

# Internal Carotid Artery Aneurysm in the Cavernous Sinus

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# Disclosures

We have no conflicts of interest to report.

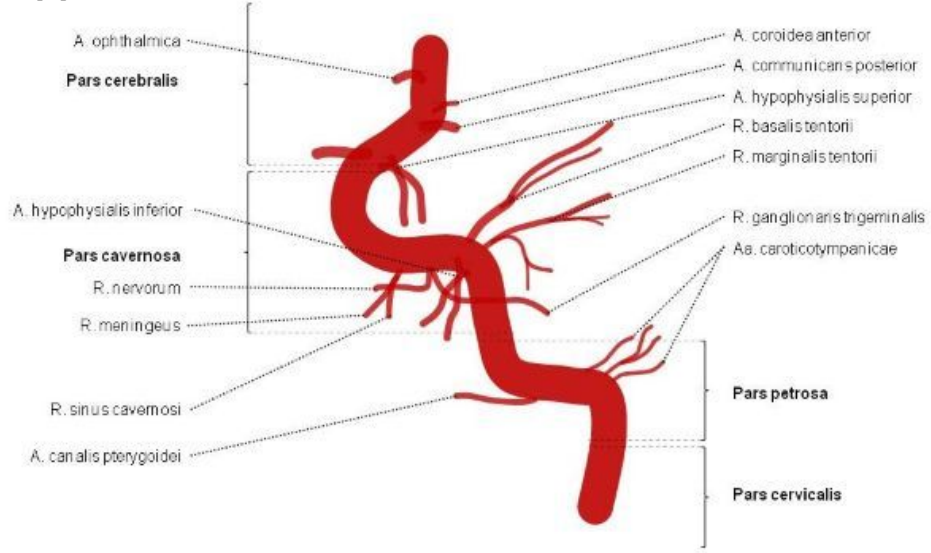


## **Specific Learning Objectives**

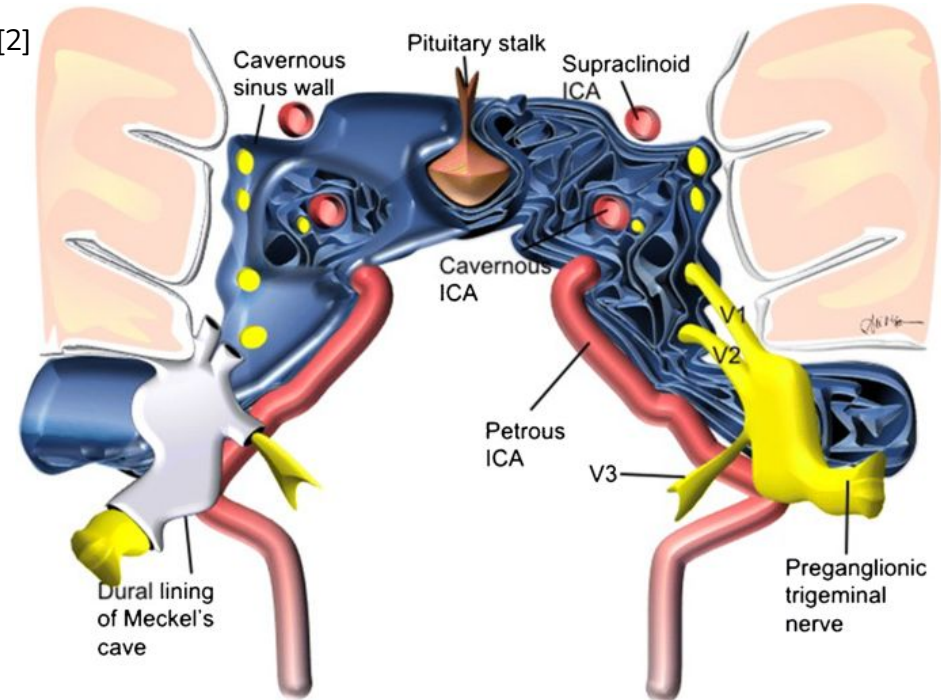
1. Anatomy and contents of the cavernous sinus
2. Cavernous sinus syndrome and its' differential diagnoses
3. Treatment options for ICA aneurysms

# Background

[1]



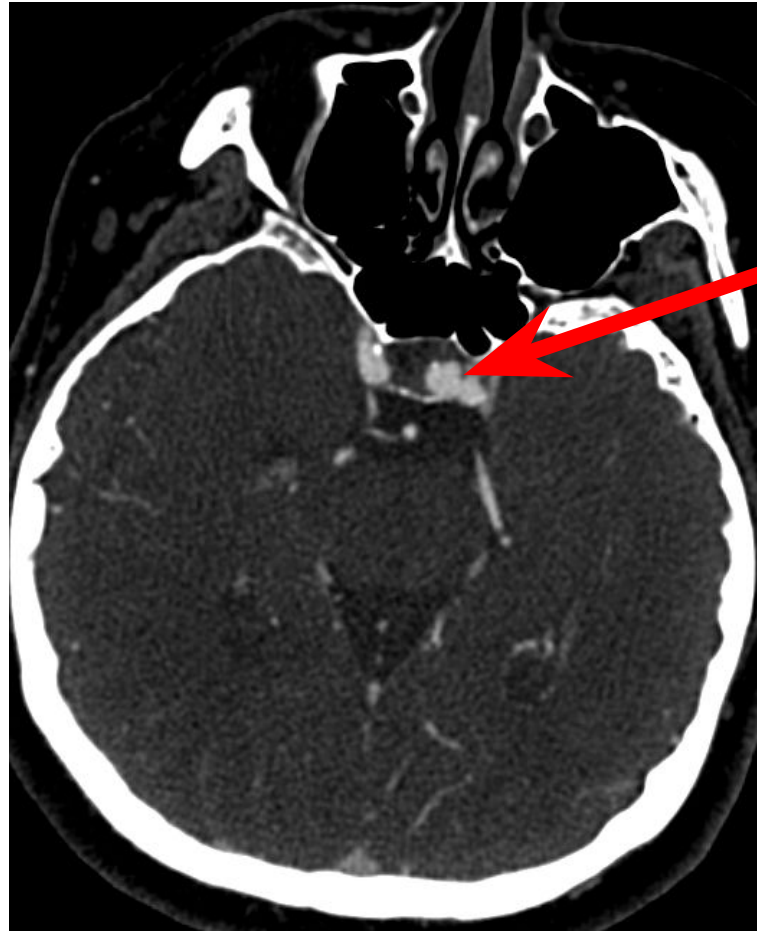
[2]





## Imaging

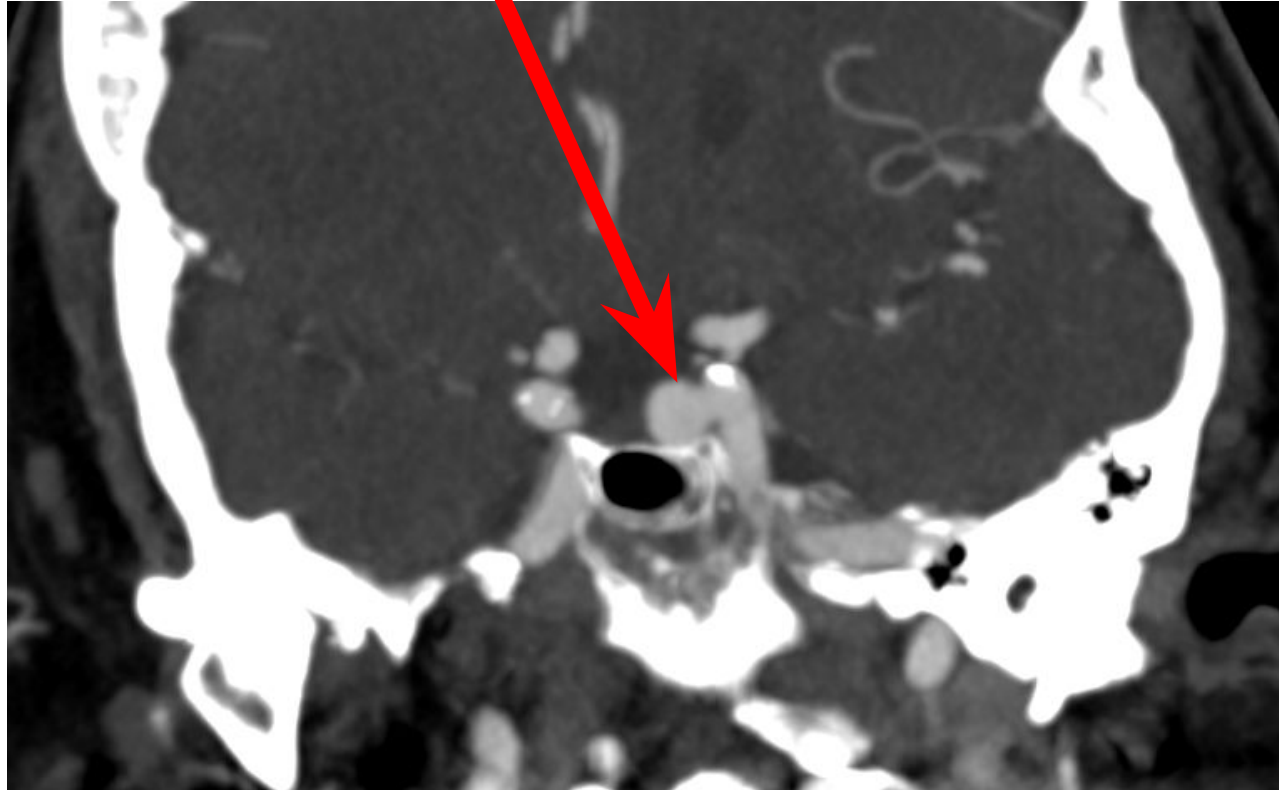
- 67-year-old female
- CT head indication:  
blurry vision





## Imaging

Since the aneurysm is not compressing the optic chiasm or oculomotor/abducens nerves the blurry vision is unexplained by this incidental infradiaphragmatic intrasellar ICA aneurysm.



# Discussion - Key Diagnostic Features

- Cavernous sinus syndrome
  - Caused by compression and dysfunction of the structures within the cavernous sinus
  - Proptosis, chemosis, ophthalmoplegia (CN palsies), Horner syndrome, trigeminal sensory loss, headache
  - Could also present with fever, tachycardia, hypertension, altered mental status

Mnemonic

O: oculomotor nerve

T: trochlear nerve

O: ophthalmic branch of trigeminal nerve

M: maxillary branch of trigeminal nerve

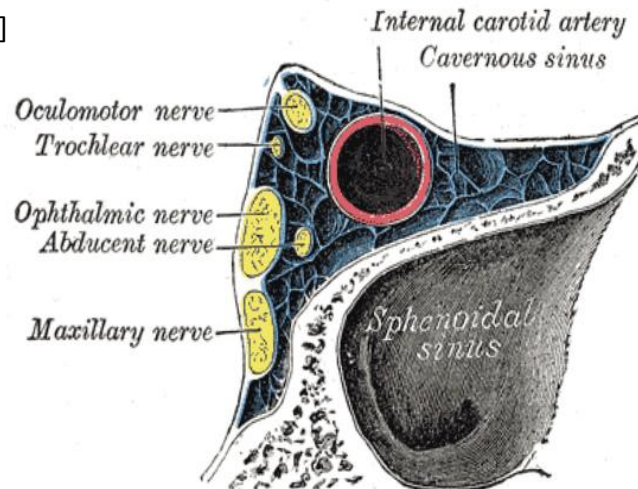
C: internal carotid artery

A: abducens nerve

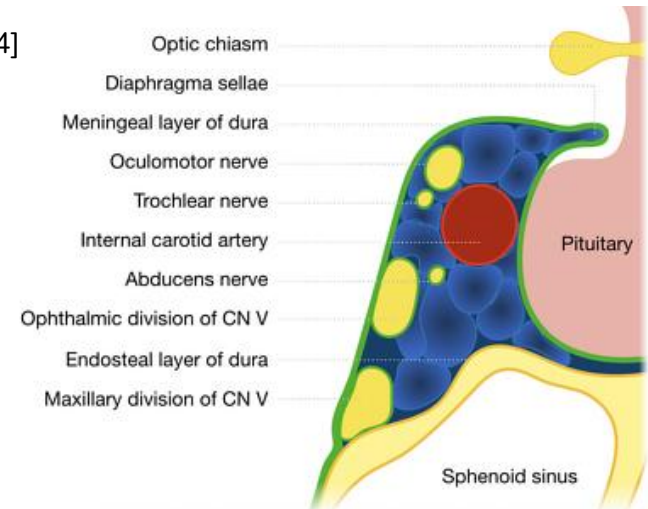
T: trochlear nerve

S: sympathetic to eye

[3]



[4]





## Discussion - Differential Diagnoses for CSS <sup>[5]</sup>

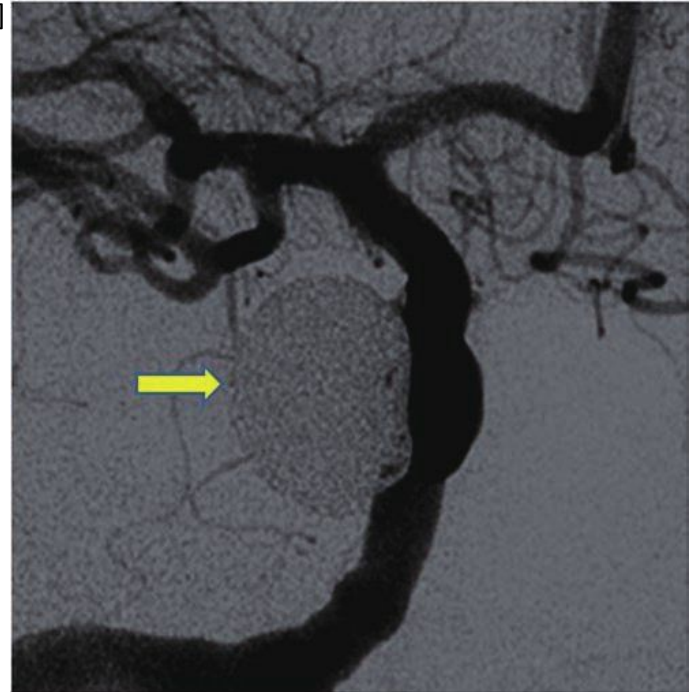
Cause	Clinical Features
Tumor	Meningioma, chordoma, neuroma, pituitary adenoma, metastases, lymphoma, nasopharyngeal carcinoma, chondrosarcoma, hemangioma, neuroblastoma
Inflammatory Disease	Tolosa-Hunt syndrome, sarcoidosis
Trauma	Basal skull fracture, operative trauma to cavernous sinus after skull base surgery
Vascular	Intracavernous aneurysm, carotid-cavernous fistula, cavernous sinus thrombosis
Infection	Mucormycosis, aspergillosis, actinomycosis, nocardiosis, mycobacterium, herpes zoster



## Discussion - Treatment Options<sup>[6]</sup>

- Asymptomatic ICA aneurysm without subarachnoid extension → observation
- Symptomatic ICA aneurysm or asymptomatic ICA aneurysm with subarachnoid extension → clipping/wrapping, endovascular embolization, or venous bypass

[7]





# References

- [1] Epomedicine. (2017, February 13). *Internal carotid artery - segments and branches*. Epomedicine. Retrieved December 21, 2021, from <https://epomedicine.com/medical-students/internal-carotid-artery-segments-branches/>
- [2] Malhotra, A., Tu, L., Kalra, V. B., Wu, X., Mian, A., Mangla, R., ... & Gandhi, D. (2018). Neuroimaging of Meckel's cave in normal and disease conditions. *Insights into imaging*, 9(4), 499-510.
- [3] Wikimedia Foundation. (2021, November 17). *Internal carotid artery*. Wikipedia. Retrieved December 21, 2021, from [https://en.wikipedia.org/wiki/Internal\\_carotid\\_artery](https://en.wikipedia.org/wiki/Internal_carotid_artery)
- [4] Gaillard, F. (n.d.). *Cavernous sinus: Radiology reference article*. Radiopaedia Blog RSS. Retrieved December 21, 2021, from <https://radiopaedia.org/articles/cavernous-sinus>
- [5] *Cavernous sinus syndrome*. EyeWiki. (2021, September 7). Retrieved December 21, 2021, from [https://eyewiki.aao.org/Cavernous\\_Sinus\\_Syndrome](https://eyewiki.aao.org/Cavernous_Sinus_Syndrome)
- [6] Zhao, J., Lin, H., Summers, R., Yang, M., Cousins, B. G., & Tsui, J. (2018). Current treatment strategies for intracranial aneurysms: an overview. *Angiology*, 69(1), 17-30.
- [7] Swain, S. K., Das, A., Acharya, S., Shajahan, N., & Agrawala, R. (2021). Acute onset of massive epistaxis due to post-traumatic cavernous internal carotid artery pseudoaneurysm: A case report. *Journal of Acute Disease*, 10(1), 39.