Göteborg, 2022

Cognitive, emotional and psychosocial functions after resective epilepsy surgery

Akademisk avhandling

Som för avläggande av medicine doktorsexamen vid Sahlgrenska akademin, Göteborgs universitet kommer att offentligen försvaras i hörsal Arvid Carlsson, Medicinaregatan 3, Göteborg, onsdagen den 25 maj 2022, klockan 09:00.

av Sofia Ljunggren

Fakultetsopponent:
Docent Ia Rorsman
Lunds universitet, Sverige

Avhandlingen baseras på följande delarbeten

I. Ljunggren, S*., Andersson-Roswall, L*., Imberg, H., Samuelsson, H., & Malmgren, K. Predicting verbal memory decline following temporal lobe resection for epilepsy. *Acta Neurol Scand.* 2019; 140(5): 312-319.

II. Ljunggren, S., Andersson-Roswall, L., Rydenhag, B., Samuelsson, H., & Malmgren, K. Cognitive outcome two years after frontal lobe resection for epilepsy - a prospective longitudinal study. *Seizure*. 2015; 30: 50-56.

III. Ljunggren, S., Winblad, S., Hallgren Graneheim U., Malmgren, K. & Ozanne, A. Experiences of emotional and psychosocial functioning after frontal lobe resection for epilepsy. *Epilepsy Behav.* 2021;121(Pt A):108077.

IV. Ljunggren, S., Winblad, S., Samuelsson, H., & Malmgren, K. Decision making after frontal lobe resection for epilepsy. *Manuscript.*

*equal contributions

SAHLGRENSKA AKADEMIN
INSTITUTIONEN FÖR NEUROVETENSKAP OCH FYSIOLOGI

GÖTEBORGS UNIVERSITET

Göteborg, 2022

Cognitive, emotional and psychosocial functions after resective epilepsy surgery

Sofia Ljunggren

Department of Clinical Neuroscience, Institute of Neuroscience and Physiology, Sahlgrenska academy, University of Gothenburg, Sweden.

Abstract

Epilepsy surgery is a potentially curing treatment for a selected group of patients with drug-resistant focal epilepsy. Cognitive side-effects after temporal lobe resections (TLR) are well documented but it is still difficult to predict individual memory outcome after TLR. Concerning frontal lobe resections (FLR), fewer studies have addressed the cognitive outcome. The aim of this thesis was to develop a prediction model for verbal memory decline after TLR and to further the knowledge of cognitive, emotional and psychosocial outcome after FLR for epilepsy.

In Study I, regression analyses based on pre- and postoperative cognitive data from 110 patients who underwent TLR for epilepsy were made to develop a prediction model for verbal memory decline after TLR. In Study II, cognitive outcome two years after FLR for epilepsy was studied through analyses of neuropsychological data from 30 consecutive FLR patients. Study III was an interview study including 14 FLR patients and 12 of their respective relatives who were interviewed about experiences of emotional, cognitive and psychosocial consequences of FLR. Data were analyzed by qualitative content analysis. In Study IV, decision making after FLR was explored using the Iowa Gambling Task (IGT). The same 14 FLR patients as in Study III were included.

Results from study I identified left sided surgery, inclusion of hippocampus in the resection, high preoperative verbal memory function and a history of tonic-clonic seizures (TCS) as predictors of significant memory decline after TLR. The results from study II mainly showed cognitive stability two years after FLR. However, at the individual level 44% of patients had reliable decline in a verbal reasoning task. In study III, patients and relatives described positive experiences after FLR, like increased autonomy and more joy in life, but also negative ones, such as loss of energy and social withdrawal. Study IV showed that patients had problems with decision making after FLR. This was demonstrated through a failure to learn from feedback throughout the IGT.

To conclude, this thesis has contributed with a prediction model which included four clinically useful predictors of memory decline after TLR. The FLR studies demonstrated mainly cognitive stability over time, positive as well as negative individual experiences of cognitive, emotional and psychosocial functions and difficulties associated with decision making. These contributions will be valuable to share with patients and their families in the preoperative counselling process preceding a decision about TLR or FLR.

Keywords: epilepsy, epilepsy surgery, frontal lobe resection, temporal lobe resection, neuropsychology, cognitive outcome, verbal memory decline, executive functions, decision making, penalized regression analysis, qualitative content analysis

ISBN: 978-91-8009-757-4 (PRINT)
ISBN: 978-91-8009-758-1 (PDF)