Trigeminal neuromas: assessment of MRI and CT

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Summary. We report four cases of trigeminal neuroma. One of the patients had von Recklinghausen's neurofibromatosis with plexiform neurofibromas of the branches of the trigeminal nerve. MRI provided more information than CT as regards the spread of tumour: extension to the mandibular and maxillary division of the trigeminal nerve was well demonstrated on sagittal and coronal sections. This examination yielded an accurate census of the intra-ocular plexiform neurofibromas and allowed a correct preoperative diagnosis to be obtained. With Gd-DOTA, better definition of the outline of the tumours and of cystic components was obtained. However, CT was better for demonstration of bone erosions.

Key words: Trigeminal neuromas – Magnetic resonance imaging – Computed tomography – Neurofibromatosis

Trigeminal neuromas account for about 0.2% of intracranial tumours and for 2-3% of intracranial neuromas [1, 2]. Although they are benign tumours, operative morbidity is high, as location close to the cavernous sinus is a major impediment to complete removal [1-3]. We report four trigeminal neuromas studied preoperatively with CT; three underwent MRI. One patient had von Recklinghausen's disease. The value of Gd-DOTA for detection and characterization of trigeminal neuromas is stressed.

Case reports

Case 1

A 56-year-old man was admitted because of disturbance of balance. Neurological examination revealed cerebellar ataxia with bilateral nystagmus, without impairment of the fifth nerve.

Initial CT with intravenous contrast medium demonstrated a large (55 x 30 mm), densely and heterogeneously enhancing mass in the right cerebellopontine angle, involving the right cavernous sinus. There was a mass effect on the right side of the pons and cerebral peduncle. The fourth ventricle was not displaced. Minimal hydrocephalus was noticed. Windowing to highlight bone detail showed erosion of the right petrous apex and sphenoid sinus and enlargement of the foramen ovale. MRI was performed on a 1.5 T superconducting magnet with 5 mm axial and coronal T1-weighted images before and after injection of Gd-DOTA. Axial T2-weighted images were also obtained. MRI showed the extra-axial posterior cranial fossa mass to extend into Meckel's cave. On T1-weighted images, the lesion gave lower signal than brain tissue, but higher than CSF. Injection of Gd-DOTA caused heterogeneous enhancement of the tumour, and clearly depicted low intensity areas corresponding to cysts on pathological examination (Fig. 1a). On T2-weighted images, the lesion gave higher signal than CSF (Fig. 1b). No oedema was detectable. High signal intensity areas were visualized around the lateral ventricles, suggesting active hydrocephalus. Cerebral arteriogram showed no pathological vasculature.

A right temporal craniotomy confirmed the large tumour in the cerebellopontine angle and Meckel's cave. The brain stem completely enclosed the medial part of the tumour. Pathological examination revealed a trigeminal neuroma. The patient died 2 days after surgery because of ischemia of the brain stem.

Case 2

A 43-year-old man had a 15-year history right exophthalmos; he had von Recklinghausen's neurofibromatosis. He complained of a paroxysmal burning sensation, occurring 3 or 4 times a day and limited to the ophthalmic territory of the right trigeminal nerve. Physical examination disclosed right exophthalmos, and loss of vision and hypoesthesia in the distribution of the first division of the right trigeminal nerve.

Contrast-enhanced CT showed a 25 x 10 mm enhancing mass in the right Meckel's cave extending to the superior orbital fissure, and exophthalmos (Fig. 2a, b). Coronal sections revealed involvement of the right maxillary sinus (Fig. 2c). T1-weighted MRI was performed on a 1.5 T
Fig. 1a, b. Case 1. Right hourglass trigeminal neuroma extending to the middle and posterior cranial fossae, close to the basilar artery. The neuroma is of low intensity on an axial T1-weighted (600/15) image, with peripheral enhancement after Gd-DOTA injection (a), and of high intensity on a T2-weighted (2500/90) image (b). The fourth ventricle is enlarged and displaced to the left.

Fig. 2a–e. Case 2. Neuroma in the right cavernous sinus involving the orbital fissure and eroding the skull base on CT (a,b). Coronal section (e) shows involvement of the maxillary sinus by the plexiform neuroma. d Enlargement of the right foramen ovale and pterygoid fossa is demonstrated on gadolinium-enhanced coronal T1-weighted image. e Sagittal T1-weighted images without Gd-DOTA show intraorbital neurofibromas and their relationship with the extraocular muscles.