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CASE REPORT

Epidermal nevus syndrome: An unusual cerebellar involvement

Syndrome du naevus épidermique : une anomalie sous-tentorielle rare

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KEYWORDS

Central nervous system;
Cerebellum;
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Summary The epidermal nevus syndrome is characterized by several developmental anomalies associated with an epidermal nevus. In addition to the skin, other organs commonly affected include the brain, eyes and musculoskeletal system. We report here on a 24-year-old woman with this syndrome who presented with hemifacial hypertrophy, hearing abnormalities, arrhythmia and an unusual infratentorial brain involvement.

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Introduction

The epidermal nevus syndrome (ENS) is a rare multisystemic syndrome. Patients present with an epidermal nevus, but are also affected by several developmental anomalies, most commonly of the brain, eyes and skeleton. Despite a growing body of knowledge, the full spectrum of the syndrome remains incompletely characterized.

Cerebellar involvement has been described, but always in association with supratentorial defects. However, we report here on a young adult woman who presented with ENS, but with an unusual cerebellar involvement. Magnetic resonance imaging (MRI) revealed enlargement of the left cerebellar hemisphere with disorganized folia and no supratentorial abnormalities.

Case report

Our 24-year-old female patient presented, since birth, a left-sided verrucous epidermal nevus that followed a linear blaschkoid course over her neck and face (Fig. 1). She also presented left-sided facial hypertrophy that was relatively mild at birth. She was the second child of non-consanguineous healthy parents and her family history was negative.

During childhood, her psychomotor development was normal. However, when she started school, she was found to have learning difficulties. She underwent a special learning course and received psychological support.

At age 12, she had several near-syncope episodes. Physical examination disclosed mild difficulty in the foot-by-foot test, but no other coordination test abnormalities. The diagnostic work-up included neurological and cardiovascular evaluations. Cranial computed tomography (CT) revealed mild fourth ventricle dysmorphism, but no other changes,

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Figure 1 Left-sided cervicofacial verrucous epidermal nevus.

and the 24-h- and video-electroencephalography failed to detect any epileptogenic activity. However, her cardiac evaluation revealed paroxysmal supraventricular tachycardia caused by an atrioventricular bypass tract, which was successfully treated by catheter ablation.

As the patient grew older, her facial asymmetry (Fig. 2) continued to worsen, and she developed mechanical dysarthria due to hemilingual hypertrophy as well as ipsilateral neurosensory deafness. Several surgical procedures were performed to correct bony overgrowth, which required the implantation of metallic maxillary and mandibular prostheses.

MRI findings

At age 24, the metallic prostheses were removed to allow cranial MRI to be performed, using a 1.5-T unit and a standard head coil. T1- and T2-weighted images revealed diffuse cerebellar dysplasia, mainly of the left hemisphere and the vermis, with abnormal folia and fissure patterns,



Figure 2 Left-sided facial hypertrophy.

and cortical polymicrogyria. Marked hypertrophy of the left hemisphere, foci of gray matter heterotopia, and effacement of the horizontal and superior fissures were also identified. There was an oblique orientation of the fissures in the superior portion of the left hemisphere, and a vertical orientation of the superior vermis fissures. The fourth ventricle was dysmorphic.

However, no supratentorial abnormalities were seen (Fig. 3). The images further documented previously known musculoskeletal changes—namely, hypertrophy of the left-sided cranial bones and contiguous soft tissues.

Discussion

In the present case, there are several features of the ENS—specifically, an epidermal nevus, hemifacial hypertrophy associated with mechanical dysarthria, left-sided neurosensory deafness, unusual structural brain changes, cognitive impairment and cardiac arrhythmia due to an abnormal AV bypass tract.

The ENS is a multisystemic syndrome that can present with a wide variety of signs and symptoms (Table 1) [1,2].

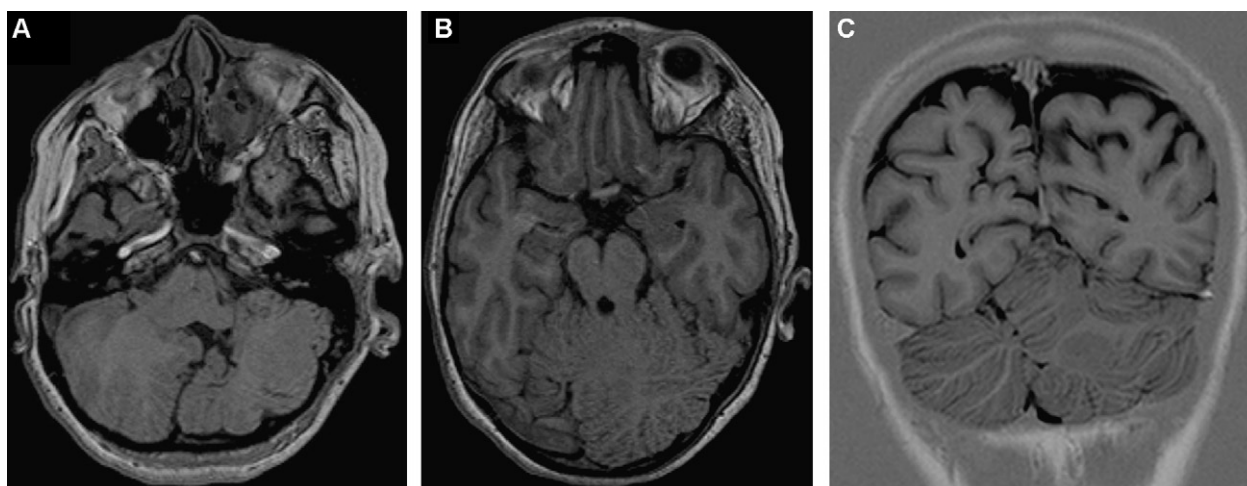


Figure 3 MRI revealing diffuse cerebellar dysplasia with left cerebellar hypertrophy.

Table 1 The primary manifestations of the epidermal nevus syndrome (ENS).

Skin	Epidermal verrucous nevus
Musculoskeletal	Hemifacial hypertrophy Limb hypertrophy
Central nervous system	Hemimegalencephaly Pachygyria Ventriculomegaly Mental retardation Seizures
Other anomalies	Ophthalmological Cardiac Urinary

Afflicted patients present with a roughly linear epidermal nevus following the lines of Blaschko, which represent the pattern of migration of ectodermal skin cells during embryogenesis. The phenomenon of the blaschkoid disposition, a recognized feature of cutaneous genetic mosaicism, supports the current idea that the multiorgan manifestations of ENS are due to genetic mosaicism [3].

Neurological manifestations include mental retardation and seizures [2]. The reported brain involvement in ENS is usually supratentorial, in most cases consisting of hemimegalencephaly, pachygyria and/or ventriculomegaly. Nevertheless, Abdelhalim et al. [4] have reported a severe ENS case with infratentorial anomalies along with major supratentorial structural changes. However, our patient presented only infratentorial anomalies. To our knowledge, this finding has not been previously reported. Another interesting feature of our patient is the finding of diffuse, but isolated, cerebellar dysplasia with no cerebral abnormalities, yet another highly unusual finding [5].

Dysplasia refers to the disorganized development of the cerebellum, as expressed by abnormal foliation and fissuration and/or the presence of gray matter heterotopias [6]. Several pathological mechanisms can cause cerebellar dysplasia [5,7], including infections, alcohol, radiation and genetic disorders. The latter may account for the cerebellar anomalies found in ENS and other neurocutaneous syndromes such as the hypomelanosis of Ito [8], in which an underlying genetic mosaicism is found. Accordingly, alterations in the genes involved in the various stages of cerebellar development—namely, the genes regulating the migration of Purkinje cells and, in particular, the prolif-

eration and migration of granular cells—are presumed to be responsible for the cerebellar anomalies. As granular cells are the most abundant neurons in the cerebellum, their developmental course is thought to determine the size and patterns of the folia and fissures.

In addition to these changes, other systems may also be affected. Musculoskeletal changes are often found, with hemicorporal segmental hypertrophy (most commonly in the head or limbs) being a typical ENS feature. Ophthalmological problems are another common finding, whereas cardiac and urinary tract abnormalities are only occasionally reported.

To adequately evaluate the multisystemic involvement of the ENS, the use of imaging techniques is required. Neuroimaging modalities, especially MRI, play an important role as they provide better anatomical detail than other techniques, particularly when infratentorial structures are involved. For this reason, we believe that the increased use of MRI may well reveal further cerebellar abnormalities in ENS patients.

Conflicts of interests

None.

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