Pediatrics
NEUROLOGY

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Neurocutaneous Syndromes

The neurocutaneous syndromes include a heterogeneous group of disorders characterized by abnormalities of both the skin and central nervous system (CNS).

These syndromes include:

Neurofibromatosis

Tuberous sclerosis

Sturge-Weber disease

Neurofibromatosis (NF)

NF is a common autosomal dominant disorder.

Clinical manifestations and Diagnosis:

There are two forms of NF:

NF-1: is the most prevalent type (90%).The NF-1 gene located on chromosome region 17q11. It is diagnosed when **any two of the following seven signs are present**:

1- Six or more **caféau-lait spots** over 5 mm in diameter in prepubertal individuals and over 15 mm in greatest diameter in postpubertal individuals. Café au-lait spots are the hallmark of neurofibromatosis and are present in almost 100% of patients.

They are present at birth but increase in size, number, and pigmentation, especially during the 1st few years of life.

The spots are scattered over the body surface, mainly the trunk and extremities, and with sparing of the face.

2- Axillary or inguinal freckling consisting of multiple hyperpigmented areas 2–3 mm in diameter.

3- Two or more iris Lisch nodules Lisch nodules are hamartomas located within the iris and are best identified by a slit-lamp examination.

They are present in >74% of patients with NF-1.

4- Two or more neurofibromas or one plexiform neurofibroma. Neurofibromas typically involve the skin, but they may be situated along peripheral nerves appear characteristically during adolescence

5- A distinctive osseous lesion such as sphenoid dysplasia (which may cause exophthalmos) or Scoliosis.

6-Optic gliomas are present in ≈15% of patients . ≈20% have visual disturbances .

7-A first-degree relative with NF-1.

Children with NF-1 are susceptible to:-

1.Neurologic complications & cognitive abnormalities like learning disabilities and abnormalities of speech.

These cognitive abnormalities are common and occur in 40–60% of NF-1 children. Complex partial and generalized tonic-clonic seizures are a frequent complication.

2.The cerebral vessels may develop aneurysms, or stenosis.

3. Psychologic disturbances.

4.Precocious puberty .

5. Malignant neoplasms

6.Patients with NF-1 are at risk for hypertension, which may result from renal vascular stenosis or a pheochromocytoma.

NF-2: accounts for 10% of all cases of NF . The gene for NF-2 is located near the center of the long arm of chromosome 22q1.11.

It is diagnosed when **one of the following two features is present:**

1- bilateral eighth nerve masses (**Bilateral acoustic neuromas)** demonstrated by CT scanning or MRI.

2- A parent, sibling, or child with NF-2 .

Treatment

Because there is no specific treatment for NF, management includes:

1-Genetic counseling: A parent with NF has a 50% chance of transmitting the disease with each pregnancy. each parent should be carefully examined before counseling for the risk of affected future pregnancies

2-Early detection of treatable conditions or complications.

Tuberous Sclerosis

Tuberous sclerosis (TS) is inherited as an **autosomal Dominant** .

TS is an extremely heterogeneous disease with a wide clinical spectrum varying from severe mental retardation and seizures to normal intelligence and a lack of seizures.

The disease affects many organ systems other than the skin and brain, including the heart, kidney, eyes, lungs, and bone.

Clinical manifestations:

**Skin lesions*

1-**Ash leaf spots** which are hypomelanotic macules on the trunk and extremities. Present in more than 90% of cases. At least three macules must be present.

2-**Sebaceous adenomas** develop between 4 and 6 yr of age; they appear as tiny red nodules over the nose and cheeks and are sometimes confused with acne.

3-**Shagreen patch** is consists of a roughened, raised lesion with an orange-peel consistency located primarily in the lumbosacral region.

4-**Subungual or periungual fibromas** of the finger and toe in many patients with TS during adolescence.

5-Retinal & Brain lesions Retinal lesions consist of two types: mulberry tumors that arise from the nerve head or round, flat gray lesions in the region of the disc and hamartoma or depigmented areas.

The characteristic brain lesion is a cortical tuber. Tubers in the region of the foramen of Monro may cause obstruction of CSF flow and hydrocephalus. MRI is useful for identification of the lesions.

Brain tumors are much less common in TS compared with NF Approximately 50% of children with TS have rhabdomyomas of the heart.

The kidneys in 75–80% of patients >10 yr of age have angiomyolipomas that are usually benign tumors. Single or multiple renal cysts are also commonly present in TS.

Sturge-Weber Syndrome

This syndrome is a sporadic disorder and consists of a constellation of symptoms and signs including a facial nevus (port-wine stain), seizures,

hemiparesis, strokelike episodes, intracranial calcifications, and, in many cases, mental retardation.

Clinical manifestations

*The facial nevus (port-wine stain) is present at birth, tends to be unilateral, and always involves the upper face and eyelid. Glaucoma of the ipsilateral eye is common complication.

*Seizures develop in most patients in the 1st year of life. They are typically focal tonic-clonic and contralateral to the side of the facial nevus. The seizures may become refractory to anticonvulsants and are associated with a slowly progressive hemiparesis in many cases.

Neurodevelopment appears normal in the 1st year of life but mental retardation or severe learning disabilities are present in at least 50% in later childhood.

Diagnosis

1- Skull x-ray: shows intracranial calcification in the occipitoparietal region in most patients. This characteristically assumes **railroad-track appearance.**

2- Brain CT scan: to detect the extent of the calcification that is usually associated with unilateral cortical atrophy and ipsilateral dilatation of the lateral ventricle.

3- **MRI** is a useful to detect the location of the vascular malformation and the presence of white matter lesions.

Treatment

1. Seizure control: by anticonvulsants. If the seizures are refractory to anticonvulsant therapy, especially in infancy and the 1st 1–2 yr, and arise from primarily one hemisphere, most centers advise surgery (hemispherectomy).

2.The facial nevus treated by **Laser therapy** (it may cause psychologic trauma).

3. Because of the risk of glaucoma, regular measurements of intraocular pressure with is indicated.