



Presurgical evaluation for drug refractory epilepsy



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HIGHLIGHTS

- Presurgical evaluation for drug refractory epilepsy must be multimodal.
- Basic investigations are a video EEG documenting 3 habitual seizures more seizures must be recorded if there are multiple lesions, combination with pseudoseizures, normal MRI and discordance in localization between these.
- A 3 Tesla epilepsy protocol MRI which is electroclinically guided to its reading is a must.
- When there is discordance of these basic investigations or when the MRI is normal and shows multiple lesions- PET, Ictal and interictal SPECT (SISCOS) and MEG must be done.
- When the hypothesis is clear but not sufficient to go for direct surgery Stereo EEG implantation and grids (for mapping eloquent cortex) specially should be used.

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ABSTRACT

Surgical management of epilepsy is an established safe and effective way in improving patients' seizure frequency and overall morbidity. A robust array of options is available to carry out an in-depth evaluation of a surgical candidate in epilepsy. However, underutilisation of the available options may seriously challenge post-operative outcomes. In this paper, we discuss the different aspects of various non-invasive and invasive procedures available to evaluate a surgical candidate of epilepsy and discuss their relative advantages and position in the diagnostic algorithm.

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1. Introduction

Surgery for epilepsy is an established method for substantial reduction in seizure frequency and improvement in the quality of life of the patient. Although associated with inherent risks, the collaterals weigh less than the risk of uncontrolled seizures. The morbidity and mortality of seizures even if small (about 0.5%) is cumulative every year. Thus a person having 6 years of seizures will

have a risk of 3% mortality [1]. Adequate safety of epilepsy surgery has been proven in a majority of world literature an attendant the risk of death being no more than 2%. Thus it is not illogical to consider epilepsy surgery if the seizures are therapy resistant. Other causes to consider surgical intervention include: Fig. 1.

- cognitive decline accruing due to recurrent epilepsy is seen with certain epilepsy syndromes or status epilepticus (SE) [2].
- depression occurring in up to 9–37% and anxiety in up to 11–25% patients with medically refractory epilepsy mandates emergent redressal [3].

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Abbreviations

AED	Antiepileptic drug
AIIMS	All India Institute of Medical Sciences
AMTR	Anteromedial temporal resection
Cm	Centimeter
CT	Computerized Tomography
DRE	Drug-resistant epilepsy
ECoG	Electrocorticogram
EEG	Electroencephalogram
e.g	For example
etc	et cetera
fMRI	Functional Magnetic Resonance Imaging

FDG	Fluorodeoxyglucose
Hz	Hertz
ILAE	International League Against Epilepsy
LKS	Landau-Kleffner syndrome
ml	milliliter
MRI	Magnetic Resonance Imaging
MTS	Mesial Temporal Sclerosis
PCO ₂	Partial pressure of carbon dioxide
PET	Positron emission tomography
SE	Status epilepticus
SISCOM	Subtraction ictal-interictal SPECT coregistered to MRI
SPECT	Single-photon emission tomography

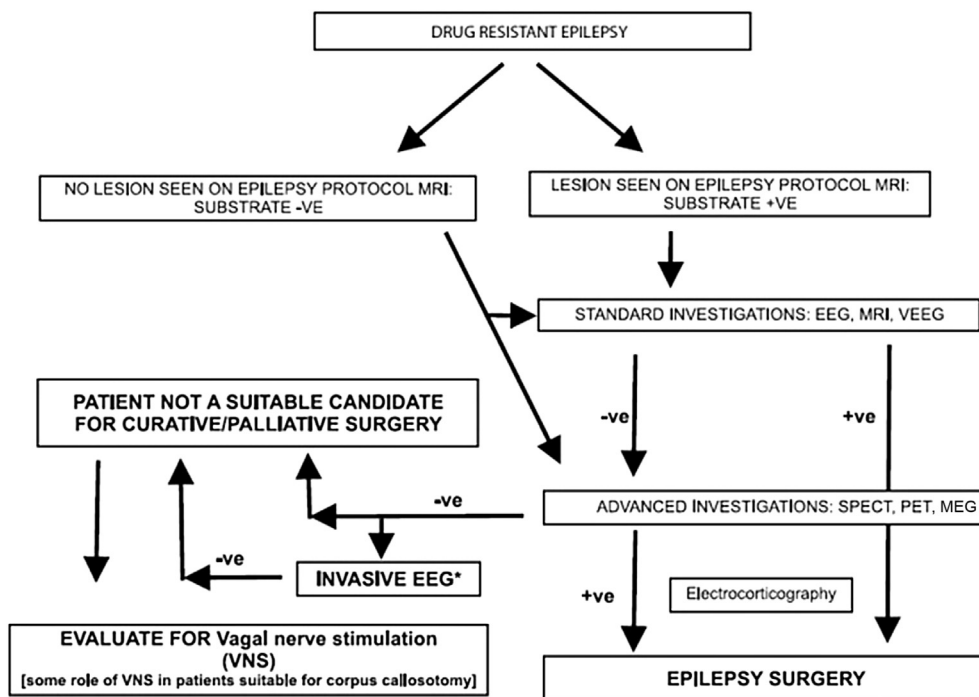


Fig. 1. Flowchart showing a management algorithm for patients being subjected to epilepsy surgery.

- c) vocational issues impeding employment
- d) social stigma associated with epilepsy, seen particularly in developing countries like India, and hence early surgery when indicated may be advantageous.
- e) better long term economic feasibility in the patient undergoing early surgery

In several retrospective trials and one prospective, randomized, controlled trial for a well-defined,

syndrome with a known favorable surgical outcome, surgery was demonstrated to have less morbidity and mortality. In addition, surgery also yielded a better quality of life and reduced depression and anxiety as early as three months after anteromedial temporal resection (AMTR), compared with continued medical therapy. This improved quality of life is specifically related to the occurrence of complete seizure freedom in both the medical and surgical study groups [1].

In order to undertake such a fruitful and successful procedure,

appropriate selection of candidates is a must along with their complete and thorough workup to maximize the benefit of surgery. In fact, the presurgical evaluation of the candidate to determine the suitability of the candidate for surgery is almost as important as selecting the correct surgical procedure for the candidate to improve morbidity and mortality outcomes.

1.1. Strategy for a surgical workup

The presurgical evaluation for epilepsy has changed substantially in the past few

decades, most notably since the advent of long-term video-EEG monitoring in the late

1970s, advanced neuroimaging, and subspecialty epilepsy centers. It is a coordinated input of an integrated team consisting of neurologists, neurophysiologists, neuropsychologists, social workers, radiologists, nurses, and epilepsy neurosurgeons. Aspects of the presurgical evaluation include patient's clinical history and

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