

Epilepsy in tropics: Indian perspective

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ABSTRACT

Epilepsy is a common neurological disorder affecting 0.5-1% of the population in India. The causes and treatment protocols vary widely. A proper understanding of the causes and treatment strategies is essential for managing this patient group. This article analyzes the common causes of epilepsy in India and provides a brief summary on the available treatment strategies.

Key words: Epilepsy, India, surgery, tropics

Introduction

Epilepsy affects 70 million people worldwide.^[1] It is considered a public health problem by the world health organization. India accounts for 10-20% (5-10 million) of the global burden of epilepsy. This is a challenge to health care services in India. Fifty to seventy percent of these patients receive either no or inadequate treatment. A proper understanding of the causes and treatment strategies is essential for managing this patient group. Infections of the central nervous system account for 2-3% of all cases of epilepsy, but are among the most common causes in infants and pre-school children. The risk of developing epilepsy and its subsequent prognosis depend on the severity of the illness and the age at which infections occurs.^[2]

Bacterial meningitis

Acute seizures are common in infections such as severe meningitis, viral encephalitis and malaria. Sequelae include increased morbidity, mortality and subsequent epilepsy. Neuronal excitability secondary to pro-inflammatory signals induced by CNS infections are a common mechanism for the generation of seizures, in addition to various other specific mechanisms.^[3]

The 20-year risk of later epilepsy is 13.4% if acute illness is complicated by seizures and 2.4% if it is not. The poor prognostic factors include extremes of age, bacteremia, seizures, coma, concomitant systemic illness, and delayed treatment.^[2]

Prompt treatment of acute seizures and the underlying CNS infection, correction of associated predisposing factors, and appropriate choice and duration of anti-epileptic therapy is the key to managing these cases. Prevention of CNS infections will ensure reduction of the burden of epilepsy, in developing countries.^[3]

Cerebral Abscess

Cerebral abscess occur secondary to suppurative infection elsewhere in the body. The source may be within the skull (40%), metastatic (33%), or unidentified (20%). Effective antibiotic therapy and improvements in ear, nose, and throat surgery have reduced the incidence of abscesses secondary to sinus or middle ear disease. The main sources of metastatic abscess are from the heart, lung, and teeth. Clinical presentation is variable with focal and generalized seizures. The diagnosis should be considered early for better outcome. Computerized tomography scanning is able to detect abscesses greater than 1 cm in diameter [Figure 1].

Chuang and colleagues reported acute symptomatic seizures in 17% and unprovoked seizures in 6.4% in a study of 205 brain absces patients. Early and late seizures occurred in almost equal number of patients. The overall mortality rate in the seizure patients was 23%. They

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concluded that the underlying valvular heart diseases and a fronto-parietal distribution of bacterial brain abscess were independent predictors of seizures, and the presence of late seizures was predictive of developing epilepsy.^[4]

Initial treatment is medical with the choice of antibiotics guided by knowledge of source of sepsis. Surgical intervention may be necessary if deterioration occurs. The advances in imaging have improved the prognosis, but the clinical course remains unpredictable and the mortality rate is still approximately 20%. Focal epilepsy is the most common sequelae and the risk rises over the time. On 10-year follow-up, 90% of the patients requiring surgical intervention will have developed this complication.

Subdural empyema

This occurs as a consequence of frontal or ethmoidal sinusitis due to direct extension or venous spread of infection. The most common offending pathogens are streptococci. Focal seizures are a late feature, and associated with a rapidly deteriorating conscious level. CT or MR scanning is usually required, but the mortality rate is high [Figure 2].

Tuberculosis

Tuberculosis is still a common infectious condition affecting the central nervous system (CNS) the in the developing countries. The clinical features vary widely. Tuberculous meningitis presents with cranial nerve palsies, cerebral infarction and obstructive hydrocephalus [Figure 3]. Tuberculomas account for 5-30% of intracranial mass lesions reported in developing countries and present with focal seizures [Figure 4]. Treatment with anti-tubercular drugs decreases the lesions and the mass effect [Figure 5]. Rarely they may present as

tubercular abscesses characterized by an encapsulated collection of pus containing viable tubercular bacilli without evidence of the classic tubercular granuloma. These lesions require surgical management that range from stereotactic aspiration of pus to craniotomy and excision of the abscess [Figure 6].

Acute seizures occur in 50% of children and 5% of adults. Rarely, they may present with convulsive or non-convulsive status epilepticus.^[5-7] These patients need to be on anti-epileptic drug cover for 3-6 months to avoid recurrence of seizures.^[7] The common drugs used are fosphenytoin/phenytoin, valproate or levetiracetam. The combination of anti-tubercular and anti-epileptic agents causes various drug interactions, which need to be kept in mind during initiation of treatment.^[8] Isoniazid inhibits phenytoin metabolism.^[9,10] Even though rifampicin counters this action, the serum drug levels need to be monitored. Isoniazid, rifampin, pyrazinamide, and valproate are hepatotoxic, and liver function needs to be monitored at regular intervals.

Neurocysticercosis

Cysticercosis is the larval stage of infection by the pork tapeworm *Taenia solium*. It is a leading cause of epilepsy in developing countries, central and South America. It is also a significant health problem in the developed world due to migration of infected individuals. Other cerebral manifestations include obstructive hydrocephalus, focal deficits, and rarely subarachnoid hemorrhages. Tonic-clonic seizures are the most common presenting feature.

The pathogenesis of is based on inflammation associated with viable and degenerating cysts and infarcts. Early treatment with praziquantel abolishes the need for continuing anti-epileptic drugs in 70% of cases, but if



Figure 1: Right temporal abscess with mass effect

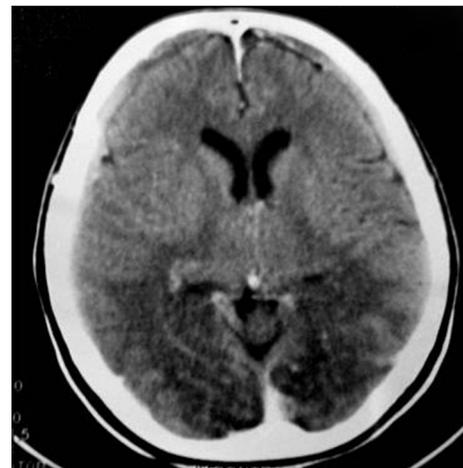


Figure 2: Right fronto-parietal subdural empyema

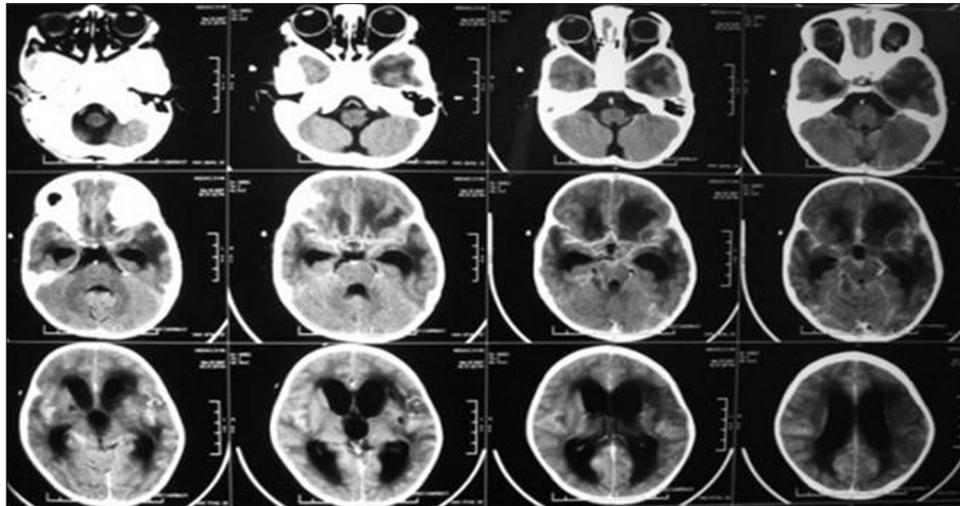


Figure 3: Tubercular meningitis with chronic basal exudates causing communicating hydrocephalus

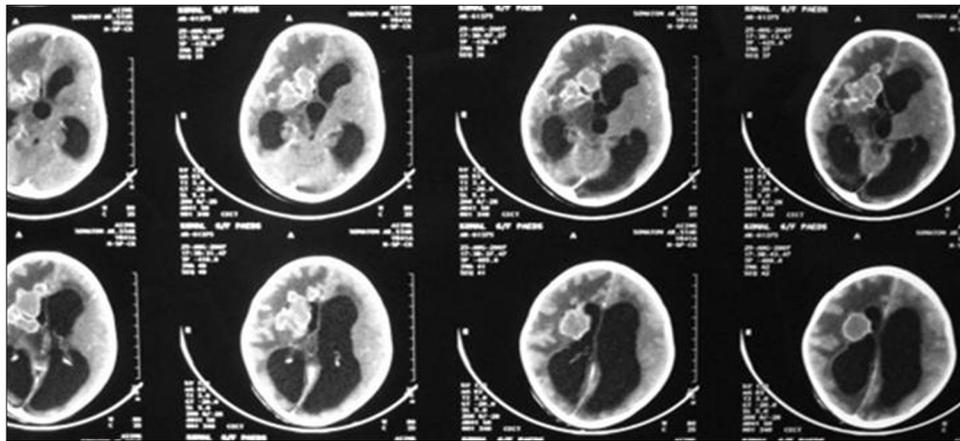


Figure 4: Multiple confluent tuberculomas in right frontal region with mass effect and obstructive hydrocephalus

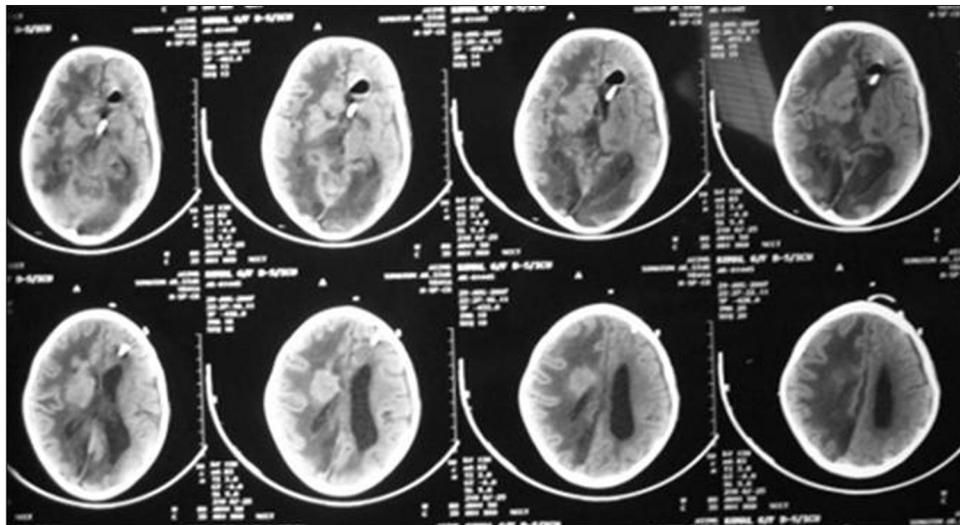


Figure 5: Patient in Figure 4, following external ventricular drain and initiation of anti-tubercular treatment showing decrease in tubercular lesions, mass effect, and resolution of hydrocephalus

the lesions calcify, a permanent epileptogenic focus may result. The radiographic appearance may be florid in untreated patients.

Indications and criteria for surgical intervention

Five to ten percent of epilepsy patients are sufficiently medically intractable to consider surgical therapy.

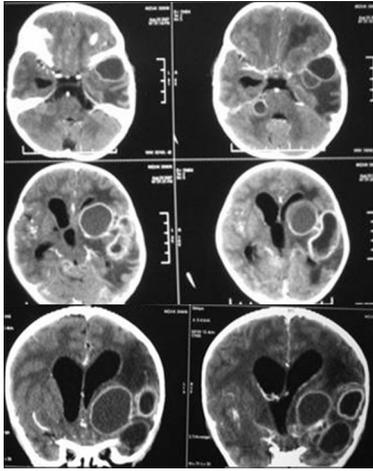


Figure 6: Multiple confluent tubercular abscesses in left fronto-parietal region with mass effect

Intractable epilepsy is a major risk for personal injury, quality of life, and in some cases, death. They also are a significant socio-economic burden to the individual and the society at large.

Surgery should be considered as early as possible when indicated. The technological advances in imaging and electroencephalography have paved the way for considering an early surgical intervention.

Surgery offers a relatively safe and effective means of either abolishing seizures, diminishing their severity, or reducing seizure frequency.^[3]

Indications for surgery^[11]

- When seizures recur despite use of appropriate anti-epileptic drugs (AEDs).
- Complex partial and secondarily generalized tonic clonic seizures due to alteration in consciousness, awareness or injury, and impair quality of life maximally.
- At least 2-3 seizures per year are considered necessary to benefit from surgical treatment.
- Seizures that occur randomly e.g. during sleep/driving an automobile is psychologically disturbing.
- Medial temporal lobe epilepsy responds well to surgical treatment.

Rationale for surgical intervention

Recurrent seizures result not only in physical harm but also in deterioration in brain structure and function with progressive decline in learning and memory. Serial imaging in patients with refractory seizures revealed progressive degeneration at anatomic loci remote from seizure origin.^[3,11]

Surgery has been established as safe, and the risk of surgery is shown to be lesser than the risks associated with the natural course of epilepsy. Moreover, surgery has a 60-70% chance of achieving seizure remission and 30-40% chance for reduction of seizure frequency.^[12]

Surgery may be resective as in lesionectomy, amygdalo-hippocampectomy with or without temporal lobe resection, multilobar resection, and hemispherectomy. Surgery may be non-resective as in subpial transections, corpus callosotomy, and vagus nerve stimulation.^[11]

Role of early intervention

Uncontrolled chronic epilepsy has the potential for irreversible cognitive, behavioral and psychosocial problems later in life. Hence, syndrome characterization, medical intractability and likely prognosis should be established early. Neural plasticity allows for functional recovery from cerebral resection when performed early in life. These facts clearly understate the importance for early surgical intervention in suitable candidates.

Contraindications to surgery

Underlying degenerative or metabolic disorders and benign epilepsy syndromes when remission is anticipated do not benefit from surgical treatment. Relative contraindications include medical noncompliance, inter-ictal psychosis, and mental retardation.^[13]

Conclusion

Even though the etiology of epilepsy is varied, they can be managed by single inexpensive medication. With proper treatment, 70-80% can lead normal lives. Early surgery in carefully selected patients can cure epilepsy.

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