Neurofibromatosis, Type II

Alternative Names
NF2
Neurofibromatosis, Central Type
Acoustic Schwannomas, Bilateral
Bilateral Acoustic Neurofibromatosis
BANF
Acoustic Neurinoma, Bilateral
ACN

Record Category
Disease phenotype

WHO-ICD
Congenital malformations, deformations and chromosomal abnormalities > Other congenital malformations

Incidence per 100,000 Live Births
2-5

OMIM Number
101000

Mode of Inheritance
Autosomal dominant

Gene Map Locus
22q12.2

Description
Neurofibromatosis, type II (NF2) is a hamartoneoplastic syndrome, characterized by the presence of benign tumors in the nervous system, particularly vestibular Schwannomas or acoustic neuromas. Acoustic neuromas grow along the auditory nerve, causing bilateral acoustic neurinomas, which is a characteristic feature of the condition. Apart from these growths, tumors may also grow on other areas of the nervous system, including the brain and the spinal cord. Although the genetic defect underlying this condition is present at birth, symptoms usually appear only by the second or third decade of life. These include hearing loss accompanied with ringing and noises in the ears, difficulty in maintaining balance, and headaches. Other symptoms vary according to the site of tumor growth. Tumors affecting the ocular nerves cause changes in vision, and cataracts, often beginning as early as in childhood. Other symptoms include coffee colored marks on the skin, facial weakness, limb weakness, swellings under the skin, and fluid accumulation in the brain. The condition shows variable expressivity, ranging from the Gardner type, a mild form that persists through life, to a severe condition known as Wishart type, which presents with more than three tumors at a young age. It is estimated that 1 in 40,000 individuals are affected by NF2.

Individuals with bilateral acoustic neurinomas and a family history of NF2, neurofibroma, meningioma, glioma, Schwannoma, or juvenile posterior subcapsular cataract are highly likely to be affected with NF2. Genetic testing is available to confirm the diagnosis. In individuals with a family history of the condition, genetic testing can detect affected patients at an early stage, thereby facilitating management of the disease. Surgery to physically remove the tumors is the only reliable method for therapy. Radiosurgery is also being considered as an alternative to conventional surgery, although there are chances of malignant changes occurring to the nearby tissues as a result of irradiation. Hearing loss is usually managed, either by a cochlear implant, or in cases of cochlear damage, by an auditory brainstem implant. Although the tumors themselves are benign, their location in the nervous system makes them more serious. Prognosis for the milder forms of the disease is generally good. However, patients affected with the Wishart form usually do no survive their fifth decade of life.

Molecular Genetics
Mutations in the neurofibromatosis 2 (NF2) gene are responsible for causing this condition. This gene codes for a tumor suppressor protein, known as Merlin, which plays a vital role in call adhesion, and has supportive functions in other important processes, such as cell movement, maintaining cell shape, and intercellular communication. It is theorized that defects in the protein lead to a breakdown of these processes and most

importantly, enable cells to loose their property of contact inhibition, thereby resulting in tumors typical of NF2.

Epidemiology in the Arab World

Arab

Sener (1996) described total callosal absence in a neurofibromatosis type 2 patient, and suggested this is caused by a neurofibromatosis-related congenital lesion in the position where corpus callosum begins to develop; namely the comissural plate.

Oman

Mishra et al. (2001) reported a 19-year old female with central neurofibromatosis who presented with a five-year history of hoarseness of voice, three-year history of squint, two years of left sided deafness and a one-year history of difficulty in walking. Examination revealed bilateral sensorineural hearing impairment and right sided third, ninth, and tenth cranial nerves palsies. CT scan and MRI imaging of the brain revealed multiple intracranial mass lesions; left lateral sphenoid wing meningioma, bilateral vestibular Schwannoma (larger on the right side), and multiple small meningiomas on the cavernous sinus region and other parts of the dura. At this stage, the left sphenoid wing meningioma was totally excised through a left pterional craniotomy. After four years from presentation, the patient developed cerebellar signs (horizontal nystagmus, dysdiadochokinesis, and mild truncal ataxia with swaying to the left) along with complete hearing loss. Audiogram revealed profound sensorineural hearing loss with no speech discrimination on the left side, and moderate serviceable hearing on the right side with 75% speech discrimination. MRI of the brain and spinal cord revealed no residue of the left sphenoid wing mass, a meningioma on the left parieto-occipital region, enhancing space occupying lesion involving the right seventh, eighth, and lower cranial nerves, meningioma en plaque on the cavernous sinus, multiple enhancing intradural extramedullary lesions in the cervical spine, and multiple spinal meningiomas on the posterior theca at the left dorsal and upper lumbar level. The right CP angle mass (vestibular schwannoma) was subjected to radiosurgery, which unfortunately was followed by loss of the residual hearing on the right side. After another four years, there was no change in her clinical and functional status, and repeat MRI revealed the growth of all lesions previously detected with no radio-necrosis or shrinkage of the right acoustic tumor. The spinal mass, which occupied 90% of the spinal canal causing cord compression, extended from the C3/C4 disc space to the lower border of T1 vertebral body. C3 to D1 laminotomy was performed with excision of the intradural part of the cervical intradural neurofibroma. The patient was discharged home after two weeks with no additional deficit. The future plan for this patient was management of the remaining four lesions (two CP angle lesions- right one increased in size after radiosurgery, left parieto-occipital lesion, and right cavernous sinus lesion).

References

Mishra GP, Lad SD, Mahapatra AK. Multiple central nervous system tumors and combined treatment modalities- an illustrative case. Oman Med J. 2001; 17(3):28-32.

Sener RN. Neurofibromatosis type2 associated with total callosal absence: a causal relationship! Kuwait Med J. 1996; 28(2):203-5.

Related CTGA Records

N/A

External Links

http://ghr.nlm.nih.gov/condition=neurofibromatosis type2
http://www.emedicine.com/radio/topic475.htm
http://www.genetests.org/profiles/nf2
http://www.nf2crew.org/
http://0-www.nlm.nih.gov.catalog.llu.edu/medlineplus/ency/article/000795.htm

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