

PRESS RELEASE

Brain tumor: anti-epileptic drug promising & tolerable

Benefits of surgery support by proven drug demonstrated at Karl Landsteiner University of Health Sciences

St. Pölten/Krems, Austria, 7. September 2022: When the anti-epileptic drug levetiracetam (LEV) is administered in the course of tumor removal surgery, cognitive abilities are preserved before and after surgery and the drug is well tolerated. These are the results of a comprehensive study conducted by St. Pölten University Hospital, one of the teaching and research sites of Karl Landsteiner University of Health Sciences (KL Krems). In this study, the cognitive functions of patients, their quality of life and side effects were determined at defined time points before and after tumor surgery ("perioperatively"). It was shown that neither the cognitive abilities nor the quality of life were impaired by the administration of LEV and that the side effects were low to moderate within the expected range. Blood values examined were also within the normal range. For the treating clinicians, these promising results confirm the practical approach.

Brain tumor patients sometimes develop epileptic seizures during or a few days after surgery. This is associated with a longer hospital stay, a lower quality of life, and an increased risk of epilepsy. Up to 10% are affected by these seizures. Nevertheless, the preventive perioperative administration of anti-epileptic (AE) drugs is controversial - also because of the potentially unfavorable side effects on the patients' cognitive abilities.

Newer generation

Levetiracetam (LEV) is a newer-generation drug with a more favorable efficacy and side effect profile than older preparations. Mag. Elias Konrath, doctoral student at the Department of Neurology at St. Pölten University Hospital and his team have now joined forces with researchers at Department of Neurosurgery also at the site St. Pölten to investigate for the first time in a prospective, multi-year clinical study how this drug affects cognitive performance in the perioperative phase. "Our patients often had to accept losses in their cognitive functions and thus in their quality of life as a result of their tumor disease alone," says Konrath. "That's why it's even more important for us to be able to rule out further negative effects from AE and assure patients that their cognitive performance will be definitively maintained."

New insights

From 2016 to 2020, the research team at the Departments of Neurology and of Neurosurgery at St. Pölten University Hospital enrolled a total of 43 patients presenting with a primary brain tumor for planned surgery. Over a period of 25 days, the following assessments were performed at 4 defined time points before and after surgery: Neuropsychological testing, quality of life questionnaires, information on side effects, and determination of various blood values. The 43 patients completed a total of 141 neuropsychological tests. The neuropsychological screening instrument used was the "NeuroCogFX test", which represents a good compromise between the reasonable test duration and the range of cognitive areas examined. This allowed the research team to get a picture of 4 cognitive domains (attention, working memory, memory and language).

New findings

It was shown that the perioperative administration of LEV had no adverse effect on any of the tested cognitive functions within the observation interval. Interestingly, there was even an improvement in the postoperative course, which, according to Konrath, may be due to the reduction of tumor tissue by the operation: "Particularly pronounced and thus clinically relevant was the improvement achieved in working memory. As an essential component of complex cognitive processes, this is involved in all types of information processing and decision-making. According to our results, decisions about further treatment and in other important areas of the patient's lives should not be made until several weeks after surgery."

In parallel with cognitive function, the patients reported postoperative improvement in their health-related quality of life and mild to moderate LEV-related side effects, of which drowsiness was the most frequently mentioned. LEV also had no relevant adverse effect on the blood values studied, making it a tolerable way to minimize seizure risk. However, sufficient evidence for effective prevention of perioperative epileptic seizures will need to be clarified in further studies.

Overall, this study makes a valuable contribution to the existing literature and again demonstrates the focus of research at KL Krems on fundamental findings with real clinical added value.

Original publication: Perioperative levetiracetam for seizure prophylaxis in seizure-naive brain tumor patients with focus on neurocognitive functioning. E. Konrath, F. Marhold, W. Kindler, F. Scheichel, B. Popadic, K. Blauensteiner, B. Calabek, E. Freydl, M. Weber, R. Ristl, K. Hainz, C. Sherif & S. Oberndorfer. <https://doi.org/10.1186/s12883-022-02762-7>

About Karl Landsteiner University of Health Sciences (2022)

At Karl Landsteiner University of Health Sciences (KL) in Krems, the comprehensive approach to health and disease is a fundamental objective for research and teaching. With its Europe-wide recognized bachelor-master system, KL is a flexible educational institution that is tailored to the needs of students, the requirements of the labor market as well as the scientific challenges. Currently KL hosts about 600 students in the fields of medicine and psychology. The three university hospitals in Krems, St. Poelten and Tulln ensure clinical teaching and research at the highest quality level. In research, KL focuses on interdisciplinary fields with high relevance to health policy - including medical technology, molecular oncology, mental health and neuroscience, as well as water quality and related health aspects. KL was founded in 2013 and accredited by the Austrian Agency for Quality Assurance and Accreditation (AQ Austria). www.kl.ac.at/en

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