

# Resection of pituitary macroadenoma with bilateral cavernous sinus extension and snowman sign

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## Objective

Case presentation (adapted from video submission) that highlights:

- (1) Management of prolactinomas depending on size and clinical symptoms
- (2) Skull base anatomy surrounding the sella



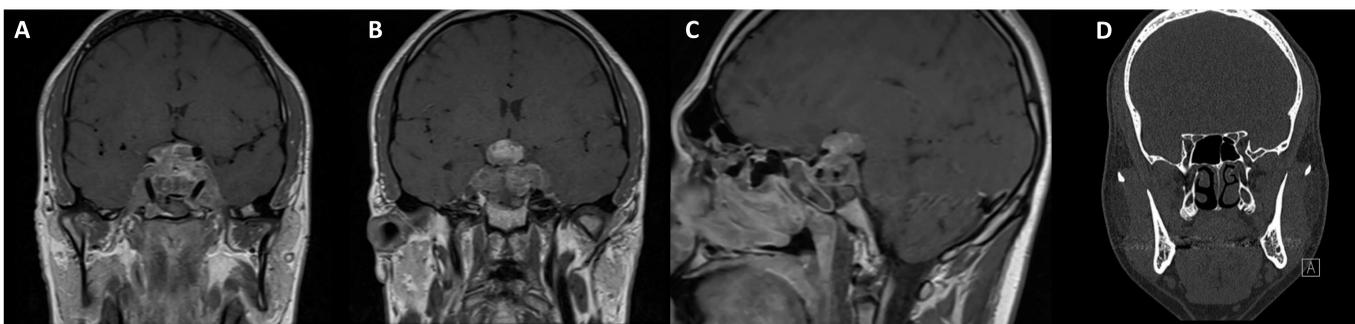
Link to video abstract

## Background

Prolactinomas often present with hyperprolactinemia and hypogonadism, with symptoms such as galactorrhea, loss of libido, infertility, menstrual irregularities, and sometimes metabolic syndrome. They are also associated with higher bone fracture risk<sup>1</sup>. Typical management is medical, using dopamine agonists such as cabergoline (first line) or sometimes bromocriptine or quinagolide<sup>1,2</sup>. Current guidelines recommend cabergoline especially for Knosp grade  $\geq 2$ ; however, there are also data that have shown significantly higher biochemical remission rates for Knosp grade 0-2 (75%) versus Knosp grades 3-4 (22%)<sup>3</sup>. Surgery can be an effective first-line treatment for Knosp grade 0-2 lesions and for larger tumors causing rapidly progressive vision loss or as a strategy for debulking in women desiring pregnancy to reduce the risk of enlargement during pregnancy<sup>2</sup>.

## Case

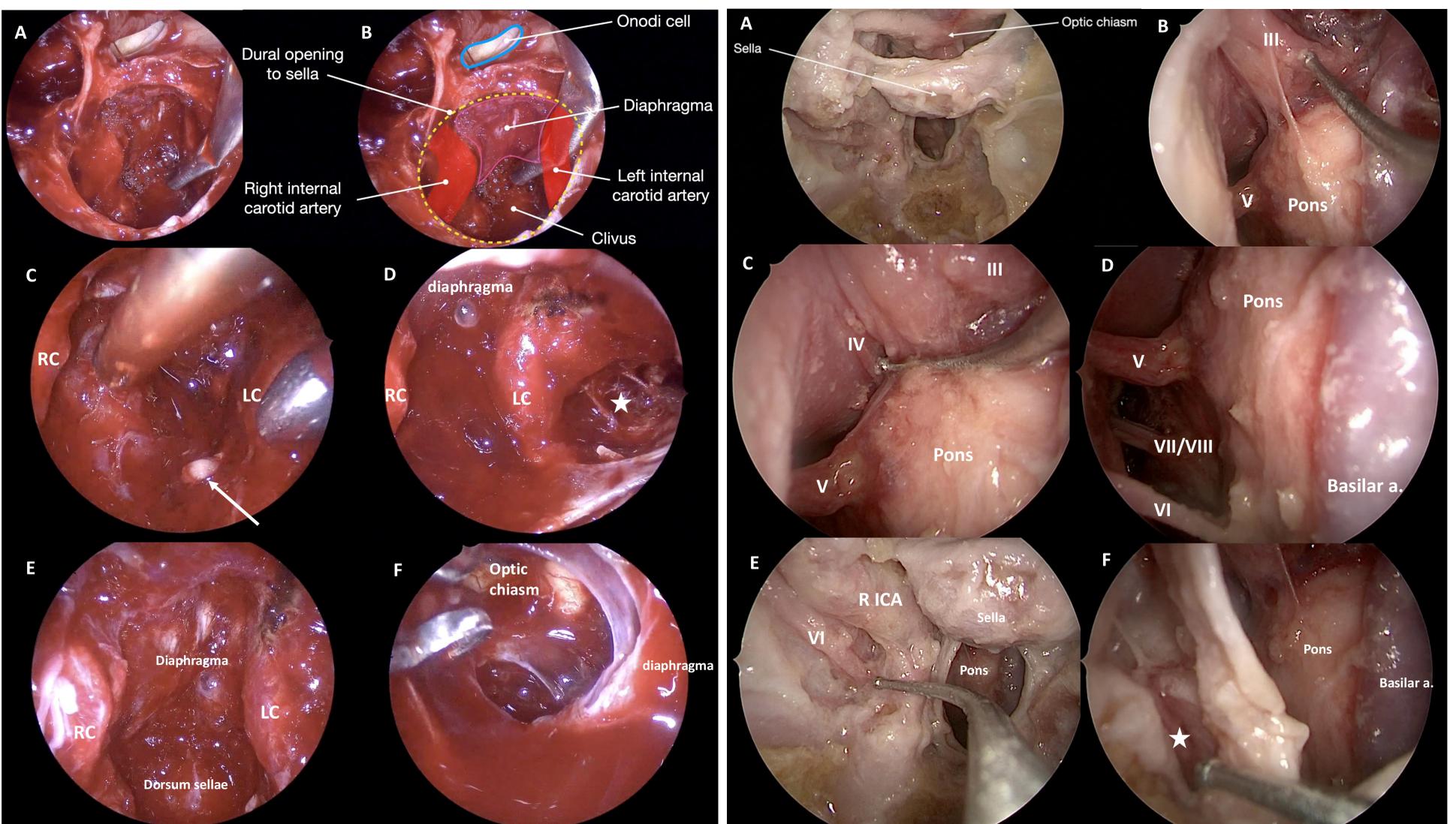
30-year-old male with headache, decreased libido, and visual changes that were progressive over the last few weeks to months. Found to have a giant pituitary macroadenoma compressing his optic apparatus and extending to bilateral cavernous sinuses (Knosp grade 4). His exam was notable for bitemporal hemianopsia, more severe on the left. Prolactin level was 1400 ng/mL. MRI (**Figure 1**) showed a 4.7 x 3.8 cm pituitary mass invading bilateral cavernous sinuses and extending upward against the optic apparatus, showing a “snowman” sign. After discussion of medical versus surgical treatment options, the patient elected to proceed with surgical resection (**Figure 2** shows images from resection, **Figure 3** shows relevant anatomy in a cadaver dissection). Post operatively, he had a left abducens palsy and was started on cabergoline. Over the next 3 months, his abducens palsy almost completely resolved and prolactin trended down to 45 ng/mL.



**Figure 1 (left) Patient imaging.** (A) T1 post contrast coronal showing bilateral cavernous sinus involvement, (B) T1 post contrast coronal showing snowman sign, (C) T1 post contrast sagittal showing snowman sign, (D) CT without contrast coronal with left Onodi cell

**Figure 2 (below) Case photos.** (A) View of sella using a 45-degree endoscope upwards, labeled in (B). (C) shows the left internal carotid artery (ICA) “LC,” right ICA “RC,” and a nerve-appearing structure that is likely CN VI (arrow), grossly intact but exposed near its exit from Dorello’s canal. (D) View of left cavernous sinus marked with a star, left ICA “LC,” right ICA “RC,” (E) view of diaphragma and bilateral internal carotid arteries, (F) view of the optic chiasm “OC” after suprasellar extent of tumor was removed through a hole in the diaphragma

**Figure 3 (below) Cadaver dissection.** (A) Trans sphenoidal/transclival approach to sella (B) angled endoscopic view of the pons and ball probe pointing at CN III (C) ball probe pointing at CN IV, which is inferior and lateral to CN III, (D) angled endoscope pointed lateral and slightly inferior showing CN V, VI, and VII/VIII, (E) angled endoscopic view of the right cavernous sinus contents, ball probe pointing at CN VI, R ICA (F) close up angled view of CN VI running in Dorello’s canal, indicated by the ball probe and star



- References**
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