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Interhemispheric Transcallosal Resection in Pediatric Craniopharyngioma: A Case Report

Nameera Zaheer Surve[1], Lijamol Varghese Thoppil[1], Luka Kutchava[1]

[1]Tbilisi State Medical University, Georgia

Abstract:

Background: Craniopharyngioma is a rare benign tumor of the central nervous system and occurs most commonly in the pediatric population, characterized by partly cystic embryonic malformation within the sellar/parasellar region.

Case Presentation: We present the case of a 4-year-old boy with craniopharyngioma, manifesting as severe headache, vision changes, nausea, vomiting, and tonic seizure. Neuroimaging revealed an irregular, non-homogenous, calcified mass in the suprasellar region with compression of the optic chiasm and midbrain structures leading to obstructive hydrocephalus. Surgical intervention via the Interhemispheric transcallosal approach successfully resected the tumor, with no post-operative complications observed except for the development of central diabetes insipidus.

Conclusion: This case underlines the challenges in managing pediatric craniopharyngioma, emphasizing the importance of multidisciplinary collaboration for optimal patient care.

Keywords: Craniopharyngioma, pediatric tumor, Interhemispheric transcallosal resection

Introduction:

Craniopharyngioma is a rare benign tumor of the central nervous system and occurs most commonly in the pediatric population. It accounts for 5% of all the tumors in the pediatric population[1]. It is a partly cystic embryonic malformation of the sellar/parasellar region and tends to extend to the hypothalamus, optic chiasm, and third ventricle [2].

Case Presentation:

A 4-year-old boy presented with a 1-week history of severe headaches accompanied by nausea, vomiting, vision changes, and general weakness. The patient's symptoms were more prominent in the

morning after awakening and he also developed a fever and tonic seizure. General physical examination was unremarkable while neurological examination revealed Bitemporal hemianopsia. Laboratory blood tests showed increased levels of prolactin and decreased levels of FT4.

The magnetic resonance imaging of the brain revealed calcified irregular and heterogeneous mass in the suprasellar region with dimensions of 3.7 x 3.6 x 4 cm as seen in Fig.1. The tumor extended into the interpeduncular cistern, predominantly on the left side as seen in Fig.2, and a slight protrusion into the frontal lobe area, compressing optic chiasm and the midbrain as seen in Fig. 3 and Fig. 4. The radiological assessment also revealed slightly asymmetric and dilated lateral ventricles as seen in Fig. 5 indicative of obstructive hydrocephalus. Moreover, endoscopic biopsy through craniotomy revealed cholesterol crystals found in motor-oil-like fluid on gross examination. These imaging and biopsy findings confirm the diagnosis of craniopharyngioma.

The patient underwent complete surgical resection of the mass via an Interhemispheric transcallosal approach for the resection of the tumor through the site seen in Fig. 7. The tumor was successfully resected as seen in Fig. 6 with the absence of infection, CSF leak, or hematoma seen at the surgical site. The patient had polyuria following surgery and laboratory blood tests revealed hypernatremia indicating Central diabetes insipidus.

Discussion:

Pediatric craniopharyngioma is considered one of the most complicated and rare diseases in the pediatric population due to its varying anatomical locations. On the grounds of histologic nature, these tumors are divided into two types: adamantinomatous and papillary. The adamantinomatous variant, which presents with wet keratin, calcifications, and cystic appearance, is the most common in the pediatric age group. The papillary type is characterized histologically by its squamous epithelial cells arranged in a papillary (finger-like) pattern, without wet keratin and calcifications. Therefore, they tend to have a better prognosis than the adamantinomatous type, as it is less aggressive, and they have a lower tendency to recur after being surgically removed. [3]

The surgical management of craniopharyngioma varies greatly and usually depends on the tumor's location, size, and mass effect concerning critical surrounding structures. The surgical approach can be broadly divided into transcranial and endoscopic endonasal transsphenoidal [3]. An interhemispheric transcallosal approach done on the patient in this case report, comes under the transcranial approach, as the location and size of the tumor make this approach less invasive and easily accessible for complete resection of the lesion, leading to minimal damage to the surrounding structures thereby reducing the risk of post-operative neurological deficits. Postoperative complications in this patient, including Central diabetes insipidus manifested as polyuria, polydipsia, and hypernatremia, align with the cases seen in the previous studies [4]. Therefore, patients with craniopharyngioma continue to require care involving specialists from various fields of medicine from neurosurgeons to endocrinologists.

In conclusion, Pediatric craniopharyngioma is a challenging condition in terms of management due to its anatomical location and the age of the patient. This case report adds valuable insight into the surgical management of such tumors as well as a multidisciplinary collaboration involving neurosurgery, radiology, pathology, and pediatric care specialists.

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Figure:

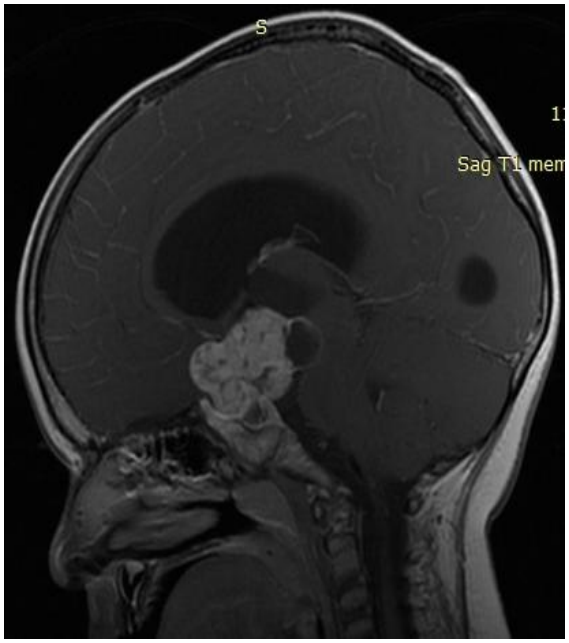

Fig. 1

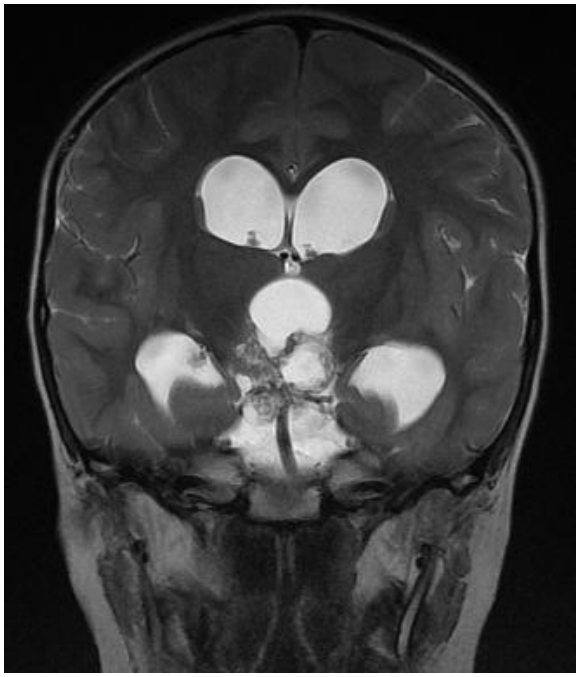

Fig.2

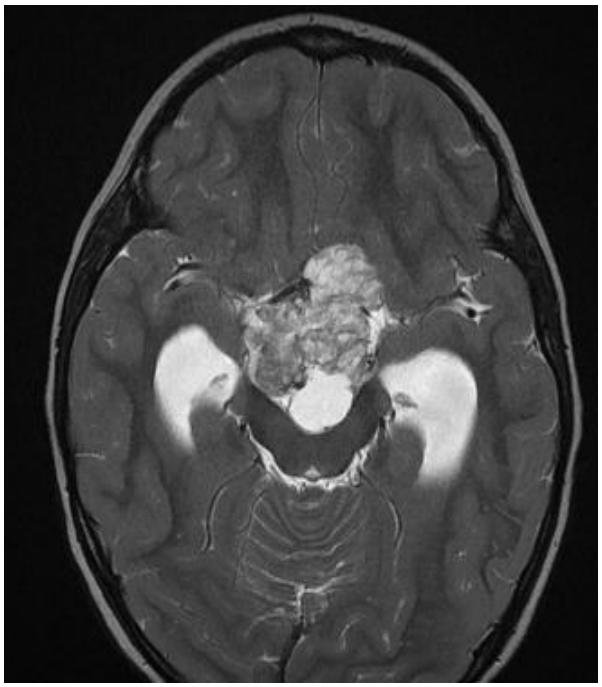

Fig. 3

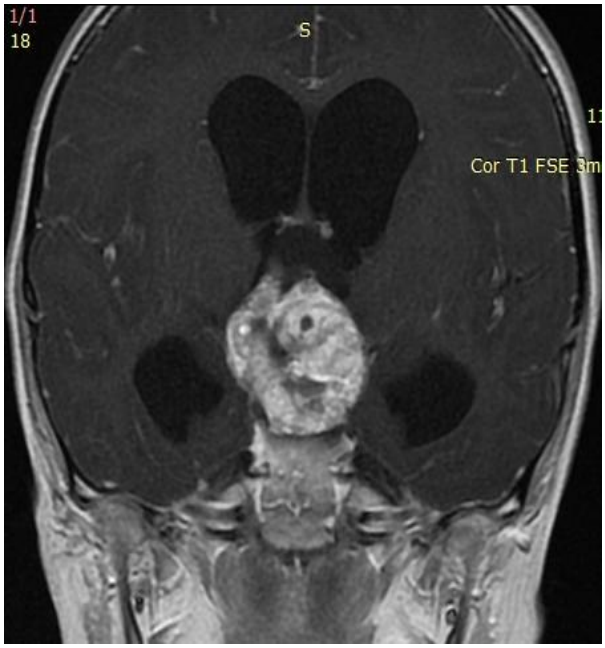

Fig. 4

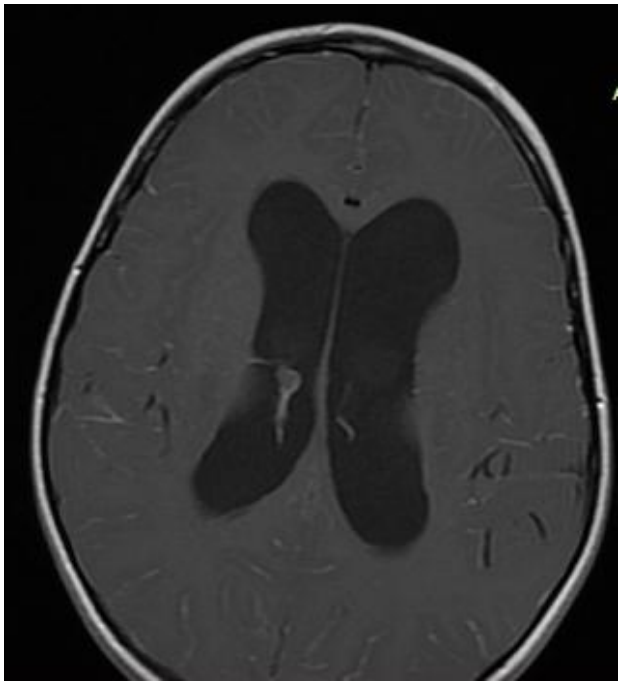

Fig.5

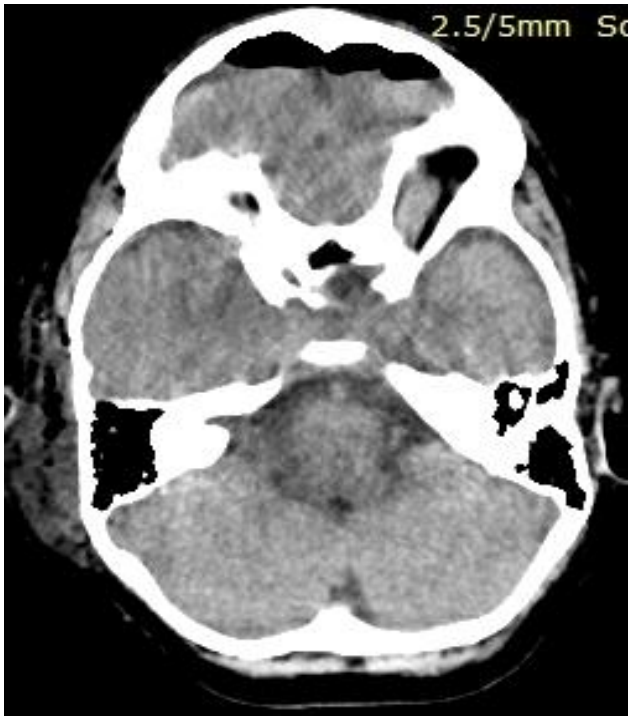

Fig. 6

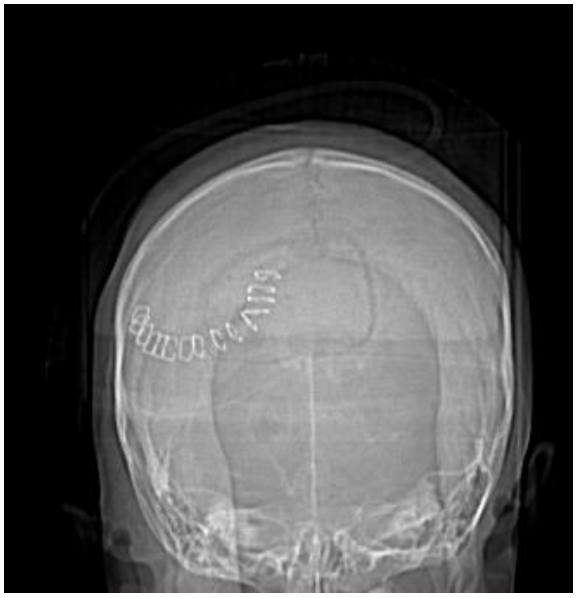

Fig. 7

პედიატრიული კრანიოფარიგნიომის რეზექცია ინტერჰემისფერული ტრანსკალოზალური მიდგომით: კლინიკური შემთხვევის მოხსენება

ნამეერა სურვე ზაჰეერ[1], ლიჯამოლ ვარგჰესე თჰოპპილ[1], ლუკა კუჭავა[1]

[1]თბილისის სახელმწიფო სამედიცინო უნივერსიტეტი

აბსტრაქტი:

შესავალი: კრანიოფარინგიომა არის ცენტრალური ნერვული სისტემის იშვიათი, კეთილთვისებიანი სიმსივნე, რომელიც ყველაზე ხშირად გვხვდება პედიატრიულ პოპულაციაში. მისთვის დამახასიათებელია ნახევრად კისტური, ემბრიონული მალფორმაცია თურქული კეხის მიდამოში.

კლინიკური შემთხვევის პრეზენტაცია: ჩვენ წარმოგიდგენთ 4 წლის ბიჭის კლინიკურ შემთხვევას კრანიოფარინგიომის დიაგნოზით. მისი სიმპტომები გამოიხატებოდა ძლიერი თავის ტკივილით, მხედველობის ცვლილებით, გულისრევის შეგრძნებით და ტონური ხასიათის გულყრებით. თავის ტვინის ვიზუალიზაციამ გამოავლინა არასწორი ფორმის, არაჰომოგენური სტრუქტურის, მოცულობითი წარმონაქმი ალაგ გაკირული კერებით, სუპრასელალურ მიდამოში. წარმონაქმნი იწვევდადა ზეწოლას ოპტიკურ ქიაზმასა და შუატვინის სტრუქტურებზე, რის შედეგადაც ჩამოყალიბდა ოკლუზიური ჰიდროცეფალია. ქირურგიული რესექცია ჩატარდა ინტერჰემისფერული ტრანსკალოზალური მიდგომით.

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დასკვნა: ჩვენი კლინიკური შემთხვევის მოხსენება ხაზს უსვამს პედიატრიული კრანიოფარინგიომის მკურნალობის სირთულეებს და განსაკუთრებულ ყურადღებას ამახვილებს მულტიდისციპლინარული კოლაბორაციის მნიშვნელობაზე პაციენტის ოპტიმალური მკურნალობისათვის.

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