

Resection of Supratentorial Lesions Employing a Combined Surgical Aspiration and Monopolar Stimulation Device

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INTRODUCTION

Intraoperative neurophysiological monitoring and subcortical mapping are indispensable during surgery close to the corticospinal tract (CST).(1) Assuming a nearly 1:1 distance-to-current relationship, a combined surgical aspiration and monopolar stimulation (cSAMS) device has recently been introduced.(2) The present study investigates results of the use of the cSAMS device focusing on both, postoperative motor deficits and the extent of lesion resection (EoR)

METHODS

Between January 2015 and September 2017, a cSAMS device (short train stimulation, interstimulus interval 4 msec, pulse duration 500 µsec) was used in 89 patients during resection of supratentorial lesions in the vicinity of the CST. Motor function was assessed preoperatively, on the first day after surgery, at discharge and at 3 months.



Glioma resection with the stimulation current of the cSAMS device at 3 mA. Additional overlay of DTI data into the microscope. Copyright Andreas Raabe - included here with permission.

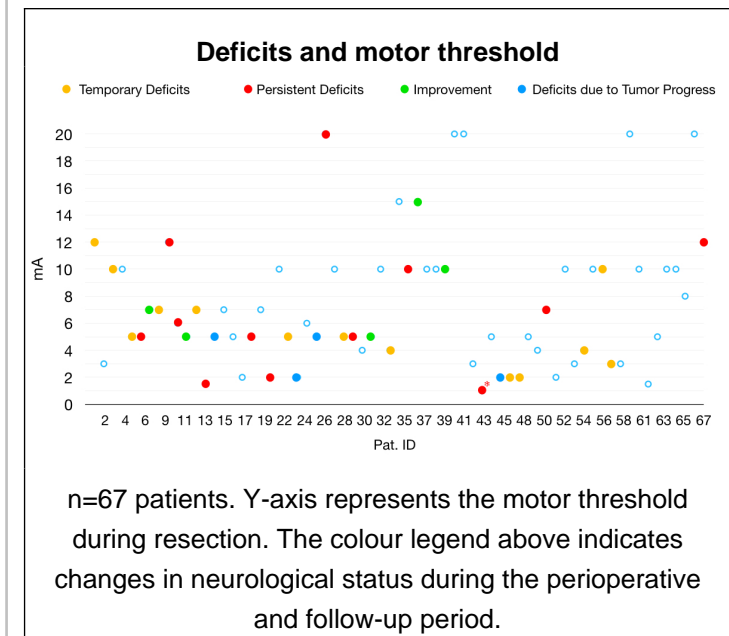


Glioma resection with the stimulation current of the cSAMS device at 3 mA. The high-pitched sound indicates running stimulation without CST response. The low-pitched sound indicates the site where resection approaches the CST. ©Andreas Raabe and JNS. Included here with permission.

RESULTS

The lowest motor thresholds evoking motor evoked potentials were as follows (mA, number of patients): 10-20mA n = 25; 5-9 mA n = 23; 2 to 4 mA, n = 16; and <2 mA, n = 3. In 22 patients, no MEPs could be evoked at stimulation intensities < 20 mA. Thus, data of 67 patients were used for further evaluation.

Immediately after surgery, a worsening of preoperative symptoms or new motor deficits were observed in 27 patients (40.3%), persisting at discharge in 10 patients (14.9%) and at the follow-up visit in four patients (6.0%). Gross total resection of lesions near the CST could be achieved in 52 patients (77.6%), whereas tumor removal had to remain subtotal or partial in 13 and 2 patients respectively (19.4% and 3.0%).



CONCLUSIONS

The cSAMS device is safe, reliable and facilitates surgery, because tumor resection does not need to be interrupted for subcortical mapping. Thanks to continuous mapping the EoR can be maximized while minimizing the risk of permanent neurological deficits.

REFERENCES

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