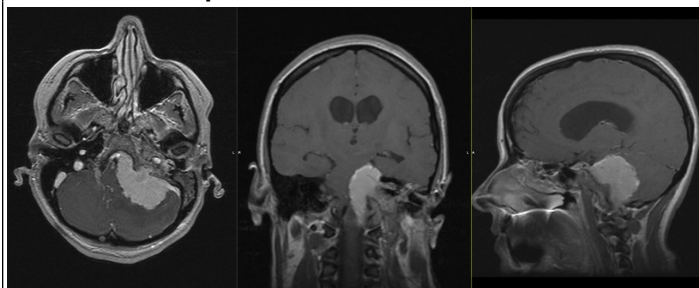


## Example of embolization candidate



Axial, coronal, and sagittal contrast-enhanced MRI of a meningioma before embolization. This is a woman in the 5th decade of life with lip and tongue numbness and chronic left hearing loss presenting with a 50x41 mm tumor.

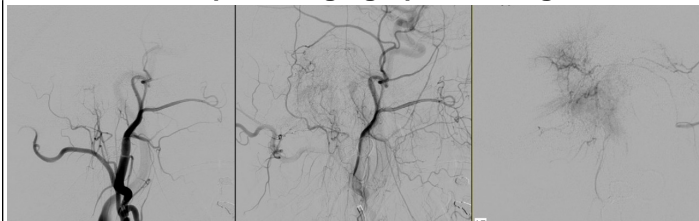
## Introduction

Preoperative embolization of meningioma and hemangiopericytoma continues to be debated. Endovascular technology continues to evolve and ethylene vinyl alcohol (EVOH or Onyx® Medtronic) has been approved for embolization of arteriovenous malformations for over a decade, and has been used off-label for brain tumor embolization. Although not corroborated in the literature, longer procedure time is a critique of EVOH embolization compared to n-butyl cyanoacrylate (nBCA).[1] This study compared radiation exposure and procedure duration for EVOH and nBCA in our experience embolizing intracranial meningiomas.

## Methods

Review of our endovascular database identified 81 consecutive meningiomas and hemangiopericytomas that underwent pre-operative embolization prior to surgical resection from 2007 to 2017.

## Example of angiographic findings



## Results

Of the 81 cases, only those cases embolized exclusively using EVOH (62) or nBCA (5) were included for analysis. These tumors occurred in 42 (63%) females with a median age of 56 (IQR 48-67) years. The median tumor diameter was 50 (44-63) mm. Tumor location included the convexity (19, 28%), the falx (13, 19%), the tentorium (12, 18%), and the skull base (21, 31%).

Compared to nBCA, Onyx embolizations exhibited a trend towards longer procedure duration (132 vs. 96 min,  $p = 0.1$ ) and significantly increased dose area product from fluoroscopy (77,395 vs. 26,216 mGy cm<sup>2</sup>,  $p=0.048$ ).

In seven EVOH embolizations, two catheters were used simultaneously. In comparison with nBCA, single-catheter EVOH had a longer procedure duration (135 vs. 96 min,  $p = 0.048$ ) and greater radiation exposure (93,164 vs. 26,216,  $p = 0.03$ ) than nBCA. Use of simultaneous dual-catheters for EVOH embolization eliminated these differences compared to nBCA (92 vs. 96 min,  $p = 0.6$ ; 76,253 vs. 26,216,  $p = 0.14$ ).

## Conclusions

Embolization with EVOH is slower than with nBCA and requires more radiation exposure. Similar to what has been described in arteriovenous malformations, simultaneous dual catheter embolization may decrease procedural time and radiation exposure.

## Learning Objectives

By the conclusion of this session, participants should be able to: 1) understand the most common liquid and particle embolysates used in pre-operative tumor embolizations; 2) describe key differences between the two liquid embolysate agents available in the United States; 3) discuss the differences in procedure time and radiation dose in using nBCA or EVOH; 4) describe the use of simultaneous dual catheters to reduce procedure duration and radiation exposure during EVOH embolization.

## References

Choo DM, Shankar JJS. Onyx versus nBCA and coils in the treatment of intracranial dural arteriovenous fistulas. *Interv Neuroradiol* 2016;22:212-6. doi:10.1177/1591019915622170