

## Commentary on “Arachnoid cysts of the quadrigeminal cistern: Proposal of a therapeutic algorithm based on a systematic review of literature”

Luca Massimi 

Università Cattolica del Sacro Cuore

 Luca Massimi, MD

e-mail: [lucamax30@hotmail.com](mailto:lucamax30@hotmail.com)

Available at: <http://www.archpedneurosurg.com.br/>

Keywords: quadrigeminal cistern, arachnoid cysts, endoscopic third ventriculostomy, neuroendoscopy, hydrocephalus

Commentary on “Arachnoid cysts of the quadrigeminal cistern: Proposal of a therapeutic algorithm based on a systematic review of literature” by Ferreira Furtado LM et al

Quadrigeminal plate arachnoid cysts (QACs) usually raise a great interest among neurosurgeons, especially those dealing with children, because of the peculiar location (midpoint of the intracranial space), the surrounding anatomy and the possible clinical implications (rich number of possible signs and symptoms, hydrocephalus).

As for most of the other types of arachnoid cysts, QACs are treated by an endoscopic fenestration in many Centers since it is felt as the best approach to manage them and the associated hydrocephalus. However, according to the literature, there is not enough evidence to recommend this approach because of the rarity of QACs and, subsequently, the low number of dedicated studies. Actually, microsurgery and even shunt are still advocated as effective though burdened by a higher rate of complications [1].

On these grounds, the review performed by Ferreira Furtado and coworkers provides a relevant update to increase the knowledge about QACs. First of all, a careful analysis of the anatomy of the quadrigeminal plate region, namely its anatomical limits and the differentiation of its arachnoid complex, allows to understand why ovoidal-shaped QACs mainly grow following an antero-posterior path without causing aqueduct compression while the

globular-shaped ones mainly grow along a rostro-caudal axis resulting in aqueduct stenosis and hydrocephalus. These findings, which can be commonly found in the daily clinical practice, have important implications on the prognosis other than on the indications for surgery.

Secondly, this review study further supports neuroendoscopy as the gold standard way to manage QACs. In the personal experience, a ventriculocistostomy plus cisternostomy or ETV is realized whenever possible to increase the success of the endoscopic procedure, independently from the age of the patients [2-4]. Good results are reported even in infants old less than 6 month [5,6]. Actually, the risk of reoperation after neuroendoscopy for QACs is related only partially to the young age of children since it can result also from a misdiagnosed/not properly treated hydrocephalus [7].

The proposed algorithm of treatment is shareable for several reasons: 1) It shows no need of surgical indications in asymptomatic cases with radiologically stable QACs. Indeed, the ovoidal-shaped cysts, in spite of an initial growth that can occur in the first months of life, tend to remain stable in size and asymptomatic; 2) It demonstrates the predominant role of neuroendoscopy in the management of QACs, especially when hydrocephalus is associated, by confirming its safety and effectiveness. Indeed, microsurgery maintains a role in selected case, that is when a reliable fenestration cannot be obtained through the endoscopic approach. Actually, due to

<http://www.archpedneurosurg.com.br/>

Submitted: 14 June 2023  
Accepted: 06 September 2023  
Published: 08 January 2024

License terms



e1982023



## Commentary on “Arachnoid cysts of the quadrigeminal cistern: Proposal of a therapeutic algorithm based on a systematic review of literature”

the invasiveness of the supracerebellar infratentorial or the suboccipital transtentorial route, the routine use of microsurgery is discouraged [8]. Similarly, shunting procedures should be adopted only in case of repeated failures of the previous techniques. Also the advantages on the long-term outcome of fenestrating the cyst into the cistern (interpeduncular cistern by ETV or ambiens cistern by cisternostomy) rather than into the lateral ventricle only is reaffirmed.

The only questionable point of the algorithm is the use of “endoscopic fenestration + choroid plexus coagulation (CPC)” in infants < 6 months. Actually, CPC has been demonstrated to increase the success rate of ETV in infants, although the results are mainly limited to the Uganda and USA experiences, but such a success is the result of the association between CPC and ETV and not from CPC and cyst fenestration [9]. Therefore, such an option should be proposed in infants with QACs and hydrocephalus manageable with ETV. Moreover, since CPC adds some risks of morbidity to the endoscopic procedure (ETV + cyst fenestration), at least an adequate ETVSS (ETV success score) [10] should be reached by the patient prior to consider an ETV-CPC in addition to the mere cyst fenestration.

As acknowledged by the authors, the main limitation of this study is related to the rarity of QACs and, subsequently, to the few studies and cases available on the literature. However, their analysis provides an updated view on the current management of QACs. Moreover, it could represent the trigger to propose a multicenter study.

### ACKNOWLEDGMENTS

None

### DISCLOSURES

#### *Conflict of interest*

The authors declare no conflicts of interest with respect to the content, authorship, and/or publication of this article.

#### *Funding*

This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors

### CONTRIBUTIONS

-**Luca Massimi:** Conceptualization, Formal Analysis, Methodology, Validation, Writing – original draft, Writing – review & editing

### REFERENCES

- Jünger ST, Knerlich-Lukoschus F, Röhrig A, Al Hourani J, Kunze S, Eberle J, Oelkers P, Messing-Jünger M. Clinical variety and prognosis of intracranial arachnoid cysts in children. *Neurosurg Rev.* 2022 Oct;45(5):3171-3178. doi: 10.1007/s10143-022-01809-0. Epub 2022 Jun 3
- Deora H. Endoscopic Management of Quadrigeminal Arachnoid Cyst with Neuronavigation Guidance. *World Neurosurg.* 2022 May;161:135. doi: 10.1016/j.wneu.2022.02.099. Epub 2022 Mar 4.
- Gui S, Bai J, Wang X, Zong X, Li C, Cao L, Zhang Y. Assessment of endoscopic treatment for quadrigeminal cistern arachnoid cysts: A 7-year experience with 28 cases. *Childs Nerv Syst.* 2016 Apr;32(4):647-54. doi: 10.1007/s00381-015-2962-5. Epub 2015 Nov 20.
- Yu L, Qi S, Peng Y, Fan J. Endoscopic approach for quadrigeminal cistern arachnoid cyst. *Br J Neurosurg.* 2016 Aug;30(4):429-37. doi: 10.3109/02688697.2015.1119236. Epub 2016 Jan 8.
- Cinalli G, Spennato P, Columbano L, Ruggiero C, Aliberti F, Trischitta V, Buonocore MC, Cianciulli E. Neuroendoscopic treatment of arachnoid cysts of the quadrigeminal cistern: a series of 14 cases. *J Neurosurg Pediatr.* 2010 Nov;6(5):489-97. doi: 10.3171/2010.8.PEDS08491.
- El Ghandour NMF. Endoscopic treatment of quadrigeminal arachnoid cysts in children. *J Neurosurg Pediatr.* 2013 Nov;12(5):521-8. doi: 10.3171/2013.7.PEDS13155. Epub 2013 Sep 6.
- Silva MA, Chang H, Weng J, Hernandez NE, Shah AH, Wang S, Niazi T, Ragheb J. Surgical management of quadrigeminal cistern arachnoid cysts: case series and literature review. *J Neurosurg Pediatr.* 2022 Jan 7;29(4):427-434. doi: 10.3171/2021.11.PEDS21497
- Massimi L, Caldarelli M, Di Rocco C. Intracranial congenital arachnoid cysts. In: Di Rocco C., Pang D., Rutka J. (eds) *Textbook of Pediatric Neurosurgery*. Springer, Cham, 2017 ([https://doi.org/10.1007/978-3-319-31512-6\\_39-1](https://doi.org/10.1007/978-3-319-31512-6_39-1))
- Baticulon RE, Dewan MC. Endoscopic Third Ventriculostomy And Choroid Plexus Coagulation in Infants: Current Concepts and Illustrative Cases. *Neurol India.* 2021 Nov-Dec;69(12 Suppl 2):S514-S519. doi: 10.4103/0028-3886.332270.
- Kulkarni AV, Drake JM, Kestle JR, Mallucci CL, Sgouros S, Constantini S; Canadian Pediatric Neurosurgery Study Group. Predicting who will benefit from endoscopic third ventriculostomy compared with shunt insertion in childhood hydrocephalus using the ETV Success Score. *J Neurosurg Pediatr.* 2010 Oct;6(4):3