA	2	Normal		Nil	52 VP	11	F	7	PNES	1	1
2 AD	8	MA	2	Normal		Nil	53 AS	14	MA	6	RT Hemisphere dysfunction	1	1
3 SP	10mp	F	6	Left MTLE		Nil	54 JS	18	MA	6.5	RT Post Quadrant Epilepsy	1	1
4 AN	25	MA	6	West syndrome		Nil	55 SA	7.5	MA	4.5	Left Frontal SMA Se	3	1
5 HC	25	MA	6	Normal		Nil	56 SK	31	M	7.5	RT Ant Temp. Epilepsy	Nil	1
6 AV	18	F	6	Normal		Nil	57 SP	31	F	7	Left MTLE	3	1
7 VS	15	F	5	Normal		Nil	58 SA	56	F	6	Left MTLE	3	1
8 NC	55	MA	8	Left MTLE		Nil	59 UJ	12	F	4	PNES	3	1
9 VS	37	F	6	Normal		Nil	60 VJ	29	MA	4.5	PNES	4	1
10 TD	15	F	8	RT PO epilepsy		2	61 VV	12	MA	4	PNES	2	1
11 AK	27	F	6	Normal		Nil	62 VV	24	MA	7	RT Occital Epilepsy	Nil	1
12 VV	13	MA	8	PNES		2	63 AP	30	F	7	PNES	4	1
13 SJ	30	F	8	RT MTLE		3	64 KC	18	MA	5.5	Normal	Nil	1
14 GS	12	F	6	RT MTLE		2	65 AP	14	MA	6	Left Centro-Temporal Epilepsy	19	1
15 GC	14	MA	6	Normal		0	66 DB	28	MA	7	RT Post Quadrant Epilepsy	Nil	1
16 PK	10	F	7	Normal		Nil	67 DB	28	MA	5	RT Post Quadrant Epilepsy	Nil	1
17 KD	3	4	MA	Typical absence		5	68 GA	3.5	MA	3.5	Secondary LGS	23	1
18 SP	14	MA	7	Normal		Nil	69 RB	27	MA	6	Normal	Nil	1
19 AT	20	MA	6	Normal		Nil	70 RB	27	MA	4	Left S RT MTLE	2	1
20 SJ	33	F	7	RT Temporal Epilepsy		Nil	71 PA	21	F	7.5	Pri Gen epilepsy	Nil	1
21 HS	55	F	4	PNES		8	72 TS	18	MA	4.5	PNES	3	1
22 CP	40	F	6	Normal		Nil	73 SC	18	MA	1	Gen Tonic	14	1
23 MK	35	MA	5	PNES		3	74 RH	14	MA	7.3	RT Hemisphere Seizures	3	1
24 SD	9	F	6	RT Post Quadrant Epilepsy		14	75 PA	21	F	7	PGE	Nil	1
25 SK	6	MA	5	RT Post Quadrant Epilepsy		Nil	76 AA	12	F	7	RT Hemisphere Seizures	7	1
26 VS	2	MA	5.5	Symptomatic Generalis		Nil	77 AP	24	MA	7	Sec LGS	Nil	1
27 MP	15	F	2	PNES		2	78 AD	15	F	6	Pri Gen Epilepsy-Absence	Nil	1
28 VS	34	MA	6	PNES		3	79 AJ	15	MA	2.5	Normal	1	1
29 VP	51	MA	5	PNES		2	80 KU	18	M	7	Gen Tonic-Symptomatic generalis	1	1
30 PG	34	MA	6.5	Normal		1	81 BS	38	MA	5	RT MTLE	24	1
31 HM	24	MA	7	Left MTLE		1	82 GJ	15	MA	4	Normal	Nil	1
32 US	4	MA	6	MS-LGS		2	83 GJ	63	MA	7	Normal	Nil	1
33 MP	23	MA	7	RT Centro-Temporal		3	84 AB	20	MA	7	No localization/lateralization	Nil	1
34 VS	24	MA	6.25	RT Post Quadrant Epilepsy		Nil	85 NA	21	F	7.5	Left MTLE	Nil	1
35 BK	44	MA	6.5	Left P-T Epilepsy		Nil	86 AC	17	MA	7	Left MTLE	Nil	1
36 MP	11	F	6	Normal		Nil	87 AC	17	MA	7	Left MTLE	Nil	1
37 TJ	5	F	6	Left Hemispheric		Nil	88 AS	15	MA	5	Left Temporal	Nil	1
38 RM	40	MA	5	Left MTLE		Nil	89 SA	25	MA	7	Normal	Nil	1
39 AS	5	MA	3	RT F-C Left Ant Temporal		Nil	90 SW	8	MA	6	Self (Self)	Nil	1
40 VP	16	MA	5.5	Pri Gen epilepsy-JME		3	91 PS	28	F	5.5	PGE (JME)	Nil	1
41 MK	5	MA	5.5	LGS		Nil	92 BA	62	MA	7.5	Left Frontal	1	1
42 DW	12	MA	7	Normal		1	93 AN	42	F	7	Left MTLE	Nil	1
43 DW	12	MA	7	RT Frontopolar epilepsy		1	94 AK	42	F	7	Left MTLE	Nil	1
44 SB	17	F	6	Normal		3	95 AK	42	F	7	Left MTLE	Nil	1
45 TD	51	F	6	PNES	Multiple	96 PA	11	MA	4	MSF	Nil	1	1
46 SB	3.5	F	6	Normal		Nil	97 AA	12	MA	7.5	RT Post Quadrant Epilepsy	Nil	1
47 AP	10mp	MA	2	Normal		Nil	98 AS	45	F	7.5	Normal	Nil	1
48 SL	12	MA	5.5	RT Anterior-Sec gen		Nil	99 AD	22	MA	6	PGE (Lateralized)	Nil	1
49 SD	35	MA	7.5	Normal		Nil	100 AA	37	F	7.5	Left F-C Epilepsy	1	1
50 SD	35	MA	7	Left MTLE		Nil							1

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### Uncommon lesions in the medial temporal lobe presenting with intractable epilepsy



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**Introduction:** Medial temporal lobe is a major site of seizure origin. Lesions present in the medial temporal lobe might predominantly present with epilepsy which might even be refractory to anti-epileptic drugs. We describe 8 uncommon lesions involving the medial temporal lobe which presented with intractable seizures.

**Material and methods:** 8 patients were included in the study from July, 2014 to July, 2015 who had presented to a tertiary care centre with seizures which were not controlled on medications. Complete clinical and radiological assessment of these cases was done. Treatment received and the seizure outcome (Engel's grade) were also noted.

**Results:** 6 cases presented with complex partial seizures out of which 5 had olfactory auras. 5 patients had right sided lesions and remaining 3 had left sided lesions. Among these 8 cases, 2 were tuberculomas and cavernomas each, 1 was epidermoid, 1 was ganglioglioma and 1 was a low grade glioma. All patients had a complete excision of the concerned lesion. Anterior medial temporal lobe resection (including amygdala and hippocampal resection) was performed in all these cases. 7 cases had Engel grade 1 seizure control and 1 had Engel grade 2 seizure control. No significant post-operative complication occurred in any of the patients.

**Conclusion:** Medial temporal lobe may harbour various pathologies and due to its location, it predisposes the patient for seizures. Lesionectomy when combined with AMTR gives good seizure control.

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### RNA-Seq analysis of hippocampal tissues reveals novel candidate genes for drug refractory epilepsy in patients with MTLE-HS



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Array-based profiling studies shows aberrant gene expression patterns during epileptogenesis. We have performed RNAseq analysis of the hippocampal tissues resected from the patients with MTLE-HS to investigate the molecular basis of epileptogenicity and/or pharmacoresistance in MTLE. For non-epileptic control experiments, healthy tissues from tumour margins obtained during tumour surgeries were used. RNA sequencing was performed using standard protocols on Illumina HiSeq 2500 platform. Differential gene expression

analysis of the RNAseq data revealed 56 significantly regulated genes in MTLE patients and showed that many of these belong to a cohesive network of physically interacting proteins linked to several cellular functions. This study identified various genes like FN1 which is central in our analysis, NEUROD6, RELN, TGF $\beta$ 2, NLRP1, SCRT1, CSNK2B, SCN1B, CABP1, KIF5A and antisense RNAs like AQP4-AS1 and KIRREL3-AS2 that needs further evaluation for their potential as diagnostic/prognostic biomarkers in intractable MTLE.

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### Differential modulation of various inflammatory mediators in mesial temporal lobe epilepsy and focal cortical dysplasia patients

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**Introduction:** Neuroinflammation and innate immunity play important role in the pathogenesis of epilepsy. Cytokines and chemokines induced inflammation may lead to a disturbance of the glutamatergic system, and subsequently to the persistence of seizures by chronic neuronal over excitation. Numerous candidate gene specific studies have postulated the role of inflammatory and immune modulators in neuronal death and/or development of pharmacoresistance in MTLE-HS however there are not many reports in FCD. Therefore, in this study we have used a multiplex immunoassay approach to measure multiple inflammatory mediators (cytokines, chemokines and growth factors) which includes IL1 $\beta$ , IL1Ra, IL6, IL10, MIP1A (CCL3), MIP1B (CCL4) and TNF $\alpha$  in brain tissues resected from MTLE and FCD patients.

**Methods:** Tissue samples collected from MTLE, FCD and tumor periphery of glioma patients (non-epileptic controls) were assessed by quantitative cytokine assays using a customized Bioplex<sup>TM</sup> Pro-human cytokine 8-plex panel kit. Scattered plots were generated using SigmaPlot version 13.

**Results and conclusion:** Analysis of FCD tissue highlighted differences with MTLE. Upregulation of IL-1 $\beta$ , IL-1Ra, IL-6, MIP-1 $\alpha$  and MIP-1 $\beta$  were observed in both MTLE and FCD patients as compared to controls. Except IL-1 $\beta$ , upregulation was relatively higher in FCD. IL-10 showed down regulation in both, MTLE and FCD as compared to controls. TNF- $\alpha$  did not show any significant change between groups. Our results are in line with data from mRNA profiling studies on human epileptic tissues. The mechanism and clinical implications of these epilepsy-related immune alterations need to be clarified in a larger cohort of patients with a goal of developing potential anti-epileptic treatment strategies.

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### Gamma knife versus open surgery for epilepsy: A longitudinal neuropsychological profiling study

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**Introduction:** Neuropsychological evaluations of preoperative epilepsy surgical candidates have been a routine portion of the multidisciplinary evaluation at most epilepsy centres for decades, hence, it is a laid fact that neuropsychology has played a prominent role throughout the modern era of epilepsy surgery. It has been explored as a means to predict and identify postoperative cognitive deficits after resections (chiefly temporal lobe), and in numerically quantifying those changes that do occur. In addition, neuropsychological results have some predicative power regarding seizure outcome following anterior temporal lobectomy.

**Aim:** To compare the neuropsychological outcomes in patients with pharmaco-resistant mesial temporal lobe epilepsy undergoing radio surgery and temporal lobe surgery, in particular with respect to verbal memory, visuo-constructive ability, attention and new learning ability function for language-dominant hemisphere treated patients along with psychosocial intervention.

**Methods:** A sample of 6 randomized consenting subjects were assessed longitudinally on standardized neuropsychological tests namely, verbal memory and learning (AVLT), visuo-constructive memory (CFT), new learning ability (PGI-MS, subtest-8), attention (colour trail 1 and 2), depression (BDI) and anxiety (BAI) from baseline to the 36 month assessment (4 follow-ups annually during the 3 year period).

**Result:** Descriptive statistical analysis shows that there was no statistical significant difference between the groups; i.e the type of epilepsy surgery (radio surgery or temporal lobe surgery) does not affect neuropsychological profile. While there was improved neuropsychological profile more in temporal lobe surgery group than in radio-surgery group over 3 year assessment. Temporal lobe surgery group has improved visuo-constructive ability ( $8.3 \pm 3.8$ ;  $15.6 \pm 7.4$ ;  $28.3 \pm 20.8$ ;  $30.0 \pm 31.2$ ), learning ability ( $25.8 \pm 29.8$ ;  $34.1 \pm 39.8$ ;  $35.8 \pm 31.6$ ;  $57.5 \pm 44.2$ ), delayed memory ( $15 \pm 13.2$ ;  $23.3 \pm 23.6$ ;  $25.0 \pm 22.9$ ;  $21.6 \pm 24.6$ ), attention ( $43.3 \pm 29.1$ ;  $77.0 \pm 28.2$ ;  $58.2 \pm 71.0$ ;  $84.3 \pm 81.0$ ) along with reduced depression and anxiety respectively over 3 year period of time, as compared to radio surgery group where only visuo constructive ability ( $10.0 \pm 4.3$ ;  $14.2 \pm 7.6$ ;  $30.0 \pm 2.5$ ;  $43.3 \pm 10.4$ ) and new learning ability ( $70 \pm 20$ ;  $83 \pm 11$ ;  $90 \pm 0$ ;  $90 \pm 0$ ) was found to be improved.

**Conclusion:** Neuropsychological testing is useful as a means of prediction and risk stratification for postoperative

