ScientificScholar®
Knowledge is power
Publisher of Scientific Journals

www.surgicalneurologyint.com

Surgical Neurology International

Editor-in-Chief: Nancy E. Epstein, MD, Clinical Professor of Neurological Surgery, School of Medicine, State U. of NY at Stony Brook.

SNI: Infection

Editor
Ali Akhaddar, MD, IFAANS
Avicenne Military Hospital, Marrakech, Morocco

SNI
Open Access

Case Report

Intrasellar cysticercosis cyst treated with a transciliary supraorbital keyhole approach – A case report

J Javier Cuellar-Hernandez[1], Alan Valadez-Rodriguez[1], Ramon Olivas-Campos[1], Paulo Tabera-Tarello[1], Daniel San Juan-Orta[2], Roberto Segura-López[1], Agnès Fleury[3]

[1]Department of Neurosurgery, Northeast National Medical Center, Monterrey, Nuevo Leon, Mexico, [2]Department of Epilepsy, National Institute of Neurology and Neurosurgery, [3]Department of Neurocysticercosis, National Institute of Neurology and Neurosurgery, Mexico City, Mexico.

E-mail: *Jose Javier Cuellar Hernandez - javiercueher@gmail.com; Alan Valadez-Rodriguez - ajvrnxqx@gmail.com; Ramon Olivas-Campos - ramon_olivasc@hotmail.com; Paulo Tabera-Tarello - paulo.taberamd@gmail.com; Daniel San Juan-Orta - pegaso31@yahoo.com; Agnès Fleury - afleury@iibiomedicas.unam.mx; Roberto Segura-López - roberto_segura09@hotmail.com

***Corresponding author:**
J Javier Cuellar-Hernandez, Department of Neurosurgery, Northeast National Medical Center, Monterrey, Nuevo Leon, Mexico.

javiercueher@gmail.com

Received : 23 October 2020
Accepted : 21 November 2020
Published : 11 December 2020

DOI
10.25259/SNI_755_2020

Quick Response Code:

ABSTRACT

Background: Neurocysticercosis is the most common parasitic disease affecting the central nervous system. Isolated sellar cysticercosis cysts are rare and can mimic other sellar lesion as cystic pituitary adenoma, arachnoid cyst, Rathke cleft cyst, or craniopharyngioma. The surgical resection is mandatory because the cysticidal drugs are ineffective, however, new microsurgical approaches are emerging to reduce complications and need to test in this condition. We present a patient with a sellar cysticercosis cyst treated by transciliar supraorbital keyhole approach.

Case Description: A 45-year-old female with presented with chronic severe headaches, progressive deterioration of 6 months in visual acuity and bitemporal hemianopia. The pituitary hormonal levels were normal. Magnetic resonance findings showed a sellar and suprasellar cyst and underwent a microsurgical supraorbital transciliar keyhole approach for lesion resection. Pathologically, the lesion demonstrated a parasitic wall characterized by wavy, dense cuticle, and focal globular structure, surrounding inflammatory reaction with plasma cells. Postoperatively, the patient recovery fully neurologically.

Conclusion: Intrasellar cysticercosis cyst causes significant neurological deficits due to its proximity to the chiasm, optic nerves, pituitary stalk, and the pituitary gland. Surgical section is an effective treatment. The supraorbital keyhole craniotomy offers satisfactory exposure, possibility of total resection with dissection of the supra and parasellar structures, short operative time, less blood loss, short hospital stay, and good overall surgical outcome.

Keywords: Cysticercosis cyst, Keyhole, Sellar, Supraorbital craniotomy

INTRODUCTION

Neurocysticercosis (NCC) is the most common parasitic disease affecting the central nervous system (CNS), cysticercosis can arise almost anywhere in the CNS (e.g., intraparenchymal, cisternal, or intraventricular) and in rare cases has been described in the sellar or suprasellar region.[7] In suprasellar region, isolated sellar cysticercosis cysts represent nearly half of cases, with the remaining patients having evidence of extrasellar or disseminated CNS involvement,[5] it can mimic a cystic pituitary adenoma, arachnoid cyst, Rathke cleft cyst, or craniopharyngioma.

In our country, where NCC is endemic, there are scare reports since 1985[14] and later 1988.[6] Due to recent advances in microscope optics, and a better understanding of microneuroanatomy, it has been possible to treat sellar lesions with minimal invasive techniques[15] that have the potential to improve the cost-effectiveness, decrease operative morbidity, and facilitate patient recovery. The supraorbital transciliar keyhole approach is a secure minimally invasive procedure and a valid alternative to the traditional craniotomies to access lesions of the anterior cranial fossa.[10,15] This minimally invasive procedure provides the same exposition and chances of tumor control, as wider craniotomies, without increasing the complication rate. Here, we present a 45-year-old female who developed a chiasmatic syndrome due to a sellar and suprasellar cysticercosis cyst.

CASE PRESENTATION

A 45-year-old woman living in an endemic area for cysticercosis, presented with chronic severe headaches, progressive deterioration of 6 months in visual acuity with blurring of her left-sided vision that caused her to bump into objects on her left side and later in the right eye.

On neurological examination, visual acuity in the right eye 20/60 and in the left eye 20/80, isochoric pupils of 2 mm and normal light reflex, bitemporal hemianopia, and extraocular movements were of full range, fundus examination was within normal limits.

Pituitary hormonal assay was carried out and was found to be normal. Brain magnetic resonance (MR) showed a cystic image in the sellar and suprasellar region (i.e., 17 × 20 × 22 mm) hyperintense on T2 sequence and hypointense on T1 with no capsule enhancement on the contrast study, causing upward displacement and compression of the optic chiasm [Figure 1].

Surgery

The patient underwent a supraorbital transciliar keyhole approach. This was performed utilizing microscopic visualization and we identified a cyst with a firm avascular capsule, clear liquid content, with lax adhesions to the chiasm, optic nerves and to a small area of thickened arachnoid and diaphragm sellae, without arterial compromise that was fully resected without complications or incidents [Figure 2]. Histological examination revealed a parasitic wall characterized by wavy, dense cuticle, and focal globular structure, surrounding inflammatory, mononuclear lymphocytic reaction with plasma cells [Figure 3]. Postoperative lentil lectin glycoprotein enzyme-linked immunoelectrotransfer blot was positive. These findings were compatible with cysticercosis cyst. Postoperatively, course was satisfactory with improvement of the visual fields, leading to discharge home 3 days after surgery.

DISCUSSION

NCC is the larval phase of *Taenia solium* in the human CNS, being this the most common parasitic brain disease in the world.[1] With an approximated prevalence of 370,710 cases of NCC in the 2010, with a mortality of about 28,114 individuals, and a prevalence that goes from 13% to 54% in Latin America, Asia, and sub-Saharan Africa, this disease is a public health issue.[4,18]

Being divided into parenchymal and extraparenchymal disease, the location of the parasite defines the pathophysiology, clinical, therapeutic, and prognostic outcomes of this illness. This difference is important for the effectiveness of the cysticidal treatment, having a very poor effectiveness in cysts located in the basal cisterns and the intraventricular space, because of the lack of interaction with the immune cells and a very low concentration of cysticidal drugs in this compartment.[8,11,12]

The extraparenchymal form that accounts for 15–30% of the cases has variable clinical manifestations including intracranial hypertension, cranial nerve abnormalities, and hydrocephalus.[11,17] Sellar NCC was also eventually recognized in autopsy series of patients with NCC,[3,5] increased awareness of intrasellar NCC only came after the introduction of modern neuroimaging diagnostic methods. In 1985 and 1988, the first series of eight patients with intrasellar cysticercosis was reported from Mexico City.[6,14]

The use of computed tomography (CT) and MR imaging helps making diagnosis of sellar pathologies including pituitary adenomas, arachnoid cysts, Rathke cleft cysts, craniopharyngioma, and NCC. The appearance of bony expansion and erosion of the sella with a hypodense cystic lesion, and occasional calcification mass, there, or in other brain region, supports the diagnosis of sellar NCC. On MR, this disease presents with a cyst that have low or high T1 signal and a heterogeneous content, also presenting enhancement and thickening of the infundibulum, and leptomeningeal enhancement in the parasellar region.[20] In extraparenchymal disease, the MR is more sensitive than CT because it allows the detection of the scolex, but even with this advantage, the attenuation and signal intensity of the cysts content being similar to the cerebrospinal fluid (CSF), and the lack cystic wall and frequent lack of scolex make this and underdiagnosed disease.[1,5]

The medical treatment in sellar NCC disease is not well established. The use of antiparasitic drug preoperatively in surgery candidate patients can result in disruption of the parasite integrity and inflammatory response that can make more difficult the cyst removal. For this reason, the surgical removal of the cysticerci recommended rather than medical therapy[19] and even the shunt surgery given it long-term mortality.[4,11] In the case we present, no anthelminthic therapy was use neither preoperative nor postoperative.

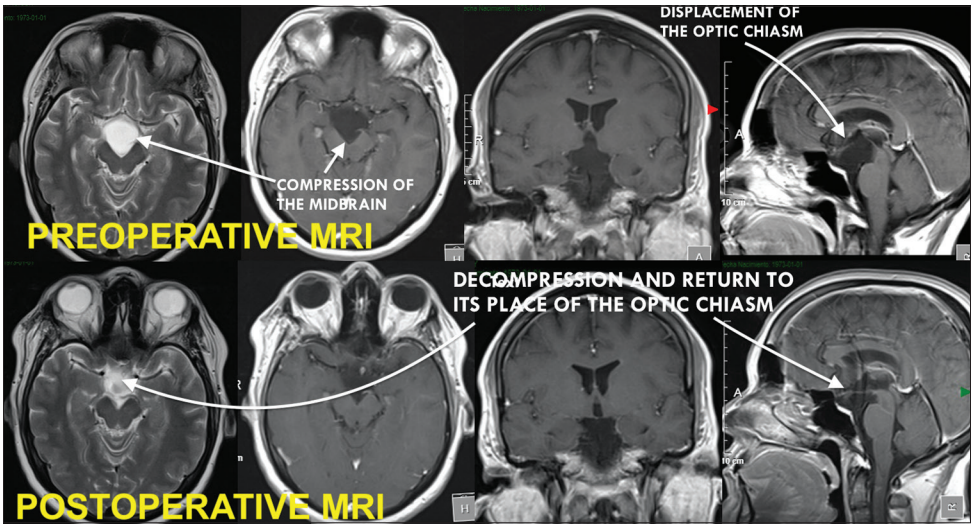

Figure 1: Preoperative magnetic resonance imaging (MRI) showed cystic image in the sellar and suprasellar region (i.e., 17 × 20 × 22 mm) hyperintense on T2 sequence and hypointense on T1 with no capsule enhancement on the contrast study, causing upward displacement and compression of the optic chiasm. Postoperative MRI reveals resection of the cyst with liberation of the sellar and interpeduncular arachnoid space.

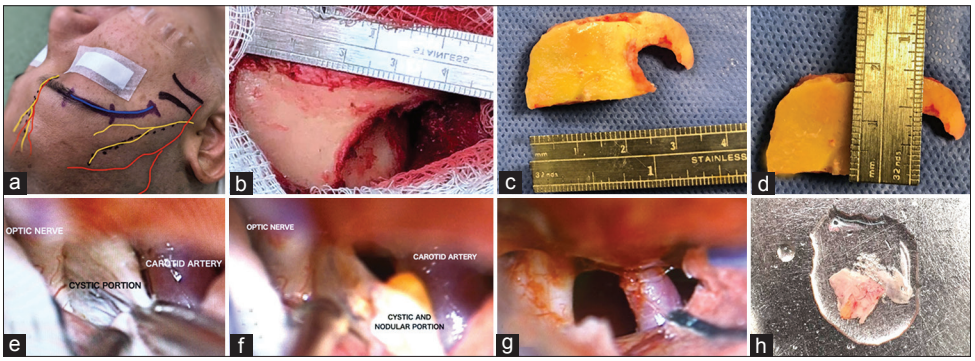

Figure 2: (a) Planning the approach taking into account the anatomical landmarks (supraorbital nerve and artery, frontal branch of the facial nerve, zygomatic arch, and supraorbital notch). (b-d) Single frontobasal burr hole was made posterior to the temporal line, thereafter, a "c"-shaped line is cut from the medial border of the frontobasal cut, thus creating a bone flap with a width of 2 × 3 cm. (e) Surgical field where is observed the internal carotid artery, optic nerve, and the cyst. (f and h) Once the cystic portion was resected, we identified a nodular portion compatible with the scolex. (g) Free carotid optic space due to total cyst resection.

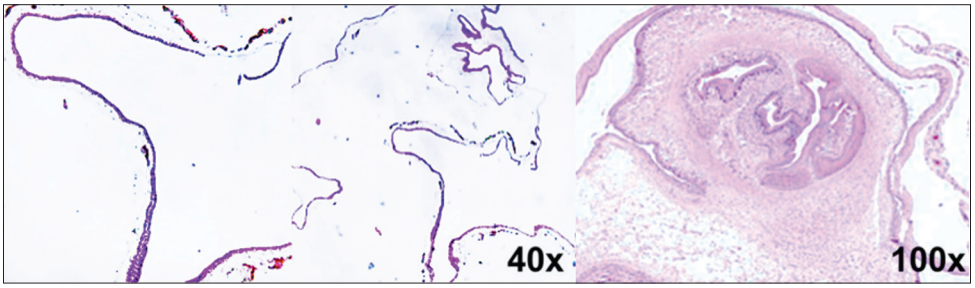

Figure 3: Microscopic image demonstrating the scolex and the parasitic wall with wavy, dense cuticle, and focal globular structure, surrounding inflammatory, mononuclear lymphocytic reaction with plasma cells. (H and E) (×40 and ×100).

The supraorbital approach allows a corridor to much of the anterior and middle cranial base and minimizes or eliminates frontal lobe retraction while exposing lesions of the sella, sphenoid wing, posterior clinoid, and other regions of the skull base. Neurovascular structures are also well visualized, and the cosmetic result is optimal.[10,15] Cheng *et al.*[2] verified quantitatively the keyhole concept in a study, concluding that with a constant rotation of the angle of view, surgeons can

access the deep parasellar region and obtain an equal area of exposure with the supraorbital keyhole approach as can be obtained with the standard pterional and supraorbital approaches. The intracranial structures on the contralateral side can also be visualized. Among the possible complications, CSF fistula, supraorbital nerve injury, and damage with communication of the frontal sinus may occur.[15]

The case we present had a campimetric deficit as the main clinical presentation caused by chiasmatic compression secondary to an intrasellar cyst. This clinical manifestation has been reported in the revised bibliography in very few cases,[3,8] having hormonal disturbances as the main clinical deficit within this location,[6,7,9,13] as well headache, loss of visual acuity, blindness, and even exophthalmos.[5] In endemic areas, every patient with a chiasmatic syndrome and hormonal disturbances, NCC needs to be rule out.[16]

CONCLUSION

Intrasellar cysticercosis cyst causes significant neurological deficits due to its proximity to the chiasm, optic nerves, pituitary stalk, and the pituitary gland. Surgical section is an effective treatment for the mass effect and performing it through minimally invasive surgery improves the outcome of the patient. The supraorbital keyhole craniotomy offers satisfactory exposure, possibility of total resection with dissection of the supra and parasellar structures, short operative time, less blood loss, short hospital stay, and good overall surgical outcome.

Declaration of patient consent

Patient's consent not required as patients identity is not disclosed or compromised.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Carpio A, Fleury A, Hauser WA. Neurocysticercosis: Five new things. Neurol Clin Pract 2013;3:118-25.
2. Cheng CM, Noguchi A, Dogan A, Anderson GJ, Hsu FP, McMenomey SO, *et al*. Quantitative verification of the keyhole concept: A comparison of area of exposure in the parasellar region via supraorbital keyhole, frontotemporal pterional, and supraorbital approaches. J Neurosurg 2013;118:264-9.
3. Cheong JH, Kim JM, Kim CH. Neurocysticercosis involving the pituitary stalk: Case report and literature review. J Korean Neurosurg Soc 2010;48:91-3.
4. Degiorgio CM, Houston I, Oviedo S, Sorvillo F. Deaths associated with cysticercosis. Report of three cases and review of the literature. Neurosurg Focus 2002;12:e2.
5. del Brutto OH, del Brutto VJ. Intrasellar cysticercosis: A systematic review. Acta Neurol Belg 2013;113:225-7.
6. del Brutto OH, Guevara J, Sotelo J. Intrasellar cysticercosis. J Neurosurg 1988;69:58-60.
7. Dutta D, Kumar M, Ghosh S, Mukhopadhyay S, Chowdhury S. Pituitary hormone deficiency due to racemose neurocysticercosis. Lancet Diabetes Endocrinol 2013;1:e13.
8. Fleury A, Carrillo-Mezo R, Flisser A, Sciutto E, Corona T. Subarachnoid basal neurocysticercosis: A focus on the most severe form of the disease. Expert Rev Anti Infect Ther 2011;9:123-33.
9. Ghosh S, Al-Khalili R, Liu JK, Slasky SE. Paradoxical migrating cyst: An unusual presentation of intraventricular neurocysticercosis with a coincidental pituitary adenoma. J Clin Neurosci 2014;21:1066-8.
10. Jane JA, Park TS, Pobereskin LH, Winn HR, Butler AB. The supraorbital approach: Technical note. Neurosurgery 1982;11:537-42.
11. Jensen TO, Post JJ. Intraventricular neurocysticercosis: Presentation, diagnosis and management. Asian Pac J Trop Med 2016;9:815-8.
12. Nash TE, O'Connell EM, Hammoud DA, Wetzler L, Ware JM, Mahanty S. Natural history of treated subarachnoid neurocysticercosis. Am J Trop Med Hyg 2020;102:78-89.
13. Paik KK, Lim SK, Lee HC, Lee EJ, Huh KB, Kim DI, *et al*. Empty sella syndrome associated with central nervous system cysticercosis. Korean J Intern Med 1988;3:128-31.
14. Rafael H, Gomez-Llata S. Intrasellar cysticercosis. Case report. J Neurosurg 1985;63:975-6.
15. Reisch R, Perneczky A. Ten-year experience with the supraorbital subfrontal approach through an eyebrow skin incision. Neurosurgery 2005;57 Suppl 4:242-55; discussion 242.
16. Sibat HF, Valdés LF. Uncommon clinical manifestations of cysticercosis. In: Novel Aspects on Cysticercosis and Neurocysticercosis. Vol. 8. Rijeka, Croatia: InTech; 2013. p. 199-233.
17. Simão D, Teixeira JC, Campos AR, Coiteiro D, Santos MM. Fourth ventricle neurocysticercosis: A case report. Surg Neurol Int 2018;9:201.
18. Torgerson PR, Devleesschauwer B, Praet N, Speybroeck N, Willingham AL, Kasuga F, *et al*. World Health Organization estimates of the global and regional disease burden of 11 foodborne parasitic diseases, 2010: A data synthesis. PLoS Med 2015;12:e1001920.
19. White AC Jr., Coyle CM, Rajshekhar V, Singh G, Hauser WA, Mohanty A, *et al*. Diagnosis and treatment of neurocysticercosis: 2017 clinical practice guidelines by the infectious diseases society of America (IDSA) and the American society of tropical medicine and hygiene (ASTMH). Clin Infect Dis 2018;66:e49-75.
20. Zada G, Lopes MB, Mukundan S Jr., Laws E Jr. Neurocysticercosis of the sellar region. In: Atlas of Sellar and Parasellar Lesions. Berlin: Springer International Publishing; 2016. p. 419-22.

How to cite this article: Cuellar-Hernandez JJ, Valadez-Rodriguez A, Olivas-Campos R, Tabera-Tarello P, Juan-Orta DS, Fleury A, *et al*. Intrasellar cysticercosis cyst treated with a transciliary supraorbital keyhole approach – A case report. Surg Neurol Int 2020;11:436.