Epilepsy surgery indications

General information

20-36% of patients continue to have seizures despite rigorous attempts at medical management with ASMs. Many of these patients may be candidates for surgical procedures to control their seizures.

Epilepsy treatment should be aggressive to reduce: brain damage, development of secondary seizure foci, psychosocial distress, and mortality.

Seizure surgery is associated with a reduction in mortality rate in medically refractory epilepsy, and while the reduction was highest when seizures are abolished, mortality is also reduced with a significant reduction of tonic-clonic seizure frequency.

Unfortunately, many patients who would benefit from surgical treatment are not referred or are referred late for surgery due to the misconception surgery should be a last resort.4 The seizure disorder must be severe, debilitating, or socially disruptive to the patient.

Epilepsy surgery is an established safe and effective treatment for selected candidates with drug-resistant epilepsy. In a opinion piece, Hale et al. from the Children's of Alabama, Great Ormond Street Hospital, Nemours Children's Hospital outlined the clinical and experimental evidence for selectively considering epilepsy surgery prior to drug resistance. The rationale for expedited surgery is based on the observations that, 1) a high proportion of patients with lesional epilepsies (e.g. focal cortical dysplasia, epilepsy associated tumours) will progress to drug-resistance, 2) surgical treatment of these lesions, especially in non-eloquent areas of brain, is safe, and 3) earlier surgery may be associated with better seizure outcomes. Potential benefits beyond seizure reduction or elimination include less exposure to anticonvulsants (ASM), which may lead to improved developmental trajectories in children and optimize long-term neurocognitive outcomes and quality of life. Further, there exists emerging experimental evidence that brain network dysfunction exists at the onset of epilepsy, where continuing dysfunctional activity could exacerbate network perturbations. This in turn could lead to expanded seizure foci and contribution to the comorbidities associated with epilepsy. Taken together, they rationalize that epilepsy surgery, in carefully selected cases, may be considered prior to drug resistance. Lastly, they outlined the path forward, including the challenges associated with developing the evidence base and implementing this paradigm into clinical care [1].

20% of patients continue to have seizures despite aggressive medical management with antiepileptic drugs AEDs. Many of these patients may be candidates for surgical procedures to control their seizures [2].

Seizure disorder must be severe, medically refractory with satisfactory trials of tolerable medication for at least 1 year, and disabling to the patient. Medically refractory epilepsy is usually considered two attempts of high-dose monotherapy with two distinct AEDs, and one attempt at polytherapy.

The three general categories of patients suitable for seizure surgery have [3]:

1. partial seizures

a) temporal origin: the largest group of surgical candidates (especially mesial temporal lobe epilepsy (MTLE) which is often medically refractory)

b) extratemporal origin

2. symptomatic generalized seizures: e.g. Lennox-Gastaut syndrome.

3. unilateral, multifocal epilepsy associated with infantile hemiplegia syndrome.

The goal is to eliminate seizures or significantly reduce seizure burden.

In most state-of-the-art epilepsy units, resective epilepsy surgery is currently the standard treatment for intractable epilepsy. Generally, the success rate, defined as a seizure-free status or Engel class I, is between 62% and 71%, as compared to 14% in non-operated cases [4) 5)].

Generally, surgery is considered in patients whose seizures cannot be controlled by adequate trials of two different medications. Epilepsy surgery has been performed for more than a century, but its use dramatically increased in the 1980s and '90s, reflecting its efficacy in selected patients.

Patients with comorbid psychosis and temporal lobe drug-resistant epilepsy may benefit from epilepsy surgery under close psychiatric supervision [6)].

Epilepsy surgery is an effective and safe therapeutic modality in childhood. In children with extratemporal epilepsy, more careful interpretation of clinical and investigative data is needed to achieve favorable seizure outcome [7)].

Tuberous sclerosis complex surgery

see Tuberous sclerosis complex surgery.

1)
Hale AT, Chari A, Scott RC, Cross JH, Rozzelle CJ, Blount JP, Tisdall MM. Expedited epilepsy surgery prior to drug resistance in children: a frontier worth crossing? Brain. 2022 Jul 27:awac275. doi: 10.1093/brain/awac275. Epub ahead of print. PMID: 35883201.
2)
Engel JJ. Surgery for Seizures. N Engl J Med. 1996; 334:647–652
3)
National Institutes of Health Consensus Development Conference. Surgery for Epilepsy. JAMA. 1990; 264:729–733
4)
Edelvik A, Rydenhag B, Olsson I, et al. Long-term outcomes of epilepsy surgery in Sweden: a national prospective and longitudinal study. Neurology 2013;81:1244–51.
5)
Sarkis RA, Jehi L, Najm IM, et al. Seizure outcomes following multilobar epilepsy surgery. Epilepsia 2012;53:44–50.
6)
D'Alessio L, Scévola L, Fernandez Lima M, Oddo S, Solís P, Seoane E, Kochen S. Psychiatric outcome of epilepsy surgery in patients with psychosis and temporal lobe drug-resistant epilepsy: A prospective

case series. Epilepsy Behav. 2014 Jul 15;37C:165-170. doi: 10.1016/j.yebeh.2014.06.002. [Epub ahead of print] PubMed PMID: 25036902.

7) Kim SK, Wang KC, Hwang YS, Kim KJ, Chae JH, Kim IO, Cho BK. Epilepsy surgery in children: outcomes and complications. J Neurosurg Pediatr. 2008 Apr;1(4):277-83. doi: 10.3171/PED/2008/1/4/277. PubMed PMID: 18377302.