P047

# Preemptive Interdural Dissection Technique in Endoscopic Transsphenoidal Surgery for Cavernous Sinus Medial Wall Resection : Technical Steps and Pitfalls

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## Background

Functioning pituitary neuroendocrine tumors (PitNETs) often show persistent hypersecretion or recurrence despite gross total resection, largely due to microscopic remnants within the cavernous sinus medial wall. Although endoscopic transsphenoidal medial wall resection (MWR) has been reported, the procedure remains technically demanding because of its proximity to the internal carotid artery (ICA) and the inferior hypophyseal artery (IHA). We present a refined, stepwise approach to cavernous sinus medial wall resection designed to enhance reproducibility and safety, and report our initial outcomes.

## Materials and Methods

We retrospectively reviewed 10 patients with functioning PitNETs who underwent endoscopic transsphenoidal surgery with CS medial wall resection between January 2020 and June 2024 at three institutions. The procedure involved creating an **interdural plane at the inferolateral sellar region before tumor removal**, followed by stepwise mobilization and detachment of the medial wall. Clinical, radiologic, and endocrinologic outcomes were evaluated

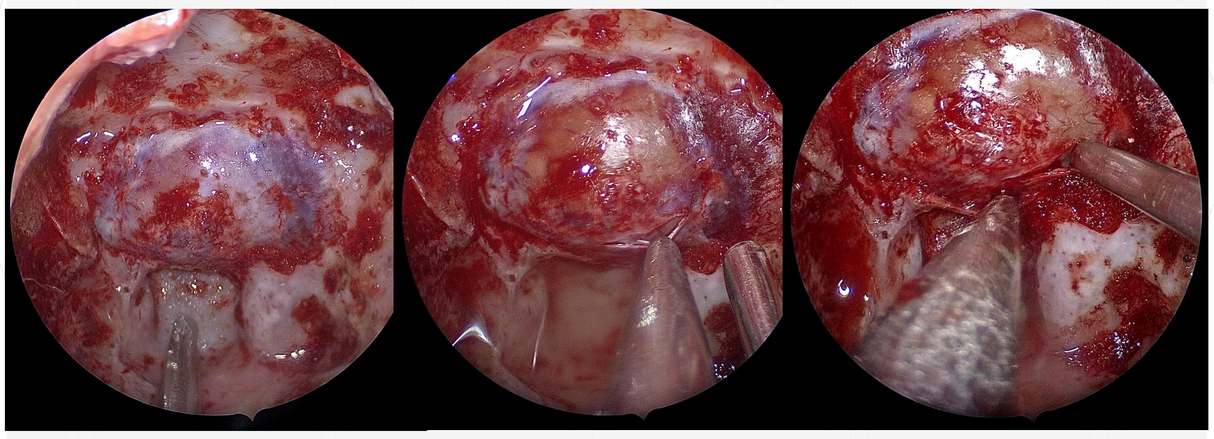
**Surgical Technique**

**Step 1. Exposure and dural incision**

After the wide exposure of the sellar dura, the outer (periosteal) dural layer was incised along the inferolateral aspect of the sella, beginning near the midline and extending laterally toward the target CS, while carefully preserving the inner (meningeal) layer. At this stage, precise control of force is essential to incise only the outer dura.

**Step 2. Interdural dissection**

After the initial dural incision, the interdural space was gently developed using a blunt dissector to create a clear plane between the outer and inner dural layers. Establishing this plane before tumor removal provides a distinct dissection plane that facilitates subsequent mobilization of the medial wall. Care should be taken to maintain dissection within the correct plane, as undue force could lead to inadvertent violation of the inner dura.



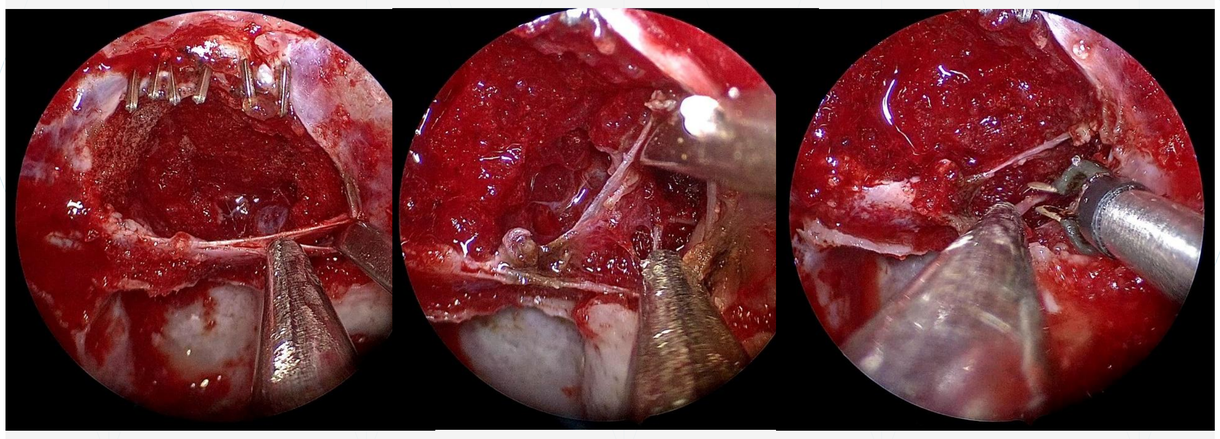
**Step 3. Tumor removal and interdural space extension**

Both the outer and inner dural layers were subsequently incised circumferentially, resulting in the exposure of the pituitary tumor, which was then removed using a standard intradural procedure. After tumor removal, the previously developed interdural plane was further extended using a blunt dissector to widen the working corridor, thereby facilitating subsequent mobilization of the medial wall. Venous bleeding is commonly encountered during this extension, but can be effectively controlled with the application of an injectable hemostatic matrix

## Results

**Step 4. Medial wall mobilization**

The medial wall was mobilized in a stepwise manner, as previously described in the literature. After division of the inferior parasellar ligament (IPL), the inferior hypophyseal artery (IHA) was coagulated and transected. Subsequent dissection involved sequential division of the parasellar ligaments tethering the medial wall, allowing gradual release and mobilization. Particular care is required to ensure complete hemostasis of the IHA to maintain a clear operative field.



**Step 5. Final detachment**

Further upward dissection exposed the carotico-clinoid ligament (CCL), which was carefully divided to release the superior attachment of the medial wall. The remaining dural connections along the posterior clinoid process and dorsum sellae were then incised, completing the removal of the medial wall. Care must be taken not to extend the incision too superiorly, as this could tear the sellar diaphragm, resulting cerebrospinal fluid (CSF) leakage.

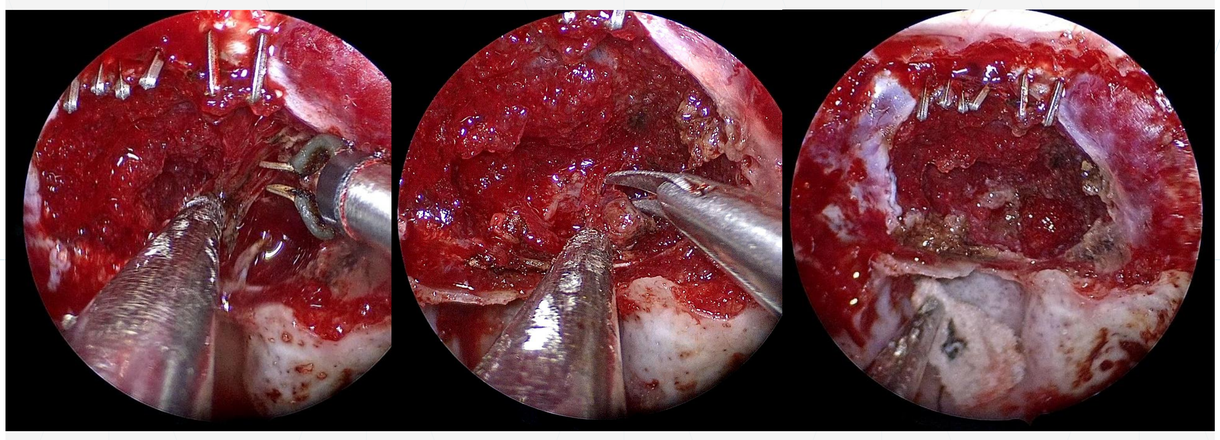


**Table 1.** Summary of patients with functioning PitNETs undergoing CS medial wall resection

| No. | Diagnosis | Size (mm) | Knosp gr. | EOR | Intraop. bld loss (mL) | Intraop. complication | Postop. complication | Endocrin. outcome |
|---|---|---|---|---|---|---|---|---|
| **1** | Acromegaly | 26 | 2 | GTR | 100 | CSF leak gr 1 | None | Remission |
| **2** | Acromegaly | 16 | 1 | GTR | 130 | None | None | Remission |
| **3** | Acromegaly | 17 | 2 | GTR | 180 | CSF leak gr 2 | Transient diplopia | Remission |
| **4** | Cushing | 21 | 1 | GTR | 70 | None | Transient DI | Non-Rem. |
| **5** | Acromegaly | 17 | 1 | GTR | 200 | None | None | Remission |
| **6** | Acromegaly | 14 | 1 | GTR | 150 | None | None | Remission |
| **7** | Acromegaly | 15 | 1 | GTR | 200 | None | None | Remission |
| **8** | Cushing | 10 | 2 | GTR | 200 | CSF leak gr 1 | Transient DI | Remission |
| **9** | Acromegaly | 17 | 1 | GTR | 150 | None | None | Remission |
| **10** | Cushing | 15 | 1 | GTR | 200 | None | Transient DI | Remission |

## Conclusion

This refined, stepwise technique for cavernous sinus medial wall resection provides a reproducible framework for safe extension of endoscopic resection in functioning PitNETs. By utilizing the interdural plane and emphasizing key anatomical steps, the approach minimizes complications while improving the likelihood of biochemical remission. This method may serve as both a practical surgical strategy and an educational guide for neurosurgeons aiming to incorporate medial wall resection into their practice.