

# THE VALUE OF MAGNETIC RESONANCE ANGIOGRAPHY IN EVALUATION OF HEAD AND NECK PATHOLOGY: A PICTORIAL ESSAY



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## ABSTRACT

**Objectives:** The aim of this presentation is to highlight the ability of Magnetic Resonance Angiography (MRA) in the clinical applications of head & neck pathology.

**Methods:** Here we present few head and neck lesions with various pathology to illustrate the diagnostic value of MRA along with its influence on therapeutic decisions.

**Results:** MRA has the ability to delineate both the anatomic relationships between head & neck pathology with normal surrounding structures, the tumour vascularity and the tumour feeding vessel.

**Conclusion:** MRA provides sufficient information to aid and influence therapeutic decisions. It is recognized as an alternative to conventional angiography due to its non-invasive approach and less time consuming.

## CASES PRESENTATION

### CASE 1: AURICULAR HAEMANGIOMA

**Comment.** A 19 year-old man presented with recurrent left auricular haemangioma. MRA was performed to evaluate the tumour vascularity and the feeding vessels. MRA revealed that the feeding vessels were derived from the left posterior auricular and occipital arteries. Surgical removal was performed and the external carotid was temporarily clamped intra-operatively with minimal blood loss. Post-operatively repeat MRA revealed resolution of the feeding vessels.

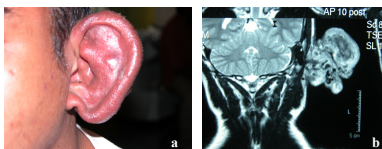


Figure 1a: Recurrent left auricular haemangioma. Figure 1b: Coronal T2W shows hyperintense left pinna with flow void signals within.

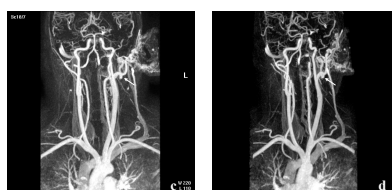


Figure 1c, 1d: Two contrast-enhanced MRA (CEMRA) with MIP images in different angles, show the feeding vessels. (arrow)

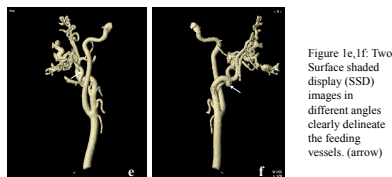


Figure 1e, 1f: Two Surface shaded display (SSD) images in different angles clearly delineate the feeding vessels. (arrow)



Figure 1g: Post operative CEMRA with maximum intensity projection (MIP image) shows resolution of the feeding vessels. (arrow)

### CASE 2: INTRANASAL HEMANGIOMA

**Summary.** A 15 year-old boy presented with polypoidal left intranasal mass associated with epistaxis. Pre-operative MRI & MRA revealed an enhanced tumour but no obvious feeding vessels. Based on this radiological finding the tumour was removed via endoscopically with minimal blood loss. Histopathological examination confirmed a diagnosis of haemangioma arising from the junction between left middle turbinate and lateral nasal wall.

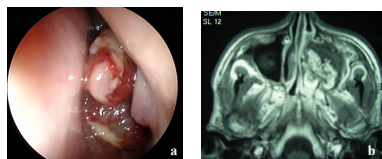


Figure 2a: Nasal endoscope shows left intranasal vascular mass. Figure 2b: Axial T1W post contrast shows heterogenous enhancing left nasal mass.

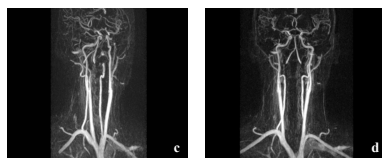


Figure 2c, 2d: Two CEMRA with MIP images in different angles show no obvious feeding vessels or tumor blush.

### CASE 3. CERVICAL SCHWANNOMA

**Summary.** A 41 year-old man presented with slow growing left cervical swelling associated with muffled voice and paresis of the left hypoglossal nerve. CT scan of the head and neck region revealed a left parapharyngeal tumour extending into the infratemporal fossa. MRI and MRA was performed to evaluate tumour vascularity and rule out carotid aneurysm. MRA showed splaying of the left internal and external carotid artery, however there were no obvious tumour blush or feeding vessels. Based on this findings surgical removal was performed safely via transcranial approach to assess the infratemporal fossa portion of the tumour. HPE revealed a diagnosis of cervical schwannoma.

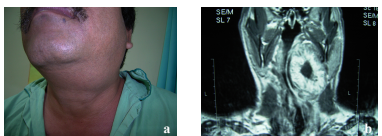


Figure 3a: Patient with left cervical swelling. Figure 3b: Coronal T1W post contrast shows heterogenous enhancing left parapharyngeal mass.

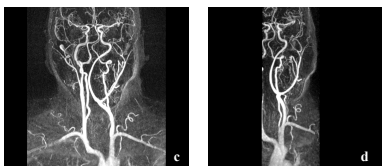


Figure 3c, 3d: Two CEMRA with MIP images in different angles show splaying of the left internal and external carotid arteries. No obvious tumor blush or feeding vessels.

### CASE 4: JUVENILE NASOPHARYNGEAL ANGIOFIBROMA

**Summary.** A 13 year-old boy presented with left juvenile nasopharyngeal angiofibroma. MRI & MRA was done to assess the feeding vessels which derived solely from the left internal maxillary artery. The tumour was safely removed via transpalatal approach and the external carotid artery was temporarily clamped during the operation.

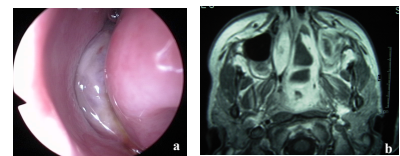


Figure 4a: Nasal endoscope shows left intranasal mass. Figure 4b: Axial T1W post contrast shows enhancing mass in post nasal space and nasal cavity.

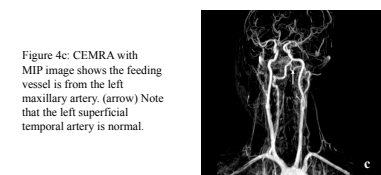


Figure 4c: CEMRA with MIP image shows the feeding vessel is from the left maxillary artery (arrow) Note that the left superficial temporal artery is normal.

## 5. HIGH JUGULAR BULB

**Summary.** A 71 year-old lady presented with left pulsatile tinnitus for one year duration. Otolaryngology showed a pulsating red mass behind the tympanic membrane. Based on the CT scanning a provisional diagnosis of glomus tympanicum was made. MRI with MRV revealed a small outpouching mass at superior part of high left jugular bulb. A diagnosis of penetrating high jugular bulb was confirmed on exploratory tympanotomy where there was no bony plate covering the pulsating mass.

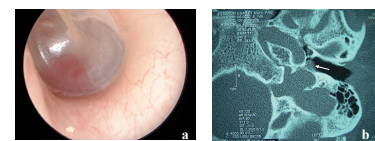


Figure 5a: Otolaryngology shows red mass behind the tympanic membrane. Figure 5b: Axial HRCT temporal bone shows protruding mass in middle ear cavity. (arrow)

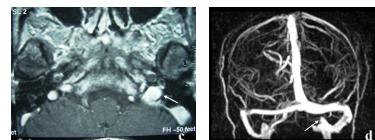


Figure 5c, 5d: Axial T1W post contrast and MRV (MIP image) show prominent and high jugular bulb. (arrow)

## DISCUSSION

Recent advances in MR technology have allowed MRI with MRA the ability to assess the anatomical relationships between head and neck pathologies with normal surrounding structures, the tumour vascularity and the tumour feeding vessels. The information is valuable and sufficient to aid the surgeon to decide the best surgical approach in order to achieve complete and safe tumour removal, as the most important point is to minimize the intra-operative bleeding. In the first and fourth case, MRA has identified the feeding vessels. Intra-operatively the left external carotid artery was temporarily clamped to minimize blood loss. Spontaneous resolution of the feeding vessels were noted in post-operative MRA as was shown in the first case. In the third and fifth case, though MRI was unable to rule out paraganglioma and glomus tumour respectively, MRA has given the surgeon some idea of the tumour vascularity. In the second case, MRA did not show any tumour blush or feeding vessel. Based on this finding the tumour was removed endoscopically without any difficulty with minimal intra-operative blood loss. As a conclusion, MRA provided sufficient information to aid and influence therapeutic decisions. It has shown clinical promise in centres where conventional angiography is not available. In the near future, MRA may be recognized as an alternative to conventional angiography due to its non-invasive approach and less time consuming procedure.

## REFERENCES

- Endres et al. The role of magnetic resonance angiography in head and neck surgery. *Laryngoscope* 1995; 105: 1069 - 1076.
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