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Distinguishing Schwannomas from Metastases in the Cerebellopontine Angle/Internal Auditory Canal

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DESCRIPTION

Proper myelination of neuronal axons is essential for proper brain function and cognitive function. The g ratio, or the ratio of axon diameter to outer fiber diameter, is a reliable measure of axonal myelination and an important index reflecting the efficiency and maximal velocity of conduction in white matter tracts. Although advanced neuroimaging techniques such as multicomponent relaxometry and diffusion tensor imaging provide information on the microstructure of brain tissue, they do not allow direct analysis of the myelin g-ratio. We show how to estimate myelin g-ratio by combining myelin content information obtained by mc despot MCR and neurite density information obtained by NODDI diffusion imaging. We present the first quantitative study of changes in myelin g-ratio index in childhood, examining 18 typically developing children aged 3 months to 7.5 years. We present the first quantitative study of changes in the myelin g index during childhood and examined 18 typically developing children between the ages of 3 months and 7.5 years. We report a pattern of maturation that is consistent with histological and developmental MRI studies, as well as theoretical studies of myelin g-ratio. This is the first *in vivo* visualization of the development of white matter g-ratio indices during early childhood. The most common lesion of the cerebellopontine angle is schwannoma of the 8th cranial nerve (acoustic neuroma). When reviewing images of patients with sensorineural hearing loss (SNHL), vertigo, and dizziness, a wide range of differential diagnostic options must be considered. The purpose of this communication is to provide the reader with a solution to this problem. A detailed anatomy of the region is part of this communication. The most common neoplasm in this location vestibular schwannoma is the subject of this review of tumors of the cerebellopontine angle. We track the common and unusual imaging manifestations of this tumor, which often causes sensorineural hearing loss, tinnitus, dizziness and, in rare cases, vertigo. We also review key imaging findings that can have a major impact on pre-surgical planning. Subsequently, we will go through the other most common tumors that occur in this location, such as meningioma, schwannoma of the facial nerve, metastasis and congenital epidermoid cyst. We highlight the distinct imaging properties of these entities that can help us improve our diagnostic accuracy. MR imaging is a high-resolution technique for examining the internal auditory canal and structures of the cerebellopontine angle. Contrast or three-dimensional T2-weighted MR sequences can detect vestibular schwannoma. In this review, the imaging findings of primary and residual vestibular schwannomas, as well as their mimics, are examined. The vestibulocochlear nerve is afflicted by a wide variety of pathologies. Magnetic resonance imaging is the preferred method for investigating vestibulocochlear nerve pathology. Agenesis or hypoplasia of the vestibulocochlear nerve is the most common type of congenital pathology. Tumors affecting the vestibulocochlear nerve are most often located in the internal auditory canal or the cerebellopontine angle. The most common tumor lesion is schwannoma of the vestibulocochlearis nerve, followed by meningioma, arachnoid cyst and epidermoid cyst. Since the leptomeninges are connected to the VCN, any leptomeningeal disease can manifest in the IAC. The CPA and IAC can be affected by any inflammatory or infectious process that causes dural and/or leptomeningeal involvement. Meningitis and postmeningitis or postoperative fibrosis are examples of this. It is sometimes difficult to distinguish infectious-inflammatory dural and/or leptomeningeal involvement from neoplastic dural or leptomeningeal disease on imaging

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CONFLICTS OF INTEREST

The authors declare that they have no conflict of interest.

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