Radiosurgery for mesial temporal lobe epilepsy

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There are several microsurgical approaches for mesial temporal lobe epilepsy (MTLE) of which the selective amygdalohippocampectomy (SAH) has evolved as the most popular intervention based on a comparably high success rate and low complication rates [6]. In addition, minimally invasive techniques have been evaluated such as stereotactic radiosurgery (SRS) and thermal ablation methods based on stereotactic radiofrequency or laser-induced thermal therapy. MRI-guided focused ultrasound ablation may be another potential method.

In this issue, the group of Liscak from Prague reports on their 20-year-long experience with Gamma Knife radiosurgery (GKRS) for MTLE [8]. Like many other centers [1, 2, 7], the authors do not seem to be very happy with their results. On the other hand, neuropsychological outcomes following GKRS for MTLE seem to be favorable [4]. Not surprisingly, GKRS for MTLE is far from being generally accepted, and it has been the subject of editorials before [3].

There are several peculiarities that need to be considered regarding radiosurgery for MTLE. In SAH, a larger volume resection seems to correlate to a better seizure control rate. In GKRS, a larger target volume also seems to correlate to a better seizure control rate, yet at the cost of more and more severe adverse radiation effects (AREs). Because of the target's location between the brain stem and visual pathways, AREs following radiosurgery for MTLE may be severe and

are potentially life threatening. They may require emergency surgery. On the other hand, the transient MR changes are the desired effect of functional radiosurgery indicating neuromodulation. They occur following radiosurgery for movement disorders or obsessive compulsive disorders where they do not indicate a problem. In the treatment of tumors or AVMs, they would be considered a complication that one tries to avoid at almost any cost. Like in other functional disorders, they are actually the desired effect following radiosurgery for MTLE. Ideally, the transient MR changes of the temporal lobe indicate the process of the desired neuromodulation [5] and not radionecrosis, and they seem to correlate with the success rate. Therefore, the dilemma that radiosurgeons face in the treatment of MTLE is to apply a high enough dose leading to what is usually considered an ARE resulting in neuromodulation rather than radionecrosis and at the same time cover a large enough target volume without putting the patient at risk of an excessive ARE. Unfortunately, this dilemma has not yet been resolved. An interesting and elegant approach may be the use of radiosurgery as a second-line treatment in case of persisting or recurrent seizures following SAH or anterior temporal lobectomy [9]. In such cases, the residual target volume is smaller than in first-line treatments, which should reduce the risk of excessive AREs. It would not be surprising if in the future radiosurgery for MTLE were to be reserved for failed surgery cases.

The comparison of radiosurgery and open surgery for MTLE is subject to an ongoing prospective, international, multicenter study, the ROSE Trial (Radiosurgery or Open Surgery for Epilepsy). Until the results of this trial are out, radiosurgery for MTLE has to be considered experimental and should only be performed within the strict guardrails of scientific trials approved by ethical committees.

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