


CASE REPORT

Optic compressive neuropathy secondary to anterior clinoid mucocele: diagnostic approach, a case report

Francisco J. Medina-Valencia¹, Enrique C. García-Pretelt^{2,*}, Verónica Alzate-Carvajal³, Camilo E. Moreno-Huertas⁴ and Isabella Moreno-Arango ⁵

¹Departamento de Neurorradiología, Fundación Valle del Lili, Cali, Colombia

²Departamento de Radiología e Imágenes Diagnósticas, Facultad de Medicina, Universidad Icesi, Cali, Colombia

³Departamento de Neurocirugía, Facultad de Medicina, Universidad Icesi, Cali, Colombia

⁴Departamento de Neurocirugía, Fundación Valle del Lili, Cali, Colombia

⁵Centro de Investigaciones Clínicas, Fundación Valle del Lili, Cali, Colombia

*Correspondence address. Universidad Icesi, Calle 18 No. 122–135, Cali 760008, Colombia.

Tel: +57-602-5552334; E-mail: enrique.garcia@fvl.org.co; enritrelt@gmail.com

Abstract

Anterior clinoid process (ACP) mucoceles are an uncommon entity and an even rarer cause of visual impairment. We review the case of a 62-year-old female with a 2-year history of progressive right-sided monocular vision loss. Paranasal sinus computed tomography (CT) scan showed bilateral ACP pneumatization. A soft tissue density mass occupied the right ACP with bone expansion and compression of the right orbital canal. An endonasal approach was performed with total vision recovery. Dedicated images are necessary to diagnose ACP. On CT, the affected sinus will have bone erosions. On magnetic resonance imaging, the signal intensity is determined by its protein concentration and mobile water protons. ACP mucoceles' accurate diagnosis determines the treatment and surgical approach. Finally, the correct management selection will determine the retrieval of the visual ability.

INTRODUCTION

The anterior clinoid process (ACP) is a bony projection on the medial aspect of the posterior border of the lesser sphenoid wing. Its pneumatization is not a rare incidental finding, with a reported incidence of 4–29.3% [1]. Its occurrence carries an increased risk of cerebrospinal fluid leakage after skull base surgery, especially after anterior clinoidectomy.

Blockage of the drainage of a paranasal sinus may occur usually because of repeated inflammation or, in some rare cases, as a congenital variation [2]. It may lead to the accumulation of secretions, resulting in a mucocele [3], with subsequent mass effect and bony remodeling. Sphenoid mucoceles account for 1% of all paranasal sinus mucoceles, and involvement of the ACP has been sparsely reported in the past [4].

Due to its proximity to the optic nerve, ACP mucoceles may, although very rare, be a cause of orbital apex syndrome—compressive optic neuropathy [5]. Computed tomography (CT) and magnetic resonance imaging (MRI) play an essential role in characterizing the lesion and its extension. We report a case according to the Surgical Case Report (SCARE) criteria [6].

PRESENTATION OF CASE

A 62-year-old woman with no medical background presented to the emergency department with a 2-year history of progressive right-sided monocular vision loss. The ophthalmological

assessment evidenced a visual acuity of 20/200 –1 PH 20/100 + 2 in her right eye, relative left afferent pupillary defect and pale temporal neuroretinal ring with normal bilateral extraocular movements and normal vision of the left eye.

At arrival, under the suspicion of a supraclinoid internal carotid aneurysm, an MRI angiography was performed, evidencing a rounded proteinaceous mass in the right ACP with compression of the optic nerve suggestive of an ACP mucocele (Fig. 1). No vascular abnormalities were demonstrated. A conventional subtraction angiography was also performed with no aneurysms detected.

A pre-surgical paranasal sinus CT scan showed bilateral pneumatization of ACP; the right one had thin eroded bony walls and was occupied by a soft tissue density lesion that compressed the orbital apex (Fig. 2).

An endoscopic endonasal approach with neuronavigation through an ethmoidal approach was performed 8 days after arrival by an experienced neurosurgeon. The expanding ACP was drilled, allowing the exposure of a soft, grayish lesion consistent with mucocele (Fig. 3), which was resected and sent to pathology. A wide osteotomy of the posterior ethmoidal cell and ACP was done to allow the optic nerve decompression.

The post-operative course was uncomplicated, with the right eye visual acuity of 20/20 2 months after surgery. Follow-up CT showed a complete resolution of the anterior clinoid mucocele with no residual lesion.

Received: June 2, 2022. Accepted: July 27, 2022

Published by Oxford University Press and JSCR Publishing Ltd. © The Author(s) 2022.

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<https://creativecommons.org/licenses/by/4.0/>), which permits unrestricted reuse, distribution, and reproduction in any medium, provided the original work is properly cited.

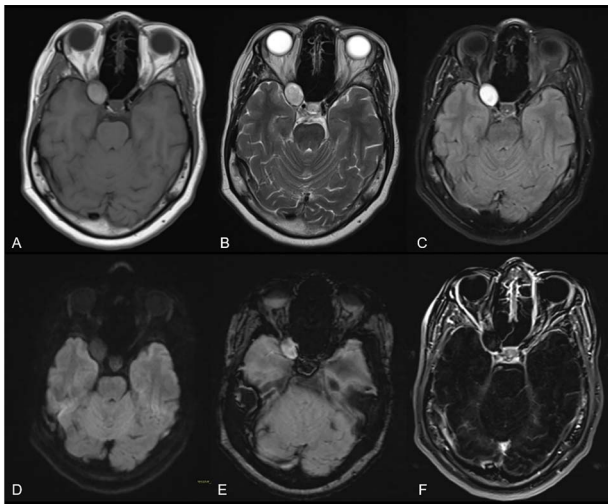


Figure 1. Axial cuts of brain MRI. T1W (A), T2W (B), FLAIR (C), DWI (D), SWI (E) and contrast-enhanced T1W images with subtraction (F); a rounded mass in the right ACP with intrinsic T1 high-intensity signal, suggesting a proteinaceous content with smooth, linear and peripheral mucosal enhancement; no restricted diffusion or susceptibility artifacts were observed.



Figure 2. Paranasal sinus CT scans multiplanar reconstructions in axial (A), coronal (B, D) and sagittal (C) planes, with modified window (A and B) and bone algorithm (C and D); they show the right ACP with thin eroded walls, occupied by an oblong, soft tissue density mass that expands the bone cortical and compresses the right orbital apex.

DISCUSSION

ACP mucoceles are an uncommon entity and a rare cause of visual impairment. Dedicated images are necessary to diagnose and treat them. On CT, the affected sinus will have rounded, eroded and thinned walls [7]. The signal intensity of sinonasal secretions of mucoceles on MRI is based on its protein concentration and mobile water protons. As protein concentration increases, the signal intensity on T1WI of sinus secretions changes from hypointense to hyperintense and to hypointense again. On T2WI, mucoceles are initially hyperintense, but the signal intensity decreases as the protein concentration and viscosity increase [8]. Chronically obstructed sinus secretions may have any combination of signal intensities.

The treatment of paranasal sinus mucocele aims to relieve the compressive effect on the surrounding structures and to prevent recurrences. Choosing the most appropriate surgical approach

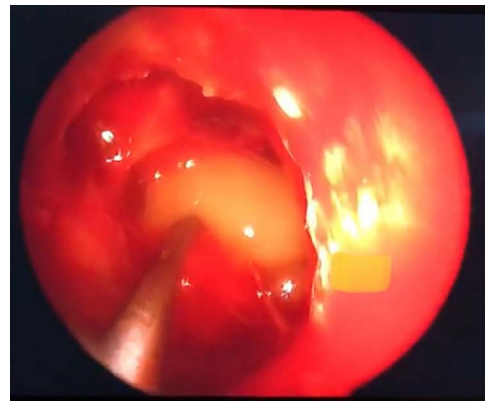


Figure 3. Grayish soft tissue lesion occupying the right ACP consistent with mucocele.

allows complete resection and minimal invasion with the least possible complications.

Pterional and subtemporal approaches were classically used to achieve total decompression and resection. However, there was a high rate of complications and morbidity. Using an endoscopic endonasal approach with a microsurgical technique has shown good anatomic and functional results [9, 10], and in some cases, with complete recovery of visual loss following endoscopic resection [11].

In this case, head images allowed an accurate diagnosis of a lesion in the right ACP with optical nerve compression, which was treated using a mini-invasive technique through an endoscopic trans-ethmoidal approach, with a total recovery of the visual deficit.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest in the writing or publication of this case report.

FUNDING

Authors did not receive funding directly or indirectly associated with the paper elaboration.

REFERENCES

1. Abuzayed B, Tanriover N, Biceroglu H, Yuksel O, Tanriover O, Albayram S, et al. Pneumatization degree of the anterior clinoid process: a new classification. *Neurosurg Rev* 2010;**33**:367–73; discussion 374.
2. Pahwa S, Sharma S, Das CJ, Dhamija E, Agrawal S. Intraorbital cystic lesions: an imaging spectrum. *Curr Probl Diagn Radiol* 2015;**44**:437–48.
3. Abozed M, Alsulaiti G, Almannaei F, Raza A, El Beltagi A, Ayyad A. Anterior clinoid mucocele causing optic neuropathy: a case report and review of literature. *eNeurologicalSci* 2017;**7**: 57–9.
4. Wang AC, Than KD, Ramnath S, Pandey AS. Anterior clinoid mucocele presenting with orbital apex syndrome. *Surg Neurol Int* 2013;**4**:63.
5. Herath HMMTB, Alahakoon AMBD, Mohideen MS, Chandrakumara AAR, Senanayaka S, Goonaratne IK. Anterior clinoid mucocele presenting as progressive fluctuating visual loss

- mimicking inflammatory optic neuropathy. *Saudi J Ophthalmol* 2021;**35**:78–80.
6. Agha RA, Borrelli MR, Farwana R, Koshy K, Fowler A, Orgill DP, et al. Statement: updating consensus surgical CAse REport (SCARE) guidelines. *Int J Surg* 2018;**2018**:132–6.
 7. Lloyd G, Lund VJ, Savy L, Howard D. Optimum imaging for mucoceles. *J Laryngol Otol* 2000;**114**:233–6.
 8. Van Tassel P, Lee YY, Jing BS, De Pena CA. Mucoceles of the paranasal sinuses: MR imaging with CT correlation. *AJR Am J Roentgenol* 1989;**153**:407–12.
 9. Garaventa G, Arcuri T, Schiavoni S, Fonzari M. Anterior clinoid mucocele: a trans-nasal endoscopic approach. *Minim Invasive Neurosurg* 1997;**40**:144–7.
 10. Kitagawa K, Hayasaka S, Shimizu K, Nagaki Y. Optic neuropathy produced by a compressed mucocele in an Onodi cell. *Am J Ophthalmol* 2003;**135**:253–4.
 11. Nundkumar N, Mittal M, Kupsky WJ, Folbe A, Mittal S. Complete recovery of acute monocular visual loss following endoscopic resection of anterior clinoid mucocele: case report and review of the literature. *J Neurol Sci* 2012;**312**:184–90.