Bilateral Vascular Supply in Juvenile Nasopharyngeal Angiofibromas

Arthur Wu MD1, Sarah Mowry MD1, Fernando Vinuela MD2, Elliot Abemayor MD PhD1, Marilene Wang MD1

1Division of Head & Neck Surgery, 2Department of Interventional Radiology
University of California, Los Angeles

Introduction

Juvenile nasopharyngeal angiofibroma (JNA) is a rare benign tumor of the nasal cavity. This tumor presents exclusively in males in their teens and twenties. While histologically benign, these tumors are locally aggressive, frequently involving the paranasal sinuses, orbit or intracranial cavities. Traditionally, these tumors have been surgically excised via open craniofacial approaches. In the last decade, tumors confined to the nasal cavity and paranasal sinuses, as well as some more extensive lesions, have been successfully removed endoscopically. Control of intraoperative bleeding is essential to the success of endoscopic resections of such highly vascularized lesions, and preoperative embolization of JNAs has become standard.

The most frequent feeding vessel is the ascending pharyngeal artery (APA). Other commonly involved vessels are the internal maxillary artery and its branch the descending palatine artery. The tumor may also acquire feeding vessels from the internal carotid artery. Typically, JNAs have unilateral feeding vasculature. Traditionally, bilateral blood supply has been reported as uncommon but possible in large tumors that cross the midline.

Methods and Materials

Three consecutive patients with juvenile nasopharyngeal angiofibroma (JNA) in a two year period from the UCLA Division of Head and Neck Surgery are presented. Case presentation, preoperative angiograms, surgical technique, and outcomes are reviewed. We also review the literature regarding the vascular supply of JNA.

Results

Patient 1 is a 15 year old male with a 26 x 38 mm mass on MRI in the right nasal cavity with widening of the sphenopalatine foramen. Preoperative angiography demonstrated tumor blush from the right ascending pharyngeal artery (Image 1). No feeders from the left carotid system were seen. After embolization, the patient was brought to the operating room. Using standard endoscopic techniques the tumor was partially resected; however, hemostasis was unusually difficult. Thus, the patient was emergently taken back to the angiography suite. Secondary angiography demonstrated tumor blush from the left ascending pharyngeal artery (Image 2). After embolization, the patient underwent resection via Caldwell-Luc approach without complication.

Patient 2 is an 18 year old male with a right posterior nasal cavity mass. Angiography demonstrated feeding vessels from bilateral carotid systems (Images 3 and 4). Feeding vessels from the right ECA system included the ascending pharyngeal artery, the sphenopalatine artery, and the middle meningeal artery. The right internal carotid artery also contributed via the vidian artery in its petrosal segment. Feeding vessels from the left ECA system included the ascending pharyngeal artery and the sphenopalatine artery. After embolization, endoscopic resection proceeded as planned the following day with no complications.

Patient 3 is a 13 year old male with a 40 x 40 mm mass in the left nasopharynx, crossing midline. Angiography demonstrated tumor feeders from bilateral carotid systems (not shown). The ECA feeding vessels included left descending palatine artery, sphenopalatine artery, and the accessory meningeal artery. Additionally, the vidian artery and ophthalmic ethmoidal collaterals from the left ICA fed the tumor. The right sphenopalatine artery, ascending pharyngeal artery and the vidian artery supplied the tumor blush to a lesser extent. Following embolization, the patient underwent endoscopic resection of the tumor without complication.

Conclusions

In all three cases, the tumors derived vascularity from bilateral carotid systems. While one tumor filled the entire nasopharynx, two of the patients had distinctly lateralized disease. Traditionally, JNAs have been thought usually to have unilateral feeding vessels except when tumors are large and cross midline. However, a literature review reveals the finding of bilateral feeding vessels to be not uncommon. As this is a rare disease, most series have less than 20 patients. While several studies demonstrated no tumors with bilateral supply, others had up to 70% of tumors demonstrating at least some bilateral supply. It is important for both the interventional radiologist and the surgeon to be cognizant of the potentially variant vascular supply of these tumors. It should be routine for the interventional radiologist to perform bilateral angiograms on all JNAs despite seeming unilaterality of the tumor.

Patient 1 demonstrates an unusual angiographic finding. During the initial angiography the only feeding vessel identified was the right APA despite. However, uncontrollable bleeding during the surgery suggested that the tumor had a persistent blood supply. We hypothesize that hypoxia within the tumor resulted in dilation of other previously constricted feeding vessels, namely the left APA. This post angiography dilation of the left APA then resulted in the uncontrolled bleeding encountered during the surgery. Profuse intraoperative bleeding should prompt the surgeon to consider additional feeding vessels and additional embolization if hemostasis cannot be achieved.

References