INTRODUCTION

The trigeminal nerve is the largest of the cranial nerves. It carries motor supply to the muscles of mastication and transmits sensory information from the face, oral and nasal cavities, and most of the scalp. Disease within or local to the nerve can cause trigeminal neuralgia or loss of sensory or motor function in the distribution of the nerve. This review describes the radiological anatomy of the trigeminal nerve and illustrates some of the pathological conditions involving the trigeminal nerve that might be demonstrated on MRI. For diagnostic clarity, pathology involving the trigeminal nerve can be subdivided according to anatomical location (nucleus, pre-pontine cistern, Meckel's cave/cavernous sinus and extracranial) ***(Williams L.S., et al., 2003)***.

Cranial nerves are surrounded by a series of connective tissues sheaths called endoneurium ,perineurium and epineurium which form the blood-nerve barrier being maintained by the combined actions of tight junctions in the endothelium of the endoneural capillaries and tight junctions in the inner layers of the peri-neurium, various insults disrupt the blood-nerve barrier allowing leakage and accumulation of contrast material with resultant perineural enhancement such disruption may arise from secondary to neoplasm ,autoimmune disease ,inflammation ,demylenation ,ischemia, trauma, radiation and axonal degeneration ,all resulting in abnormal cranial nerve enhancement. So MRI is the imaging modality of choice when trigeminal nerve pathology is suspected ***(Majoie C.B. et al., 1995)***.

However, there are no specific clinical features allowing confident localization of pathology affecting the trigeminal nerve. It is therefore essential that the whole brain is imaged routinely to ensure that all significant pathology is demonstrated. Routinely, 1 mm thick sagittal oblique reformations are constructed for each trigeminal nerve along with 1 mm reconstructions in the coronal plane from brain stem to Meckel's cave ***(Hutchins L.G., et al., 2001).***

The pathological processes affecting the trigeminal nerve may be most usefully considered according to the anatomical part of the nerve affected.

Lesions involving the trigeminal nuclei as in Cerebrovascular disease is a common cause of sensory loss within the distribution of the trigeminal nerve. Brain stem neoplasms in adults are most commonly metastases from an extracranial primary neoplasm. Primary intraaxial tumours arising in the brain stem are usually gliomas ***(Bilaniuk L.t., et al., 2000)***.

Vascular malformations of the brain stem, such as arteriovenous malformations (AVMs) and cavernous haemangiomas, may become symptomatic following an episode of haemorrhage ***(Gomori J.M., et al., 2002)***.

Lesions involving the trigeminal nerve in the pre-pontine cistern as in neurovascular compression is now accepted as being the commonest cause of trigeminal neuralgia unresponsive to medical therapy. Tortuous branches of the posterior circulation vessels, particularly the superior cerebellar artery, may impinge upon the trigeminal nerve at its REZ. Cerebellopontine angle neoplasms may cause trigeminal neuralgia or neuropathy by extrinsic compression of

the nerve as Acoustic neuromas, Meningiomas, arachnoid cysts and epidermoid cysts ***(Lovely T.J. and Jannetta P.J., 2001)***.

Meckel's cave and cavernous sinus as in neoplasms within Meckel's cave, for example meningioma, epidermoid tumour and trigeminal neuroma, may cause trigeminal nerve symptoms.Granulomatous or inflammatory disease, such as neurosarcoid, may involve the nerve or ganglion at this site. Carotid aneurysms may cause trigeminal symptoms, particularly cavernous aneurysms ***(Nowak D.A. and Widenka D.C., 2004)***.

Extracranial involvement of trigeminal nerve divisions as in any local pathology, most commonly head and neck neoplasms and metastatic tumour deposits, may affect the three divisions of the trigeminal nerve ***(Caldemeyer K.S. et al., 1998)***.

Aim of work

To highlight the role of MRI in the diagnosis of trigeminal cranial nerve malfunction and its different causes.