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SPECIAL REPORT

Current management of low-grade, epilepsy-associated brain tumors in Europe

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Abstract

Low-grade epilepsy-associated brain tumors (LEATs) are a frequent cause of drug-resistant focal epilepsy in both children and adults. Epilepsy surgery is a well-recognized treatment option, with almost 80% of patients being seizure-free at 1 year, and 50% of children being seizure- and drug-free at 5 years. Despite these outcomes, standardized management guidelines remain lacking. The present study aimed to assess current practices in Europe. A comprehensive web-based survey was conducted by EpiCARE (European Reference Network for Rare and Complex Epilepsies). Responses were collected from 172 clinicians representing 75 institutions in 26 European region countries. The questionnaire addressed institutional protocols, individual practices, referral pathways, presurgical evaluation, histopathology, molecular diagnostics, and follow-up. Clinicians largely agreed that epileptic seizures are a major comorbidity in LEAT patients, and most reported that seizure frequency and duration influence their treatment approach. This reflects an understanding of LEATs not only as an oncological entity, but above all as an epileptogenic lesion with a strong impact on quality of life, systematically requiring a multidisciplinary approach. Significant inconsistencies were identified, particularly regarding referral pathways, presurgical assessment (66% referred systematically to an epilepsy team), and molecular diagnostics. Only 48% of respondents reported having institutional protocols in place. Although the majority supported early referral to an epilepsy surgery team after diagnosis (even in the absence of confirmed drug resistance), 13% still required failure of at least two antiseizure medications. Long-term postsurgical follow-up was recommended by 89% of clinicians beyond 1 year after surgery. Almost all clinicians acknowledged that histopathology influenced clinical decision-making for follow-up, and 87.2% were familiar with the World Health Organization 2021 central nervous system tumor classification and molecular diagnostics. This large European study shows growing alignment with international recommendations, but significant inconsistencies remain in clinical practice, particularly regarding referral pathways, presurgical assessment, and molecular diagnostics. These

findings highlight the need for consensus-driven international guidelines for LEAT management.

KEYWORDS

clinical practice, epilepsy surgery, European Reference Network EpiCARE, molecular diagnostics, multidisciplinary management, WHO 2021 CNS tumor classification

1 | INTRODUCTION

Low-grade epilepsy-associated brain tumors (LEATs) are the second most prevalent disease category among drug-resistant focal epilepsy cases in both pediatric and adult cohorts.[1,2] According to the 2021 World Health Organization (WHO) Classification of Tumors of the Central Nervous System (5th edition), LEATs primarily include glioneuronal and neuronal tumors, circumscribed astrocytic gliomas, and pediatric-type diffuse low-grade gliomas largely corresponding to central nervous system (CNS) WHO grade 1. Clinically established entities are gangliogliomas, dysembryoplastic neuroepithelial tumors, low-grade diffuse astrocytomas, angiocentric gliomas, and pleomorphic xanthoastrocytomas. Notably, there were several novel tumor entities included into each new edition of the WHO classification system that are closely associated with the LEAT spectrum, for example, polymorphous low-grade neuroepithelial tumor of the young; multinodular and vacuolating neuronal tumor; diffuse glioneuronal tumor with oligodendrogliomalike features and nuclear clusters; and pediatric subtype, diffuse low-grade glioma, mitogen-activated protein kinase pathway-altered. However, the clinical profile and epileptogenic potential of these newly introduced LEAT entities remain incompletely studied so far, and histopathology and genetic findings have significant overlap with well-established LEATs, challenging a reliable diagnosis consistent across neuropathology readers.

Published data coherently emphasized that early surgical treatment represents the best long-term treatment option leading to seizure-freedom, antiseizure medication (ASM) withdrawal, significant positive impact on quality of life, and a more precise neuropathological and genetic diagnosis of the nature of the tumor, thus better defining optimal follow-up and supporting patient and sample stratification for our future research.[1,3–26] Yet, the approach to patient management reveals large variability with respect to access to specialized care at the level of individual hospitals but also at the level of countries.

One of the main discrepancies in the clinical management is related to the approach, whether it is neuro-oncology driven, in which the primary surgical target is the visible tumor or infiltrated tumor tissue, or whether it is epilepsy driven, which recognizes epilepsy as a network disease in which brain regions beyond the tumor may contribute to epileptogenesis. Both scenarios require careful planning to limit damage to noninfiltrated cortex and subcortical structures, including gray and white matter. Resection of the LEAT alone, without a presurgical evaluation, may carry a higher risk of persisting or relapsing seizures. In contrast, epilepsy surgery aims to resect all cortical and subcortical tissue involved in the seizure network, provided this does not involve eloquent areas. Eloquent cortex and critical subcortical pathways can be identified, when needed, through preoperative functional imaging such as functional magnetic resonance imaging (fMRI), tractography (diffusion tensor imaging), magnetencephalography, or transcranial magnetic stimulation.

The International League Against Epilepsy (ILAE) established a collaborative task force to systematically review available data and perform a Delphi study with the aim to produce international recommendations for best practices in patients with LEATs. As part of the work in progress, the European Reference Network for Rare and Complex Epilepsies (EpiCARE), was asked to perform a study mapping current practices of reference centers across Europe.

The European Reference Network (ERN) EpiCARE (https://epi-care.eu) was established by the European Commission in 2017 as one of 24 ERNs dedicated to improving care for rare and complex diseases. The management of the ERNs is funded by the European Commission through sustainable grants. Today, the ERN EpiCARE unites more than 60 accredited epilepsy reference medical teams within the EU, working closely with other experts in the European region. As a multidisciplinary network of experts, it involves more than 1400 clinicians, researchers, and additional professionals dedicated specifically to epilepsy care for both children and adults. One of the main aims of the network is to reduce diagnostic delays, harmonize clinical pathways, and promote access to advanced diagnostics and surgical evaluation for complex epilepsy cases. The ERN EpiCARE collaborates closely with the scientific societies in the field of neurology, namely, the European

Academy of Neurology and the European Pediatric Neurology Society, in addition to the European chapters of the ILAE.

We conducted a comprehensive survey to assess how LEAT patients are managed across European reference centers to gain valuable insight into current practices, identify areas of consensus and divergence, and support the development of future guidelines.

1.1 | Methodology

In 2024, a structured, web-based survey was distributed to more than 70 institutions, including members and supporting partners of the EU network, across 26 European countries. The questionnaire targeted nearly 500 individual physicians working at epilepsy centers, including adult and pediatric neurologists, neurosurgeons, neuropathologists, neuro-oncologists, and neurophysiologists. The aim was to assess current clinical practices and individual perspectives on the management of patients with LEATs. Respondents were invited to share information about both their institution's protocols and their own individual approaches to patient care.

The survey was developed by the EpiCARE working group on neuropathology and the coordination team, using the SurveyMonkey platform. The platform was open for a period of 6 weeks, during which three reminders were sent. The survey was divided into three sections: respondent identification, general clinical practices at the level of the institution/medical team, and individual practices of the solicited clinicians. The study distinguished care practices when an LEAT was suspected and when the diagnosis was considered as established.

2 | RESULTS

2.1 | Participation overview

The survey gathered responses from 172 participants with expertise in managing complex epilepsy cases, representing 75 university-based institutions (nearly 100% of the centers contacted), in 26 European region countries. Distribution of respondents per country is illustrated in Figure 1. A detailed list of participants and their corresponding institutions can be found in Appendix 1. Among them were 68 adult neurologists, 48 child neurologists, two neurologists (with both adult and pediatric practice), 34 neurosurgeons, 10 neuropathologists, four neurophysiologists, three neuro-oncologists, and three neuroradiologists.

Key points

- Multidisciplinary care: Seventy-six percent of centers routinely discussed LEAT cases in multidisciplinary conferences
- Diagnostic evaluation: Although MRI (82.6%) and neuropsychology (90%) are routinely performed, presurgical evaluations still vary across European centers (66.5% had 24-h video-EEG monitoring; 34.8% required seizure recording).
- Presurgical evaluation: Consensus supports early presurgical assessment, yet timing and criteria remain inconsistent.
- Histopathology and molecular diagnostics: Eighty-nine percent of decisions were influenced by histopathology; 87.2% were familiar with WHO 2021 CNS tumor classification; 67.1% used molecular tissue analysis.
- Follow-up: Eighty-nine percent recommend long-term follow-up (>1 year) after epilepsy surgery.

FIGURE 1 Country distribution and number of respondents per country.

In terms of clinical exposure in the year preceding the survey (2023), 44% of respondents reported managing more than 10 LEAT patients, 28% managed between five and 10 patients, and 22% cared for between one and

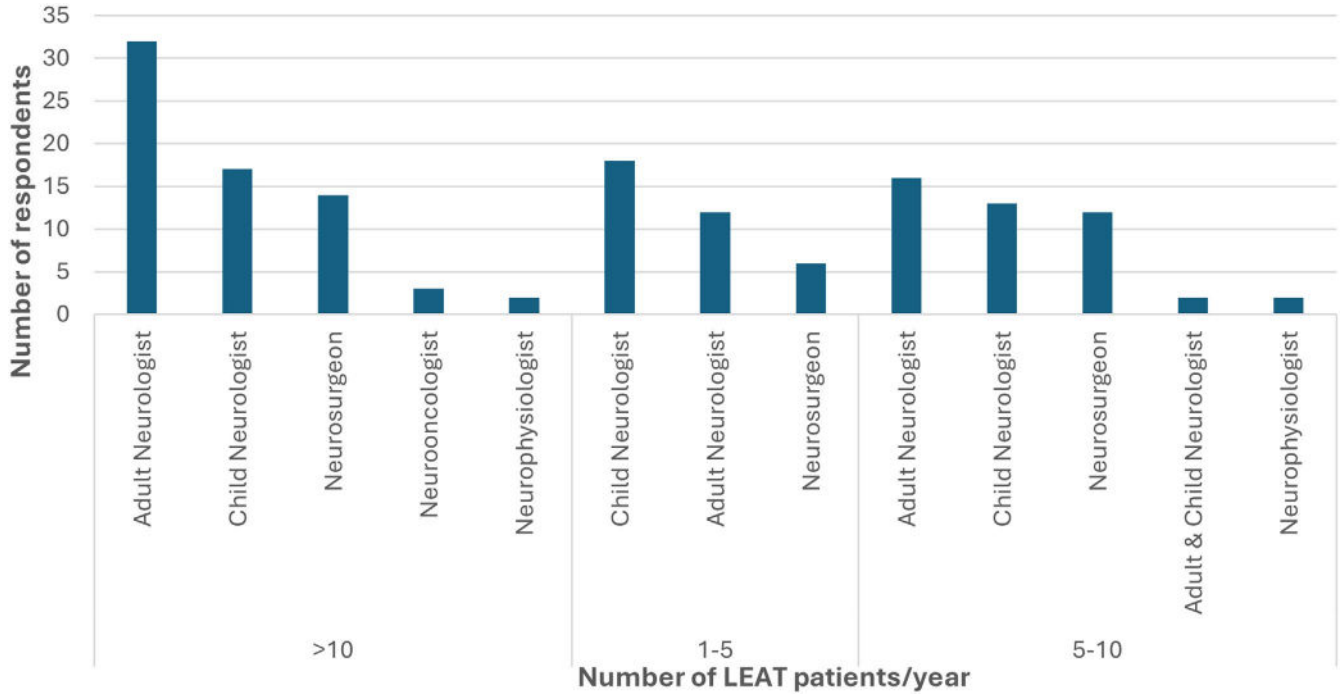

FIGURE 2 Number of patients followed by each medical specialty. Distribution of survey respondents is shown according to medical specialty and number of low-grade epilepsy-associated brain tumor (LEAT) patients managed in the year preceding the survey (2023). The figure focuses on specialties involved in the clinical management and treatment decision-making for patients with LEATs; diagnostic disciplines (e.g., neuropathology/pathology and radiology) were not included, as they typically contribute to diagnosis but do not directly manage patients with LEATs.

five patients over the year. A few respondents from diagnostic specialties such as neurophysiology, neuroradiology, and neuropathology also reported exposure to LEAT cases; however, as they do not directly manage patients, they are not represented in Figure 2, which illustrates the number of patients followed by each clinical specialty.

2.2 | Diagnostic and referral pathways when an LEAT was suspected

Almost half (48%) of respondents reported following a formal institutional protocol for evaluating patients with seizures and suspected LEATs. However, 45% indicated that no such protocol existed in their institution. Among those with an established management protocol, referral pathways varied (Figure 3); 32% referred patients directly to a neurologist, 13% to a neurosurgeon, and only 22% to a multidisciplinary team (MDT). Sixteen percent of the responders determined referrals based on the initial point of care (Emergency Department, Neurology or Child Neurology Department, Neurosurgery Department). No respondents reported transferring patients to another hospital due to proximity to a reference center.

2.3 | Care pathways once the diagnosis of LEAT was considered to be established

Once the diagnosis of LEAT has been clinically established, different care pathways are followed across institutions. Most respondents (66%), independently of the number of LEATs managed, reported that patients are systematically referred to an early presurgical evaluation by an MDT. For 13% of the participants, a presurgical evaluation is only undertaken once drug resistance has been confirmed (defined as failure to respond to at least two ASMs). Only 5% reported proceeding directly to surgery without prior epilepsy screening. This decision is usually based on factors such as LEAT location, seizure characteristics, and patient-specific factors, although one center noted that this process is being revised to include epilepsy evaluation beforehand. Finally, 16% of respondents indicated they do not have an established policy in this regard.

2.4 | Expert personal practices

We also collected expert personal opinions regarding the multidisciplinary approach and diagnostic recommendations for patients with a suspected or

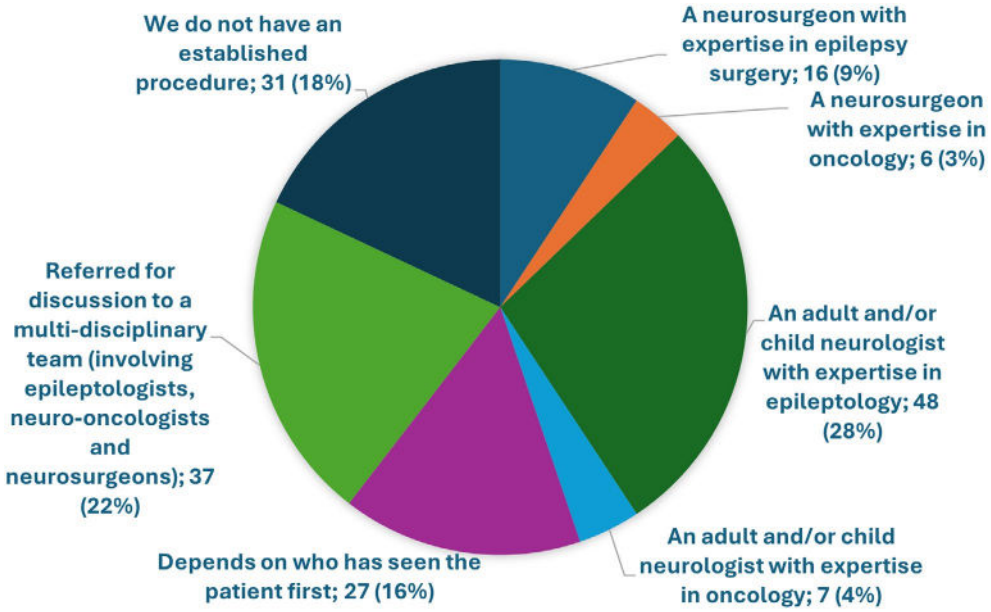

FIGURE 3 Decision pathways following seizure presentation in suspected low-grade epilepsy-associated brain tumor (LEAT) cases. Referral patterns reported by respondents after seizure presentation in patients with suspected LEATs are shown. Values indicate number of respondents, with percentages shown in parentheses.

confirmed LEAT. Respondents ($n = 155$) were surveyed on their preferences for systematic counseling and recommended diagnostic evaluations.

2.4.1 | Counseling preferences in patients with LEAT-related seizures

Among 155 respondents, the majority supported systematic evaluation for LEAT patients by an epileptologist (143, 92.3%) and by a neurosurgeon (129, 83.2%). Approximately half (80, 51.6%) favored evaluation by a neurologist with dual expertise in epilepsy and oncology, whereas only 55 (35.5%) supported routine counseling by a neuro-oncologist without epilepsy expertise. Alternatively, 83 respondents (53.5%) explicitly rejected the latter option, and 17 (11.0%) reported being unsure. Smaller numbers of respondents also expressed uncertainty regarding the role of neurosurgeons (4, 2.6%) and epileptologists (1, .6%).

2.4.2 | Recommended diagnostic workup in patients with suspected LEATs presenting with seizures

Participants were also asked to share their personal opinion on whether specific investigations should be recommended in the case of suspected LEAT. The majority supported the following:

- Structural neuroimaging using the Harmonized Neuroimaging of Epilepsy Structural Sequences (HARNESS) protocol (128, 82.6%)
- Neuropsychological evaluation prior to surgery (140, 90.3%)
- Systematic 24-h video-electroencephalographic (EEG) monitoring (103, 66.5%)

Only 34.8% considered seizure recording to be mandatory before making any treatment decision, the remaining suggesting that the indication whether to record seizures prior to surgery has to be decided by the epilepsy team based on all other available data, including detailed description of the seizure patterns and frequency, interictal EEG data, and neuroimaging (MRI) findings.

Regarding functional neuroimaging, 40% supported its use, whereas 22.6% of respondents expressed uncertainty regarding its contribution. They emphasized that its application should be tailored, by the MDT, to individual cases. Reported determinants included the location of the lesion (particularly involvement of eloquent cortex or language areas), seizure control, age, patient compliance, and results of neuropsychological testing. Some respondents noted that fMRI is performed only when deemed necessary for surgical planning. Others mentioned that in selected cases, they may need to rely on alternatives such as stereo-EEG with extended video-EEG and functional stimulation, particularly when fMRI is not feasible.

Our results show a strong consensus among experts regarding the importance of systematic epileptological

and neurosurgical evaluation in LEAT management, as well as the role of targeted neuroimaging, video-EEG monitoring of background activity, and neuropsychological testing. Certain diagnostic procedures, such as functional imaging or the video-EEG documentation of seizures, remain controversial and merit further discussion.

2.4.3 | Seizures as a comorbidity

A vast majority (94.2%) considered seizures a significant burden in LEAT patients. Similarly, 70.5% acknowledged that seizure frequency and duration influenced treatment decisions.

When asked about management strategy, 90% recommended referral to a specialized epilepsy surgery team, in line with ILAE recommendations.[27] Many respondents emphasized the importance of additional factors in decision-making, such as the number of ASMs used, potential effects of polypharmacy, interictal EEG abnormalities, lesion location, and the patient's age. One respondent noted uncertainty about long-term seizure control and expressed concern about missing a critical window for surgery in tumor locations where neuroplasticity could be compromised, particularly in cases involving the hippocampus or other eloquent regions.

A minority of respondents recommended alternative approaches; 4% supported direct surgery without prior epilepsy screening, and only 5% preferred the establishment of pharmacoresistance (failure of at least two ASMs) before initiating a presurgical evaluation.

Furthermore, 75.6% supported surgical intervention even if seizures were well controlled with ASMs, indicating that seizure control alone does not preclude surgical consideration; 6.4% had no personal opinion on this subject.

2.4.4 | Multidisciplinary practices and long-term follow-up

A total of 76% of respondents routinely discussed LEAT cases in MDTs including clinicians (neurologists or child neurologists) with expertise in EEG and epilepsy care, neuro-oncologists, and neurosurgeons. The decision to discuss the case depended on the location of the LEAT for 6% of the participants, whereas 17% reported that they did not routinely involve an MDT. Among those who did not, several justified alternative workflows based on epilepsy presence or tumor characteristics. For example, in Finland, standard MDT composition includes a neurologist, neuroradiologist, and neurosurgeon. Six centers noted that neuro-oncologists were involved only on a case-by-case basis.

Among the 157 respondents, the vast majority (89%) reported that they follow all LEAT patients beyond 1 year after surgical treatment. A small proportion (4%) indicated that they only follow patients who continue to experience seizures, whereas 6% stated that they do not have clinical experience with the follow-up of surgically treated LEAT patients.

Regarding follow-up duration ($n = 155$):

- 55% followed patients >5 years
- 32% for 3–5 years
- 14% for at least 2 years

These findings highlight a strong tendency toward long-term follow-up in clinical practice, irrespective of seizure outcome.

2.4.5 | Role of histopathology and molecular diagnostics

Most respondents (71%) stated that surgical samples were analyzed by certified neuropathologists. In contrast, 28% reported evaluation by histopathologists with a neuropathology focus, and 2% by general pathologists.

Importantly, 89% indicated that histopathological findings influenced their clinical decisions, emphasizing the diagnostic value in guiding postsurgical care. Awareness of the 2021 WHO Classification of Tumors of the Central Nervous System was high (87.2%), reflecting the widespread adoption of molecular criteria in reference center practices.

Systematic requests for molecular genetic analysis in LEAT patients varied significantly. Routine molecular testing of brain tissue was reported by 67.1% of respondents. Only 18.1% indicated that they routinely analyzed blood samples, whereas 62% reported not doing so and 20.0% were unsure of which should be the best practice. Although we did not enquire for actual numbers of requested genetic tests, these results highlight a clear preference and reliance on brain tissue for molecular diagnostics in LEATs, suggesting that blood-based analysis is not yet standard practice in this clinical context.

When presented with discordant results between methylation profiling and histological diagnosis, responses varied, revealing differences in clinical approaches and unsettled confidence in molecular diagnostics.

In cases of discordance between histology and methylation profiling, 57.1% of respondents either had no experience or were unsure how to proceed. Among those

with an established approach, 26.3% stated they would pursue additional sequencing to clarify the diagnosis, 9.6% would rely on the histological diagnosis, and 7.1% would continue with the methylation array-based diagnosis.

These varied responses underline the need for clearer guidelines for interpreting conflicting molecular data in LEATs.

3 | DISCUSSION

This comprehensive, multinational survey of European reference centers provides valuable insights into the current management of patients with LEATs in the European regions. Although the findings indicate notable progress toward harmonization and general alignment with international recommendations,[27] particularly regarding early presurgical evaluation, significant inconsistencies persist, especially in referral pathways, presurgical assessment, and the application of molecular diagnostics.

We discuss these observations in the context of the existing literature and explore their implications for care pathways, multidisciplinary practice, and advancements in LEAT diagnosis and management.

3.1 | Heterogeneity in institutional protocols and care pathways

Our results underscore the considerable variability in institutional protocols for evaluating patients with seizures and suspected LEATs. Only half of the surveyed respondents reported the existence of a formal institutional approach, underscoring an ongoing need for harmonized guidelines. This variation may reflect both local resource availability and differences in clinical culture. The high degree of direct referral to neurology or neurosurgery, rather than systematic multidisciplinary case review, may limit early integration of comprehensive epilepsy assessment and potentially delay optimal presurgical planning. Such discrepancies align with previous reports[28] emphasizing barriers to timely surgical evaluation in epilepsy care.

Interestingly, only 22% of institutions referred patients to an MDT at the initial diagnostic stage. Although multidisciplinary care is recognized as best practice in both neuro-oncology and epilepsy surgery, implementation in daily practice appears suboptimal. This gap calls for broader dissemination and enforcement of MDT-based approaches, as advocated by the ILAE and ERN EpiCARE missions.

3.2 | Presurgical evaluation and decision-making

The data demonstrate strong expert consensus on the critical role of thorough systematic epileptological evaluation, including assessment by epileptologists, neurosurgeons, and neuro-oncologists with epilepsy expertise, in LEAT management. More than 90% of respondents supported systematic involvement of an epileptologist, and neuropsychological evaluation prior to surgery was strongly endorsed. These findings are consistent with prior studies indicating that early, comprehensive presurgical evaluation enables precise anatomoelectroclinical correlation and facilitates optimal surgical planning.

However, disagreements persist regarding the necessity and timing of video-EEG seizure recording and functional imaging. Although two thirds favored systematic 24-h video-EEG monitoring, only one third deemed seizure recording as mandatory for all cases. The preference for individualized multidisciplinary decision-making over universal protocols reflects the nuanced clinical judgment required in real-world practice, particularly for lesions located in eloquent cortex or those with atypical clinical features.

Of note, some responders were in favor of surgical intervention even when seizures were controlled under ASM, reflecting recognition that tumor-related epilepsy often remains drug-resistant in the long term and that early surgical treatment can improve both seizure and oncological outcomes. The minority positions favoring direct surgery or requiring established pharmacoresistance highlight ongoing debates about surgical timing, especially in the absence of standardized guidelines.

3.3 | Multidisciplinary practice

Another key finding is the widespread (but not universal) adoption of regular MDT discussion for LEAT surgery candidates, with 76% reporting routine case review. Yet the composition of these teams differs across centers. Whereas the involvement of epileptologists and neurosurgeons is practically uniform, the role of neuro-oncologists only occurs on a case-by-case basis, which may impact the consistency of care decisions. Nonetheless, a significant minority either limit MDT discussion by tumor or patient factors or do not engage in such practices at all. Integration of MDTs is associated with improved diagnostic accuracy, safety, and functional outcomes, particularly in complex or borderline cases. The observed variability suggests opportunities for targeted interventions and continuing medical education to bridge these gaps.

3.4 | Diagnostic process

The diagnostic approach was relatively homogeneous, with strong agreement on the use of high-resolution MRI following the HARNESS protocol (82.6%)[29] and preoperative neuropsychological testing (90.3%).[30] Systematic video-EEG was also frequently used (66.5%), although only 34% considered seizure recording to be a mandatory step prior to surgical planning.

3.5 | Clinical perspectives on surgery

Clinicians largely agreed that seizures are a major comorbidity in LEAT patients, and most reported that seizure frequency and duration influence their treatment approach. This reflects an understanding of LEATs not only as an oncological entity, but above all, as an epileptogenic lesion with a strong impact on quality of life, systematically requiring a multidisciplinary approach.[31–34]

Importantly, most respondents would consider surgery even in cases where seizures are well controlled by medication and would refer the patients to epilepsy surgery teams for evaluation. This suggests that many clinicians are conscious of the potential long-term benefits of surgical intervention and the risks of having seizures persist if only a neuro-oncological approach is chosen.

3.6 | Postoperative follow-up

Long-term follow-up was largely adopted, with 89% of clinicians continuing to monitor patients beyond 1 year after surgery. More than half reported follow-up periods exceeding 5 years, indicating a strong commitment to sustainable care and global support. However, a minority of clinicians restricted follow-up to patients with persistent seizures or were unsure or had limited experience, indicating possible disparities in care continuity.

3.7 | Evolving role of histopathology and molecular diagnostics

The adoption of advanced neuropathological and molecular testing marks a major advance in LEAT diagnosis and classification. Our findings also highlight that almost all clinicians (89%) acknowledged that the histopathology diagnosis influenced clinical decision-making for follow-up, 87.2% were familiar with the WHO 2021 CNS tumor classification, and molecular diagnostics,[35] particularly methylation profiling and sequencing, are common for brain tissue samples.[8,16,17,20,36–47] However, testing of blood samples remained limited (18.1%), and most respondents (62%) reported not using it routinely possibly due to logistical constraints, cost, or uncertainty about its clinical relevance.

The study also reveals a lack of consensus on how to handle discordant results between histology and methylation profiling. More than half of respondents were either unfamiliar with or unsure how to interpret such discrepancies. Among those with a defined approach, opinions were divided between further molecular testing, histology, or methylation profiling.

These results endorse calls for clearer, consensus-driven algorithms for the interpretation of combined histopathological and molecular diagnostic data, as well as the need for education and resource sharing across European centers.

3.8 | Limitations

This study has several limitations. First, responses may reflect reporting bias or idealized descriptions of institutional protocols rather than actual practice. Furthermore, the geographic and institutional representativeness of our participating centers, although extensive, remains unbalanced, with potential overrepresentation of high-volume or research-active centers.[48] However, we are not aware of other surveys on LEAT practices performed at nonepilepsy centers, which would allow us to compare the results.

Another significant limitation is that the group of nonepilepsy centers engaged in the primary treatment of LEAT patients is underrepresented in the EpiCARE consortium and surgery thereof and not captured well. However, patients with LEATs are currently addressed only within broader clinical guidelines for low-grade gliomas (e.g., childhood astrocytomas, other gliomas, and glioneuronal/neuronal tumors treatment Physician Data Query [PDQ], www.cancer.gov; or S2k-leitlinie glioma, www.awmf.org, American Society of Clinical Oncology-Society for Neuro-Oncology (ASCO-SNP) Guideline for Diffuse Astrocytic and Oligodendroglial Tumors in Adults, International Society of Pediatric Oncology (SIOP) 2024),[49] which warrants further discussion toward a comprehensive and multidisciplinary clinical management for all individuals with LEATs.

4 | CONCLUSIONS

This large European survey, performed within the research orientations of ERN EpiCARE,[50] provides a detailed overview of current practices in the management of LEATs. The individual response rate (35%) from a

well-defined target population falls within a realistic and methodologically credible range.[51]

Although there is broad recognition of LEAT as a primarily epileptogenic lesion requiring multidisciplinary care, major heterogeneity persists in referral pathways, presurgical evaluation practices, and the use of molecular diagnostics.

Most clinicians support early referral to epilepsy teams for a multidisciplinary and comprehensive presurgical evaluation without waiting for confirmation of drug resistance to at least two ASMs and long-term postoperative follow-up. A majority of the respondents would consider surgery even in cases where seizures are well controlled by medication, following evaluation by a specialized epilepsy team.

Histopathology remains central for clinical decision-making. The adoption of the WHO 2021 CNS tumor classification is widespread, but the interpretation of discordant molecular and histological findings remains inconsistent. These results highlight both areas of emerging consensus and persistent gaps, underscoring the urgent need for harmonized international guidelines and collaborative efforts to ensure equitable, evidence-based management of LEAT patients across Europe and the world.

Taken together, the results suggest that seizures function as modifiers rather than gatekeepers for surgery. Although seizure burden strongly influences clinical urgency and management strategies, seizure control alone does not preclude surgical consideration when lesion-related or long-term epilepsy risks are present. In this context, the coexistence of seizure-driven and lesion-driven decision frameworks identified by the survey should not be viewed as a flaw, but rather as a core and informative finding of the study.

AUTHOR CONTRIBUTIONS

All authors contributed to drafting the different versions of the publication, approved the final version submitted, and agreed to be accountable for all aspects of the work. Alexis Arzimanoglou, Sébile Tchaicha, Angelika Mühlebner, Imad Najm, and Ingmar Blümcke substantially contributed to the conception of the work, the content of the study, and the interpretation of the data. Alexis Arzimanoglou, Sébile Tchaicha, and Belén Trebino Harrington substantially contributed to the acquisition and analysis of the data.

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CONFLICT OF INTEREST STATEMENT

None of the authors has any conflict of interest to disclose. We confirm that we have read the Journal's position on issues involved in ethical publication and affirm that this report is consistent with those guidelines.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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APPENDIX 1

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[a]Pr. Martha Feucht sadly passed away. The revision of the manuscript was completed and submitted posthumously. Our condolences to her survivors and her medical team.