To Embolize or Not: A Ten Year Review of Complications

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Why do preoperative angiography for meningiomas?

- Can reveal need for embolization
- Can reveal vascular relationships
- Can reveal unexpected vascular relationships. Realization of these can reduce potential complications
Meningioma Prior to Initial Resection (outside institution)
Meningioma Post Resection- MCA Infarct with Residual Tumor
CT Head 4 Years Later- Tumor Growth
MMA Supply to MCA at Pterion- DANGER!!!
MMA Supply to MCA with M1 Missing - DANGER!!!
Embolization of Meningiomas

- Introduction/Review of Meningiomas
- Background for Embolization
- Review of Our Complications over last 10 Years
- Thinking about Preoperative Embolization
Meningiomas: Epidemiology

- 15-19% of Primary intracranial neoplasms
- Peak Incidence at 45 years of age
- Female to Male Ratio 3:2
- 1.5% in childhood and adolescence, usually between ages 10-20
Figure 28.2 The architecture of the arachnoid villi, depicting arachnoid cap cells, the origin of meningiomas.
Embolization: Meningioma

- Why Do We Embolize These Tumors?

- Meningiomas Typically Vascular Tumors

- Goal of the Embolization is to devascularize the tumors so that surgical resection can easily be achieved
Why not Just Ligation?

Microemboli enter tumor and devascularize regardless of collateral circulation

Bilateral devascularization easily achieved

Decrease in tumor size from necrosis

Theoretically may reduce the chances of recurrence

Time from Embolization to Surgery?
Support for Embolization

- Dean et al AJNR 1994
- Prospective, Matched Embo vs No Embo
- Blood loss: 533cc vs 866cc
- # of transfusions: 0.39 vs 1.56 units
- Resection time: 10.6 days vs 15 days
- Cost: $29,605 vs $38,449
- Only Blood Loss and # of Units statistically significant
Embolization: Our Experience

- 111 preoperative embolizations over the last 10 years – only external carotid embolizations were reviewed
- 73 Done at UPMC
- 38 Done at UT Southwestern
- 7 Major Embolization Specific Complications
- 6.3% Embolization Specific Complication Rate
- 0% Mortality
Embolization: Complications

- Anastomosis with branches of internal carotid a. or vertebral a.
- Embolization of cranial nerve vascular supply
- Choice of embolization agents: size
Embolization: Complications

- 2 patients with monocular blindness
- Facial paralysis
- Dissection of MMA
- CN X, XI, XII Palsy
- MMA perforation and sacrifice
- Left Frontal Lobe Hematoma/Intratumor Hemorrhage
(A) Right frontal meningioma (tumor); (B) Arteriogram showing blood supply to tumor prior to embolization; (C) Arteriogram after embolization of blood supply to tumor.
Case #1/#2

- Large convexity meningiomas
- Due to anastomotic channels which opened between the middle meningeal a. and ophthalmic a. connections
- Both cases done using 50-150 um PVA particles
- Both patients with gross total resections following these complications
Case #3: Facial Paralysis

- 57 y/o Petroclival Meningioma
- Posterior Branch of Left MMA
- IA Lidocaine / Gel Foam Powder
- Facial Paralysis secondary to embolization of the petrous branch of MMA which supplies CN VII
Case #4: Dissection of MMA

- 50 y/o with large convexity meningioma
- Supply from MMA
- Dissection of MMA during catheterization
- No free flow of contrast
- Unable to Embolize the tumor
Case #5: Multiple CN Palsy

- 39 y/o with clival meningioma
- Fed by Ascending Pharyngeal branch
- Absolute ethanol and avitene
- CN IX, X, XI discovered prior to operation
Case #6: Epidural Hematoma

- 32 y/o large Parasagittal Meningioma
- Fed by MMA
- Perforation of MMA
- Small Epidural Hematoma
- Observation and Resolution Prior to Surgery
Case #7: Hemorrhage

- 61 y/o recurrent large convexity meningioma
- Left STA/MMA Feeding Tumor
- 300-500 um PVA
- Left frontal Lobe ICH/ Emergency Craniotomy after Pupillary Change
- Good Outcome with eventual gross total resection
Conclusions

- Excellent knowledge of collateral circulation is essential
- Knowledge of CN vascular supply
- Most complications associated with very small embolization materials (<150 um)
- IA Lidocaine prior to embolization
- Does the tumor need to be embolized at all?
Conclusion

In the hands of an experienced interventionalist, preoperative embolization is a safe and valuable aid to the surgeon in the treatment of selected difficult and complex meningiomas.