AJPMHS GLOBAL RESEARCH NETWORK

AMERICAN Journal of Pediatric Medicine and Health Sciences

Volume 03, Issue 06, 2025 ISSN (E): 2993-2149

CALOSOTOMY IN PHARMACORESISTANT EPILEPSY

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Annotation: Epilepsy is a polyetiological, common disease of the nervous system, which is diagnosed in 1–2% of the adult population and 3–4% of children.

Most patients are successfully treated with antiepileptic drugs (AEDs), but long-term, sometimes lifelong, use of AEDs causes side effects, even with complete control of epileptic seizures. At the same time, almost 20-25% of epilepsy patients are resistant to anticonvulsant therapy, and surgical treatment is indicated for them [1].

Key words: meningioma, venous infarction, venous sinuses, drainage veins, postoperative complication

Introduction. Surgical treatment of epilepsy is developing in two main directions: the first is classical resection operations, the second is functional or palliative surgical interventions. Functional operations are used in situations where it is impossible to perform resection of the epileptic focus due to its localization in a functionally important area of the brain, several epileptic foci, multiple brain lesions, bilateral changes in electrical activity. Functional surgical interventions include callosotomy, multiple subpial transection, various stereotactic interventions, including radiosurgical, as well as electrical stimulation operations (vagus nerve stimulation, deep brain stimulation, long-term cortical and cerebellar stimulation) [2,3].

The corpus callosum is the largest and most important neuronal commissure connecting the cerebral hemispheres. Because of the large number of interneuronal connections in the corpus callosum, epileptic discharges can quickly spread from one hemisphere to another and cause generalization of epileptic seizures. Therefore, it was natural to assume that dissection of the corpus callosum could help block the spread of epileptic impulses from one hemisphere to another, which prevents a second generalization of seizures.

The purpose of calosotomy is to prevent the spread of epileptic activity from one hemisphere to another by interrupting the neural connections involved in the generalization of epileptic activity [4,5].

Calosotomy interrupts bilateral synchronization, but leaves an epileptic focus in the brain. Today, there are no clear indications for calosotomy. Operation

is indicated for patients with cryptogenic, symptomatic and idiopathic primary generalized tonic-clonic, atonic seizures and drop attacks, characterized by sudden loss of consciousness and falling. According to electroencephalography (EEG) data, patients exhibit bilateral synchronized epileptic activity [5–7].

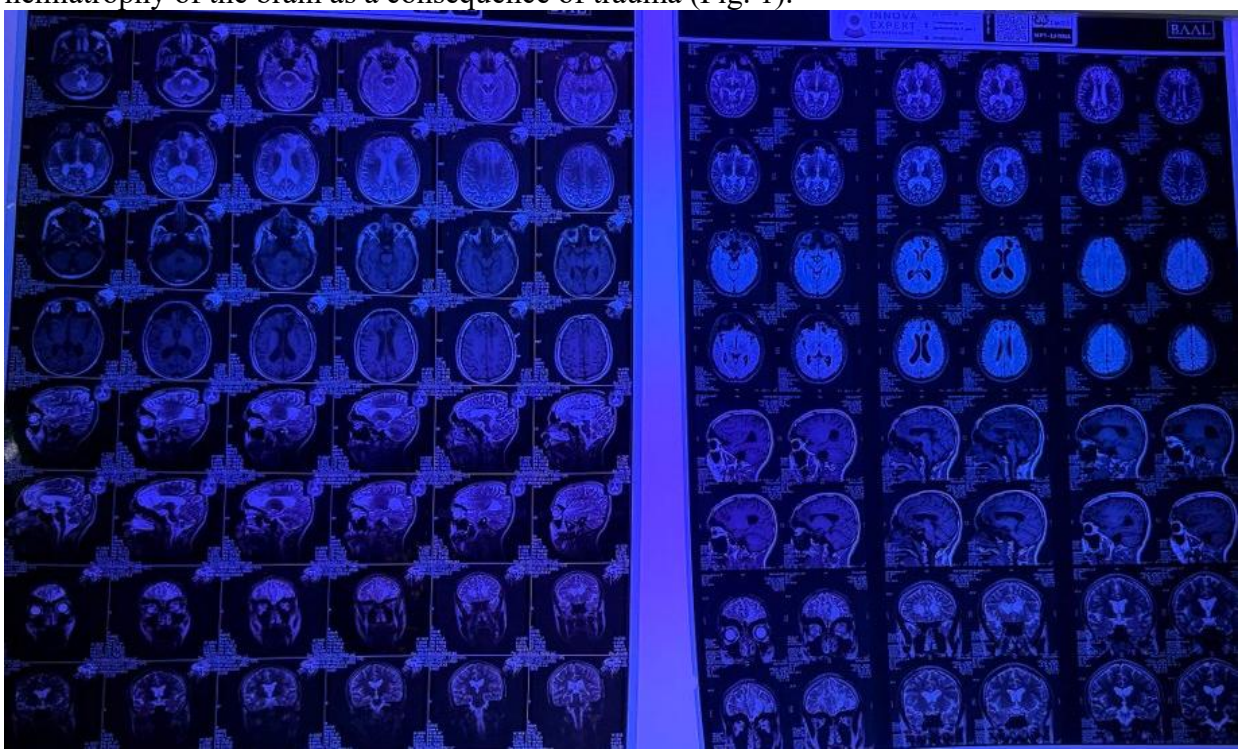
Most often, anterior callosotomy is performed, dissecting the corpus callosum from the beak to the posterior third of its trunk. If a positive effect from the operation is not observed, a second operation is performed within a period of several months to 2 years, during which the remaining posterior part of the corpus callosum is dissected. Such a period between operations is necessary to reduce the risk of separation syndrome. In severe cases of epilepsy and diffuse multifocal brain damage, total calosotomy is performed in one stage [12–14]. The latest approaches to calosotomy are the introduction of endoscopic, navigation, stereotactic, and in particular radiosurgical technologies [15–18].

Despite the widespread use of this operation, the results of calosotomy vary. This is due to the lack of clear standardization of the anatomical structures intersected during the operation and the lack of criteria for selecting patients for calosotomy, taking into account the characteristics of the course of the disease, the nature of epileptic seizures, and data from electrophysiological and neuroimaging research methods.

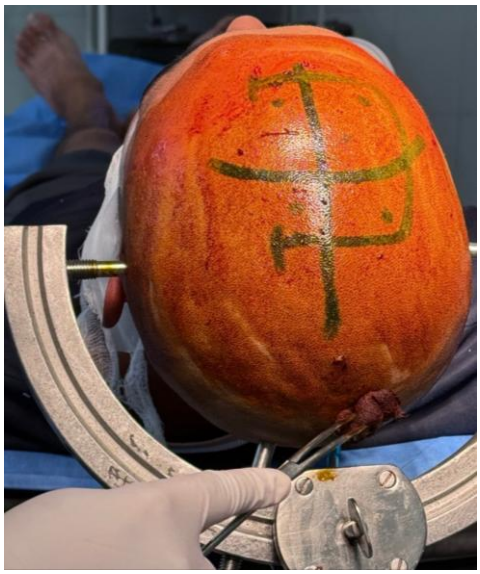
Materials and methods: In a multicenter study involving 56 patients who underwent calosotomy, complete cessation of epileptic seizures was observed in 7.6% of patients, significant improvement - in 60.9%, in 31.4% of patients the frequency of seizures after surgery did not change. In other studies, cessation of seizures was observed in 34% of patients, in 24% - the frequency of seizures decreased by more than 50%, in 32% it did not change. It was shown that generalized atonic seizures are better controlled, while the severity and frequency of partial seizures after calosotomy does not change significantly.

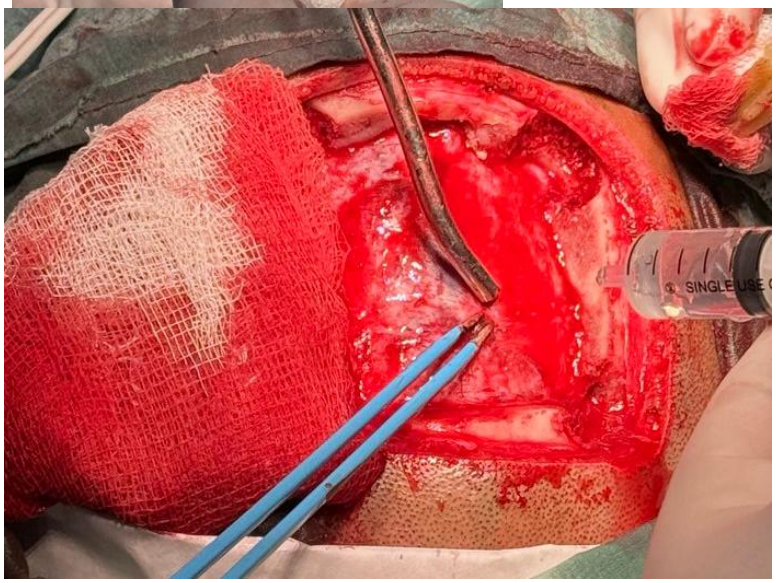
All patients tolerated stereotactic intervention well, there were no postoperative complications. Patients were discharged on the 7th-8th day. The observation period ranged from 3 to 18 months (11 months on average). In order to objectively evaluate the results of the operation, antiepileptic therapy was not changed for 6 months after the operation. In one observation, epileptic seizures ceased (Engel scale 1), in 2 patients the seizure frequency decreased by more than 90%, in 2 – by more than 50% (Engel scale 3). In 3 patients, who had partial seizures with secondary generalization before the operation, short-term partial seizures were detected after the operation, the frequency of which significantly decreased. This indicated blocking of the spread of epileptic activity from the intact epileptic focus to the opposite hemisphere. We present a clinical observation.

Patient Zh., 20 years old, was examined in the clinic. The diagnosis was: symptomatic epilepsy with simple partial seizures, secondary generalization, drug-resistant form, right-sided hemiatrophy of the brain as a consequence of trauma (Fig. 1).



Stages of right anterior colostomy

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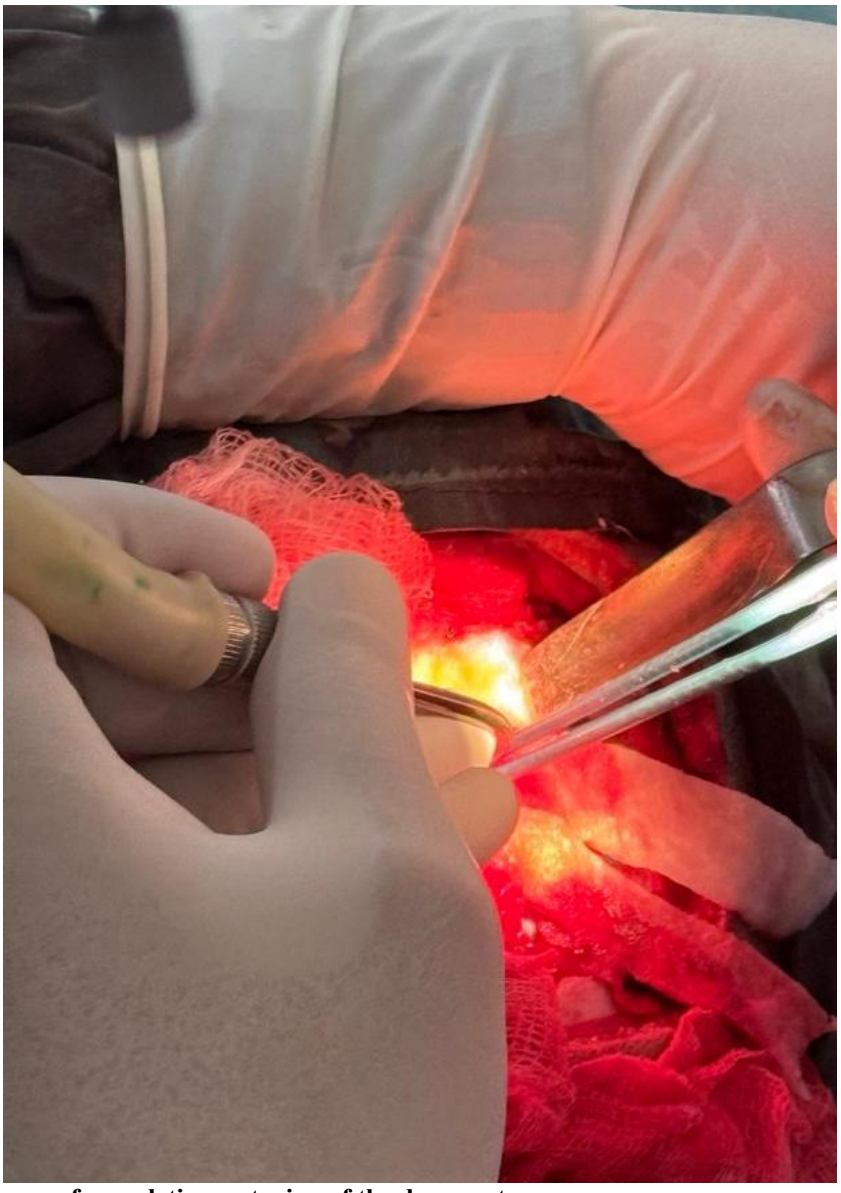
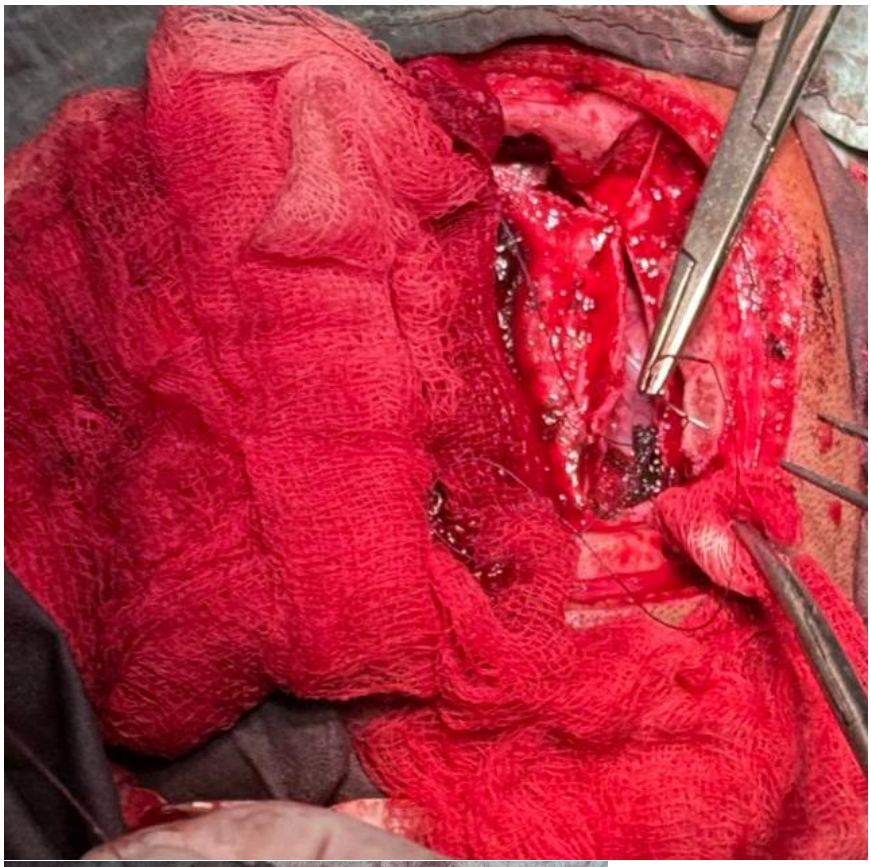
Microsurgical stage



Stages of completion, suturing of the dura mater



She used 4 AEDs, but the frequency of epileptic seizures remained high - up to 2 per day. According to MRI, focal structural changes in the right hemisphere of the brain were not detected, while according to electrophysiological studies, epileptic activity was observed in the left frontal-temporal region of the brain, which spread to the opposite hemisphere. The nature of epileptic changes in the electrical activity of the brain corresponded to the clinical manifestations of epileptic seizures: the seizures began with tonic tension of the right limbs, more upper, with further loss of consciousness, falling, tonic-clonic seizures. On 10.06.2024, an operation was

performed: stereotoxic anterior callosotomy on the right.
There were no complications; after the operation, antiepileptic therapy was not changed.
The observation period was 15 months. One month after the operation, the patient developed 3 short-term simple partial sensory seizures in the form of paresthesia in the right upper limb, after which the seizures ceased. According to the control EEG data, significant asymmetry in the distribution of epileptic activity between the hemispheres of the brain was revealed.
If before the operation the difference in pathological activity between the epileptic activity generating left hemisphere and the opposite right hemisphere was insignificant (the asymmetry coefficient — KA was 31%), after the operation a significant predominance of pathological activity in the affected left hemisphere was observed (KA 6). These data indicate blocking the spread of pathological impulses from one hemisphere to the other. The assessment of the effectiveness of surgical treatment according to the Engel scale is 1.
The obtained preliminary data indicate that stereotactic anterior callosotomy is an effective and safe method of surgical treatment of severe forms of symptomatic epilepsy due to the impossibility of resection of the epileptic focus. Despite the palliative nature of the surgical intervention, all patients managed to achieve a positive effect, and in one observation, epileptic seizures completely ceased, in 2 cases their frequency decreased by more than 90%. There were no complications during and after the operation. After the operation, the patients did not need to stay in the intensive care unit and postoperative rehabilitation continued.
The conducted research allows us to draw preliminary conclusions.

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