Selective amygdalohippocampectomy case series

Thirty-nine temporal lobe epilepsy (TLE) patients were recruited with 3 and 7 T MRI scans and a semi-quantitative assessment of the hippocampal internal architecture (HIA) was performed. Differences in HIA scores between 3 and 7 T MRI were evaluated. HIA and hippocampal volume asymmetry were also calculated and compared. The utility of HIA and hippocampal volume asymmetry in epilepsy lateralization, and the predictive value between these two indicators were compared. The relationship between HIA and postoperative outcomes was investigated in 25 patients with amygdalohippocampectomy.

HIA scores of epileptogenic hippocampi were lower than those of non-epileptogenic hippocampi at 3 and 7 T MRI. Higher HIA scores were observed at 7 T MRI. The HIA asymmetry and hippocampal volume asymmetry were both strong predictors for epilepsy lateralization and did not show difference in predictive value. No statistical differences in HIA asymmetry were observed between seizure-free patients (ILAE 1) compared to patients with seizures (ILAE 2-5).

Visualization of hippocampal internal architecture (HIA) may be improved at 7 T MRI. HIA asymmetry is a significant predictor of laterality of seizure onset in TLE patients and has similar predictive value as hippocampal volume asymmetry, however, HIA asymmetry at 7 T does not have extra value in determining epilepsy lateralization and neither does predict surgical outcomes [1)].

Qiu et al., conducted a prospective study and enrolled 50 consecutive patients with refractory MTLE who underwent SAH after their presurgical evaluations. The variables independently associated with MCID in the Quality of Life in Epilepsy Inventory-31 (QOLIE-31) overall score 1 year after SAH were analyzed by multiple binary logistic regression analysis.

Significant improvements in the QOLIE-31 overall score and all subscale scores were observed after SAH ($p < 0.001$). Among 50 patients with refractory MTLE, 78% reached the criteria for MCID of QOL overall score after SAH. In the multiple binary logistic regression model, the presurgical independent predictors of significant improvement by MCID in QOL were absence of depression diagnosis (adjusted odds ratio [OR] = 8.391, 95% confidence interval [CI] = 1.240-56.776, $p = 0.029$) and good cognitive function (adjusted OR = 8.427, 95% CI = 1.115-63.670, $p = 0.039$); the postoperative independent predictor was seizure freedom (adjusted OR = 8.477, 95% CI = 1.195-60.122, $p = 0.032$). The sensitivity and specificity for significant improvement in the QOL were 97.4% and 45.5% respectively, with an overall model accuracy of 86.0%.

Presurgical depression, cognitive function, and postsurgical seizure freedom are independent predictors for meaningful improvement in QOL after SAH among the Chinese patients with refractory MTLE. Preoperative evaluation of patients with refractory MTLE should consider the cognitive dysfunction and psychological disorders [2)].

2016

Forty-eight patients were randomly assigned to trans-sylvian (n = 24) or temporobasal (n = 24) SAH.

Postoperative visual field defect (VFD) were quantitatively evaluated using automated static and kinetic perimetry. In 24 cases, diffusion tensor imaging-based deterministic fibre-tracking of the optic radiation was performed. The primary endpoint was absence of postoperative VFD. The secondary endpoint was seizure outcome and driving ability.

Three patients (13 %) from the trans-sylvian group showed no VFD, compared to 11 patients (46 %) from the temporobasal group without VFD (p = 0.01, RR = 3.7; CI = 1.2-11.5). Fifteen patients from each group (63 %) became completely seizure-free (ILAE1). Among those seizure-free cases, five trans-sylvian (33 %) and ten temporobasal (66 %) patients could apply for a driving licence (NNT = 3) when VFDs were considered. Although the trans-sylvian group experienced more frequent VFDs, the mean functional visual impairment showed a tendency to be less pronounced compared with the temporobasal group. DTI-based tracking of the optic radiation revealed that a lower distance of optic radiation to the temporal base correlated with increased rate of VFD in the temporobasal group.

Temporobasal SAH shows significantly fewer VFDs and equal seizure-free rate compared with the trans-sylvian SAH. However, in patients in whom the optic radiation is close to the temporal base, the trans-sylvian approach may be a preferred alternative [3].

1993

Cendes et al studied the electrocorticogram (ECoG) before and immediately after transcortical selective amygdalo-hippocampectomy, prospectively in 13 consecutive patients and retrospectively in three others. ECoG was performed with surface and two depth electrodes inserted through T2 aimed at the amygdala and anterior hippocampus. Before resection the ECoG showed a variable amount of interictal spiking, recorded either independently from the depth and surface, or synchronously. A small cortical incision (2-3 cm) was made in T2. The hippocampus, amygdala and parahippocampal gyrus were removed subpially. After the resection, increased epileptiform abnormality was observed in all 16 patients and a different ECoG pattern emerged. It consisted of repetitive, high amplitude spikes and polyspikes, separated by attenuated background, recorded from the most anterior temporal area. Similar observations were reported by Niemeyer in 1958. The outcome was comparable to that of standard anterior temporal resection: 62.5% class I and 25% class II (Engel's scale). ECoG is often used to tailor the amount of resection, and the persistence of epileptic abnormalities correlates with worse outcome. This is not the case in selective amygdalo-hippocampectomy, suggesting that a different underlying mechanism is responsible for the increased interictal spiking following this procedure [4].

1)
Zhang Y, Lv Y, You H, Dou W, Hou B, Shi L, Zuo Z, Mao W, Feng F. Study of the hippocampal internal architecture in temporal lobe epilepsy using 7 T and 3 T MRI. Seizure. 2019 Jul 9;71:116-123. doi: 10.1016/j.seizure.2019.06.023. [Epub ahead of print] PubMed PMID: 31325818.
2)
Qiu Y, Zhang J, Yan Y, Liu W, Zhan S, Huang P, Deng Y. Predictors of meaningful improvement in quality of life after selective amygdalohippocampectomy in Chinese patients with refractory temporal lobe epilepsy: A prospective study. Epilepsy Behav. 2019 Jun 7;97:1-7. doi: 10.1016/j.yebeh.2019.05.006. [Epub ahead of print] PubMed PMID: 31181423.
3)
Delev D, Wabbels B, Schramm J, Nelles M, Elger CE, von Lehe M, Clusmann H, Grote A. Vision after trans-sylvian or temporobasal selective amygdalohippocampectomy: a prospective randomised trial. Acta Neurochir (Wien). 2016 Sep;158(9):1757-65. doi: 10.1007/s00701-016-2860-y. Epub 2016 Jun 6.

PubMed PMID: 27272893.
4)
Cendes F, Dubeau F, Olivier A, Cukiert A, Andermann E, Quesney LF, Andermann F. Increased neocortical spiking and surgical outcome after selective amygdalo-hippocampectomy. Epilepsy Res. 1993 Dec;16(3):195-206. PubMed PMID: 8119270.