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Technical Note

# Endoscopic removal of a central neurocytoma from the posterior third ventricle

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**Abstract**

Central neurocytoma is a rare benign tumor that most commonly arises within the ventricular system of young adults. Its occurrence in the posterior third ventricle is one of the least reported presentations. These tumors are usually treated by a combination of either biopsy or open surgical resection, often followed by radiation (Gamma knife or Novalis) with or without chemotherapy. A 37-year-old woman with a posterior third ventricle neurocytoma presented with acute signs of aqueductal stenosis. The patient underwent endoscopic assisted gross total resection of the tumor with the aid of intraoperative laser followed by standard third ventriculostomy; no further treatment was required. The patient did not develop any subsequent neurological deficit. A 36-month follow-up was still consistent with a normal neurological examination. Serial post-operative MRIs show neither residual nor recurrent tumor. Thus, posterior third ventricle central neurocytomas are relatively benign tumors that can be successfully removed using a minimally invasive approach, thereby avoiding both the morbidity related to conventional open craniotomy and the potential toxicity of any adjuvant treatment.


*Keywords:* Central neurocytoma; Endoscopic surgery; Third ventriculostomy; Radiosurgery; Chemotherapy

## 1. Introduction

Central neurocytoma (CN) was originally described by Hassoun et al.[1] in 1982; since then, a few hundred cases have been described.[1–54] It is considered a low-grade lesion arising within the ventricles and is classified as a central nervous system (CNS) tumor, World Health Organization (WHO) grade I.[55] Despite numerous reports,[1–54] the natural history of this tumor and its best management remain controversial. Standard and widely accepted treatments for these lesions are a conventional craniotomy, usually via a transcallosal approach followed by: (i) observation, and/or (ii) conventional radiation,[56,57] and/or (iii) chemotherapy.[5]

Recent data seem to point to the most successful form of treatment being surgical resection or endoscopic biopsy followed by radiotherapy, either stereotactic (SRS) or conventional radiotherapy (RT).[36,58–66] We describe a patient with a posterior third ventricle CN successfully treated by endoscopic resection, followed by standard third ventriculostomy with no adjuvant therapy.

## 2. Patient

A 37-year-old woman, with a no significant past medical history, was admitted to the neurosurgical unit with a progressively worsening headache, nausea, vomiting and diplopia. A head CT scan showed triventricular hydrocephalus, consistent with an occlusive etiology; a subsequent MRI demonstrated a posterior third ventricle moderately enhancing lesion that obstructed the aqueduct and was causing significant hydrocephalus and transependymal oedema (Fig. 1). After her admission, her

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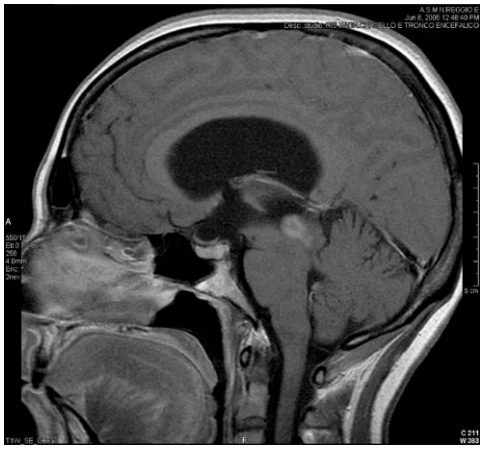

Fig. 1. T1 sagittal contrasted MRI showing a 18 mm moderately enhancing lesion in the posterior third ventricle causing aqueduct stenosis and hydrocephalus.

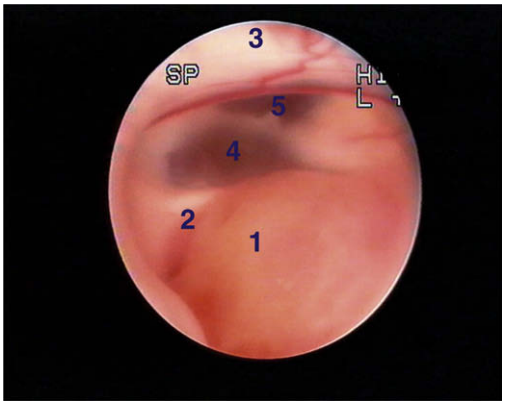


Fig. 3. Endoscopic view of the posterior third ventricle lesion: 1, lesion; 2, posterior commissure; 3, massa intermedia; 4, pineal recess; 5, supraipineal recess.

neurological examination was consistent with a left VI cranial nerve weakness; other cranial nerves were intact and so were both her motor and sensory function. Because she had a normal mental status she was able to consent to an endoscopic tumor resection followed by standard endoscopic third ventriculostomy to relieve the hydrocephalus (Fig. 3). The procedures were uneventful, and the patient was discharged on the third post-operative day. Histopathological examination showed small, round cells with a thin rim of clear cytoplasm and uniform nuclei; there was no necrosis or mitotic activity. Immunohistochemical assay was strongly positive for synaptophysin and neuron-specific enolase; these features were consistent with a central neurocytoma (WHO grade I). Brain MRI with and without contrast obtained 3 months after surgery showed a small enhancing lesion within the midbrain. This MRI interpretation in retrospect was inconclusive; initially the neuroradiologist could not determine whether the small enhancing

Fig. 2. Follow-up T1 sagittal enhanced MRI taken 36 months post-operatively showing no residual and/or recurrence of the lesion that was previously excised endoscopically.

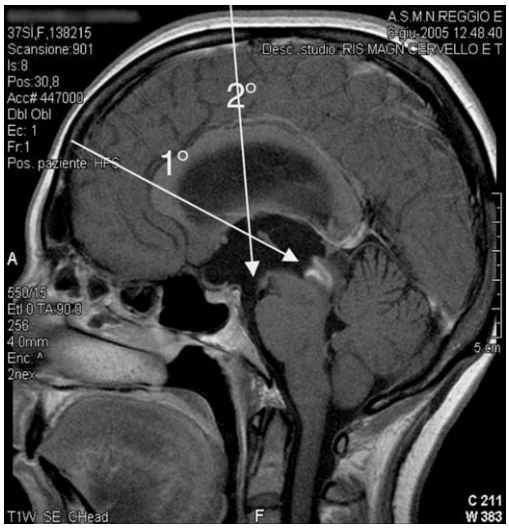


Fig. 4. T1 sagittal contrasted MRI of the posterior third ventricle lesion with two schematic arrows: 1, the trajectory and angle to endoscopically target the lesion in the posterior third ventricle, 2, the trajectory and angle to perform the third ventriculostomy.

lesion was a small tumour remnant or was just related to post-operative changes. However, the 6, 12, 24 and 36-month MRIs failed to show any tumor regrowth or residual tumor (Fig. 2). Very importantly, at clinical follow-up the patient remains neurologically intact. Her diplopia resolved post-operatively and she does not have any new complaint.

## 3. Surgical technique

The operation was planned and completed with the aid of a rigid endoscope of 0° and 30°. We used the Hopkins II optical system (Endoscopy-America, Charlton, MA, USA), operative channel by Karl Storz (Tuttlingen, Germany), 30 cm long and 2.9 mm diameter. Frameless stereotactic guidance was also used (Stealth Station, Medtronic