

## Introduction

Intraventricular meningiomas are rare tumors that typically present with hydrocephalus or are found incidentally. If surgical resection is indicated due to tumor growth or blockage of the cerebrospinal fluid pathway, resection carries a risk of intraventricular hemorrhage and subsequent hydrocephalus. Preoperative embolization of these tumors helps to reduce intraoperative hemorrhage and risk of complications. Vascular supply to intraventricular meningiomas typically comes from branches of the anterior or posterior choroidal arteries. Embolization through an anterior choroidal artery (AChA) feeder carries significant risk of infarct to the lateral geniculate nucleus or the posterior limb of the internal capsule, causing hemiplegia, hemianesthesia, and hemianopia. Because of this risk, extreme caution when using liquid embolic such as Onyx (Covidien, Irvine, CA, USA) is needed to embolize these tumors safely.

## Objective

This case report describes the treatment of an intraventricular meningioma by embolization through an anterior choroidal artery feeder, followed by surgical resection through a minimally-invasive tubular retractor system. This case illustrates the important considerations in minimizing perioperative complications for embolization and resection of an intraventricular meningioma.

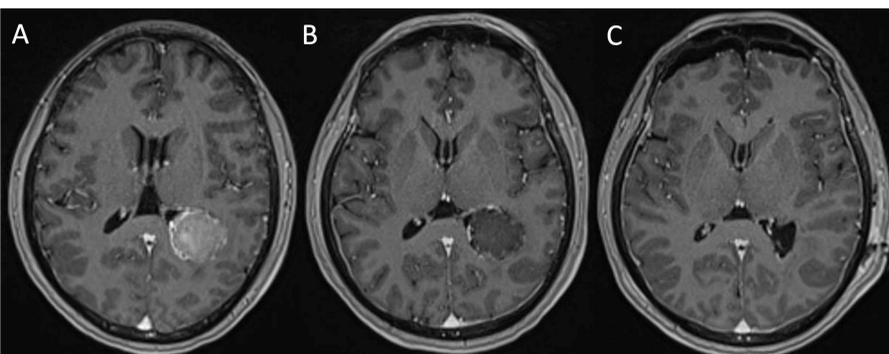


Figure 1: Axial T1 post-contrast MRIs showing (A) preoperative image of the meningioma in the left lateral ventricle, (B) post-embolization image showing complete devascularization of the meningioma, and (C) post-operative image showing complete resection of the tumor.

## Methods

We summarize the prior literature on this rare approach and illustrate the endovascular and surgical considerations in accomplishing the treatment of this pathology safely.

## Results

A 44-year-old woman presented with a 3.3cm avidly-enhancing tumor in the left lateral ventricle consistent with an intraventricular meningioma, which had grown on serial imaging (**Figure 1**).

She underwent angiography which revealed tumor hypervascularity, supplied by a distal branch of the left anterior choroidal artery. A microcatheter was used to select this feeding artery and navigate past the “plexal point,” which is where the anterior choroidal artery enters the ventricle, minimizing risk to the lateral geniculate nucleus or the posterior limb of the internal capsule. From there, the tumor was embolized with liquid embolic (**Figure 2**).

Post-embolization MRI revealed that the mass no longer enhanced with contrast. The patient underwent surgical resection the following day via a parietal trans-sulcal approach with a minimally-invasive tubular retractor system. During the resection, the tumor was found to be completely devascularized, resulting in minimal blood loss (**Figure 3**).

Post-operative MRI revealed gross total resection of the tumor. The patient tolerated the procedure without complication or neurologic deficit.

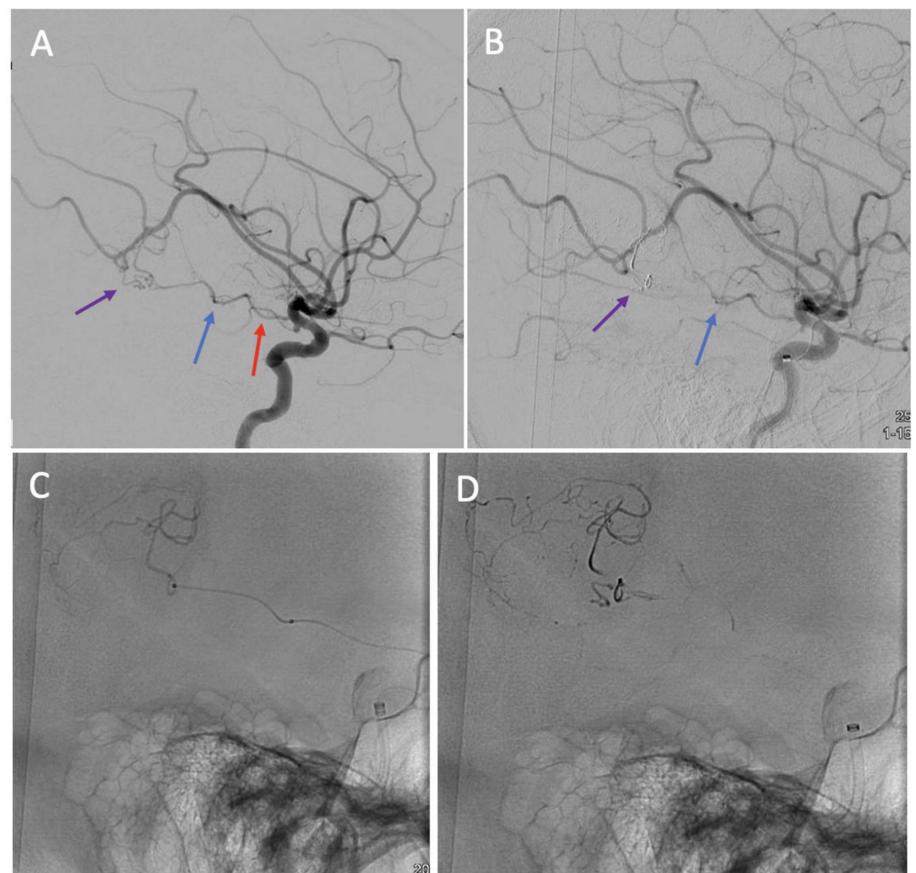


Figure 2: Angiography from a Lateral View. (A) Left ICA injection showing tumor blush (Purple Arrow) coming off of the anterior choroidal artery (Red arrow) in a posteriorly-projecting branch distal to the plexal point (Blue arrow). (B) Post-embolization left ICA injection without evidence of tumor blush (Purple arrow) past the plexal point (Blue arrow). (C) Selective injection of the AChA feeder prior to embolization. (D) Post-embolization lateral image showing the Onyx embolization material in the area of the prior tumor blush.

## Discussion

Preoperative embolization of an intraventricular meningioma fed by an anterior choroidal artery feeder can be safely achieved through embolization distal to the “plexal point,” with careful injection to avoid reflux of the embolic material. Embolization facilitates resection of the tumor with reduced risk of intraoperative blood loss, post-operative hemorrhage or hydrocephalus. However, given the higher risk of embolization through an anterior choroidal artery feeder, extreme caution must be used and a deep understanding of the anatomy must be appreciated.



Figure 3: Intra-operative microscopic image of the surgical approach. A tubular retractor system was used for the trans-sulcal parietal approach to the left lateral ventricle. This intra-operative view of the partially debulked meningioma demonstrates the complete devascularization of the tumor by preoperative embolization.

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