Endovascular Intervention and Management of Pediatric Mandibular Arteriovenous Malformation

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Introduction

Arteriovenous malformation of the mandible are a rare and potentially life threatening entity. Life threatening exsanguination from this lesion is a well documented event. Management of these lesions is unfortunately unclear and unstandardized due to their rare occurrence. Their presentation is wide and varied ranging from complaints of a loose tooth to acute hemorrhage and shock. Currently a multidisciplinary approach that typically involves input from oral maxillofacial surgeons (OMFS), otolaryngologists, and endovascular neurointerventionalists is required to manage these lesions. Often these lesions require both endovascular intervention and surgical resection. Due to the lesions high rate of recurrence and proximity to vital structures, gross surgical resection of the lesion is required. Gross surgical resection brings its own challenges in the growing pediatric patient including considerable aesthetic deformity and growth disturbances. Therefore definitive treatment with endovascular techniques is a reasonable goal for therapeutic management. Embolization of the lesion nidus is often hard to achieve in these malformations due to their high flow state. Retaining these agents of embolization at the target feeder vessels is difficult for these lesions. The case presented here is an example of a pediatric mandibular arteriovenous malformation that was treated entirely with endovascular management.

Presentation

17 y/o female with no medical history who presented to Cooper ER from Orthodontists office. Patient had been complaining of a loose tooth (#18) since November of the previous year. Initially thought to be due to gingival disease patient was prescribed a mouth wash with no resolution of symptoms. Patient was sent for Panorex and a left posterior mandibular lesion was found. Patient was initially seen by oral maxillofacial surgery in the ED where CT of head and neck was performed. OMFS notes that patient had bounding pulse and palpable thrill along left mandible. Arteriovenous malformation of left jaw was diagnosed. Neurosurgery is consulted. Decision made to take patient for angiography and embolization.

Methods and Results

First Intervention

• Access: right femoral artery
• 0.038” glide wire and 6 French Envoy DA catheter used for diagnostic portion. Echelon 10 microcatheter used for arterial feeders
• On right carotid there is one lingual feeder to AVM. Right suprachinoid carotid, R MCA, R ACA all unremarkable.
• Left common carotid reveals large malformation with multiple feeders from the external carotid artery. Left lingual artery and internal maxillary are the major feeders. Left suprachinoid carotid, L MCA, L ACA unremarkable.
• Intervention:
  - Synchro 2 microwire guided Echelon 10 catheter into left lingual artery
  - Microcatheter was prepped with DMSO and then Onyx 18 was injected into lingual artery, catheter was removed
  - Post embolization angiography demonstrated occlusion of vessel, two more feeder vessels are embolized in similar fashion.
  - Mild slowing of AVM demonstrated
  - Intervention stopped due to contrast load and radiation exposure

Second Intervention

• Access: right femoral artery and left femoral vein
• 0.038” glide wire and 6 French Envoy DA catheter used for diagnostic portion. Echelon 10 microcatheter used for arterial feeders. On the venous intervention, the 6 French Envoy catheterized the internal jugular vein. Then a SL 10 microcatheter was used to catheterize the left mandibular vein. An IM VB catheter was used for the left communicating jugular vein.
• Intervention:
  - After catheterizing the left internal jugular artery with an Echelon 10 catheter, deep space filled with DMSO and Onyx 18 deployed. Catheter is removed and replaced. This is repeated for all 5 feeders of the internal maxillary artery.
  - For the venous intervention multiple catheters were attempted for access to communicating jugular vein. Eventually was able to get IM VB catheter in. Using a Synchro micronire an SL-10 catheter could be advanced to the venous varix. The catheter could not be advanced past the mandibular vein. Here multiple coils were deployed to obliterate venous side. Post intervention angiogram demonstrated complete resolution of arteriovenous shunting.

Results

• At the conclusion of the second intervention no high flow arteriovenous shunting was appreciated. Patient did well with procedure. She suffered no side effects from the intervention aside from local edema in the area of the jaw. Patient will be followed with another angiogram 3 months after intervention.

Summary and Conclusions

Mandibular AVMs represent a dangerous entity that is often difficult to treat. There is no question that endovascular embolization is essential for prevention of life threatening exsanguination. Surgery is often required for definitive management due to the propensity of these lesions to recur. Endovascular treatment alone has produced mixed results. Traditional endovascular treatment aims for obliteration of the arterial feeders of high flow lesions and studies have shown that up to 80% of these lesions can recur. Here we present a case where intervention was the sole treatment for a mandibular AVM. It was performed for both the arterial feeders and for the venous varix present in the left mandibular vein with successful reduction of arteriovenous shunting. By obliterating both the arterial feeders and the venous varix of this high flow AVM, we hope to avoid recurrency and deforming surgical resection.

References