

Magnetic Resonance Imaging of the Skull Base and Extracranial Head and Neck

William P. DILLON, M. D.

University of California San Francisco

Advances in magnetic resonance imaging using high field (1.5 T) high resolution systems permit more accurate diagnosis of intracranial pathology including acute and chronic hemorrhage, pituitary lesions, and ischemic changes. However, the use of MR in the diagnosis of extracranial head and neck pathology has received less emphasis than the intracranial applications. In many respects MR is ideal for the evaluation of the skull base and surrounding soft tissue structure of the nasopharynx due to this region's immobility and need for orthogonal imaging planes. Through the use of sagittal and coronal scans, the cranial nerves may be imaged not only in their intracranial course, but also throughout their extracranial course in the nasopharynx and carotid glands. Specifically, the cisternal and cavernous portion of the cranial nerves III, IV, V, and VI are routinely imaged on thin section T-1 weighted MR scans. The second and third divisions of the V cranial nerve are routinely imaged through their course in the extracranial head and neck. The accurate portrayal of the fine anatomy of the nasopharynx and skull base on MR now permit more accurate mapping of the extent of pathology including perineural spread of tumor around cranial nerves, cavernous sinus involvement, and skull base erosion. CT and polytomography may be more useful in the depiction of osseous abnormalities near the cranial cervical junction, however MR has proven useful in depicting the relationship of the intracranial parenchyma to surrounding bone. In addition, diseases infiltrating the bone marrow of the skull and skull base may be diagnosed at an earlier stage than with CT. Disease processes such as leukemic infiltration of bone marrow and metastatic disease may be detected at an earlier stage with MR than by CT. Pathology of the nasopharynx is more accurately depicted by MR due to a greater soft tissue contrast than on CT. In addition magnetic resonance also better demonstrates the relationship of vessels to tumor, pathologic nodes, and extracranial nerve involvement.

In summary, magnetic resonance imaging is the preferred modality for imaging the soft tissue component of extracranial and skull base pathology. High resolution CT scans may be useful in the depiction of subtle bony anomalies and pathology within the temporal bone. However, magnetic resonance offers a unique alternative to CT in the diagnosis of skull base and nasopharyngeal pathology.