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KLIPPEL-TRENAUNAY-WEBER SYNDROME: A CASE WITH CEREBRAL AND CEREBELLAR HEMIHYPERTROPHY AND A REVIEW OF THE LITERATURE*

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The syndrome which includes cutaneous vascular nevus, varicose veins in childhood and hypertrophy of soft tissue and bone in one limb was described in 1900 by Klippel and Trenaunay[1]. Later, Parkes-Weber[2] added arteriovenous fistulae to the findings of the syndrome. Bilateral involvement is not uncommon[3]. Congenital aplasia or obstruction of the deep venous system[3,4], defect in the venous reflux and microscopic arteriovenous communications[5] have been proposed as causes of the disorder. This mesodermal defect is known as a sporadic condition since no hereditary transmission has been observed so far. We present a patient with Klippel-Trenaunay-Weber syndrome in whom cranial computerized tomography (CT) revealed cerebral and cerebellar hemihypertrophy, a finding that has not been reported previously.

Case Report

A thirteen-month-old girl was brought to the hospital because of an asymmetric appearance of her face and body. She was the first child of healthy and unrelated parents and was born weighing 3500 g after an uncomplicated pregnancy and delivery. Hemangiomatous lesions involving the left arm, leg, and the left side of the face and trunk had been observed at birth. They partially faded during the first year of life. When the patient was seen at thirteen months of age, soft tissue swelling and hemangiomas were observed on the left side of the body and a cutaneous hemangioma was also seen on the upper lip (Fig. 1). There was a difference of 1.5 cm between the length of the two legs. The patient's height and weight were at the 60th percentile while the head circumference was at the 90th

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percentile. The anterior fontanel was closed. She was rated as normal on the Denver Developmental Screening Test standardized for Turkish children[6]. A roentgenogram of the abdomen obtained in another hospital showed that the left femur and pubic bones were larger than the right ones. An abdominal ultrasonography revealed slight enlargement of the left kidney. A cranial CT demonstrated that the left cerebral and cerebellar hemispheres were markedly larger than the right ones as well as the bony structures of the posterior fossa (Fig. 2).

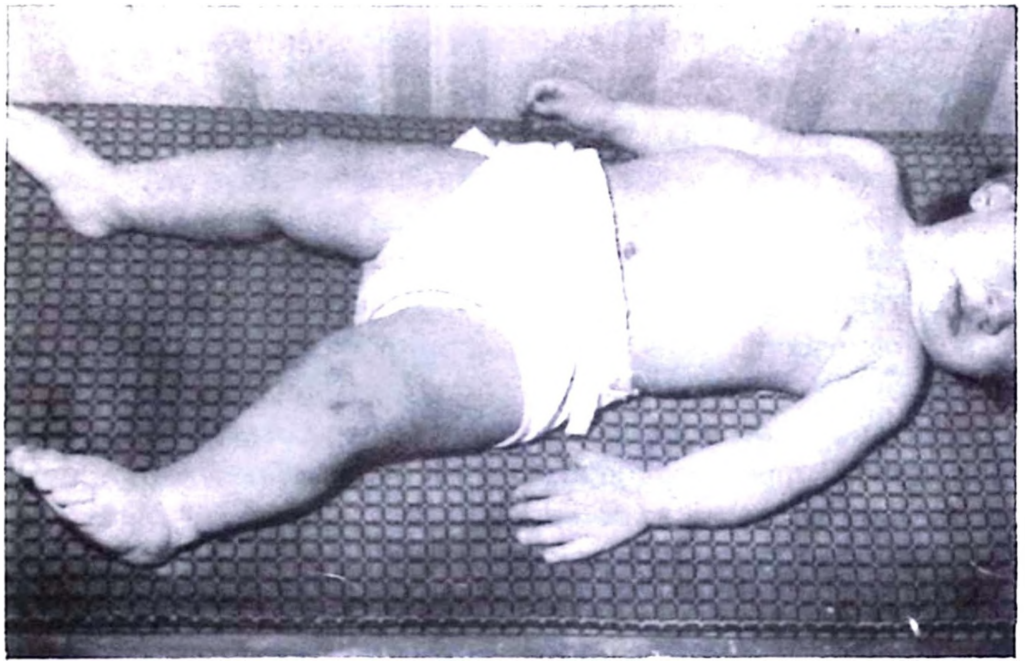

Fig. 1:
Left hemihypertrophy and hemangiomas.

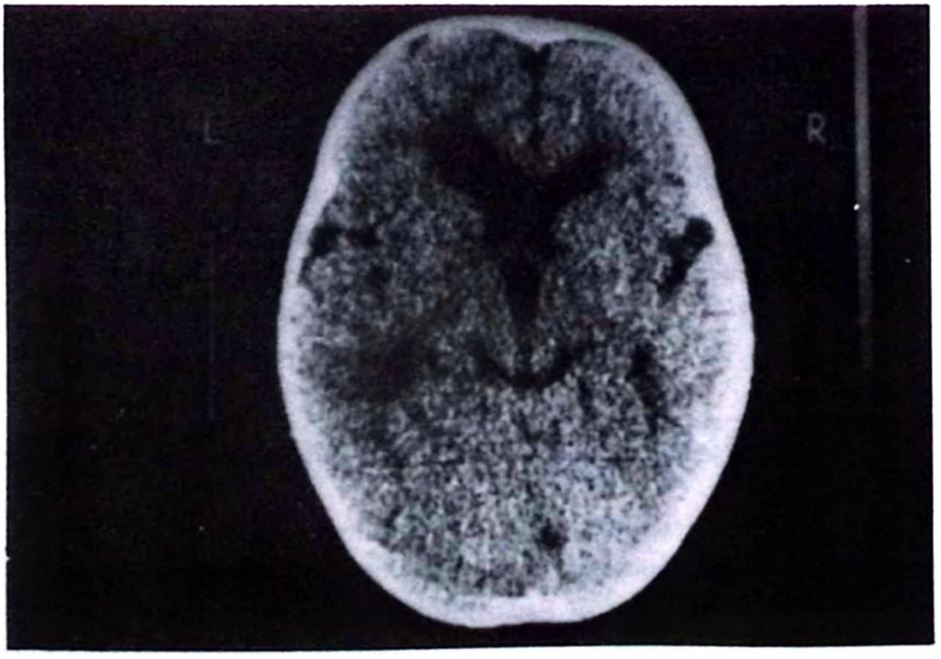

Fig. 2:
Hypertrophy of the left cerebral and cerebellar hemispheres.

Discussion

Since the first description of the Kippel-Trenaunay-Weber syndrome[1], several case reports and series have been published and have added to its features (Table I). In our thirteen-month-old patient, hemangiomas and limb hypertrophy were observed, but varicose veins which usually appear during childhood were absent. Although the syndrome appears to be benign, serious complications may occur; hemorrhages from the gastrointestinal or urinary tracts and incapacitating limb hypertrophy are among the most important (Table II). It is advisable that the patient be periodically examined for such complications and that non-invasive diagnostic procedures like ultrasonography or computerized tomography be used in order to investigate the extension of the disorder.

From our review of the literature, we have observed that the central nervous system was the least investigated, either radiologically or pathologically. Macrocephaly, sometimes accompanied by developmental delay, has been reported in the Klippel-Trenaunay-Weber syndrome by Stephan et al[16]. These workers proposed over vascularization of the brain and cranium, low-grade hydrocephalus and/or macrocephaly as explanations for the increased head circumference. No radiologic examination except skull roentgenograms were taken of their patients. In a case with retromedullary arteriovenous fistula presenting with subarachnoid hemorrhage and monoparesis, Benhaiem-Sigaux et al[11] observed normal findings in cranial CT and frontal ischemic necrosis at autopsy. We are not aware of any report about malformations of the brain in this syndrome. In our case, CT was performed for macrocephaly. The left cerebral and cerebellar hemispheres were found to be markedly enlarged as well as the left lateral ventricle; the brain parenchyma was normal.

Various treatment methods have been tried in this syndrome (Table III). Early intervention is advised in order to prevent the progression of the deformities. Symptomatic therapy and elastic compression are sufficient for mild cases. Local varicectomy and stripping may be needed if varices constitute a serious problem and deep patent veins are seen on venography. This approach can be harmful if agenesis or hypoplasia of the deep veins are established. Epiphysiodesis, amputation and remodeling of the limb may be required when hypertrophy is incapacitating. Cosmetic excision for small angiomas and percutaneous injection of thrombotic material for larger ones have yielded satisfactory results in some patients.

The differential diagnosis of limb hypertrophy includes macrodactyly simplex congenita, idiopathic macromelia, idiopathic hemihypertrophy, the Klippel-Trenaunay-Weber syndrome, neurofibromatosis and macrodystrophia lipomatosa progressiva[18]. The first two entities are limited to one digit or limb, respectively.

TABLE I: Features of the Klippel-Trenaunay-Weber Syndrome

Findings previously described	Present case
Vascular nevus[1,3]	+
Varicose veins in childhood[1,3,4]	–
Soft tissue and bone hypertrophy[1,7]	+
Arteriovenous fistulae[2,8]	–
Visceral angiomatosis[9,10]	?
Spinal angioma[11]	–
Other congenital malformations[3]	–

TABLE II: Complications of the Klippel-Trenaunay-Weber Syndrome

Ulcerations of the skin in involved areas[7]
Recurrent thrombophlebitis and cellulitis[12]
Orthopedic-limitation of activities[7]
Hematuria and phleboliths[13]
Gastrointestinal hemorrhage[14]
Hemothorax[3]
Spinal cord symptoms[11]
Ophtalmologic[15]

TABLE III: Treatment Methods in the Klippel-Trenaunay-Weber Syndrome

Elastic support[7]
Medical treatment for thrombophlebitis, anemia, cellulitis[12]
Orthopedic surgery (osteotomy, epiphisiodesis, amputation)[17]
Intermittent pneumatic pressure[7]
Surgical release of deep veins in the lower limb[4]
Ligature of the opposite popliteal vein[4]
Excision of hemangioma[3]
Varicectomy and vein stripping[18]
Percutaneous injection of sclerotic agents[3]

Neurofibromatosis is distinguished on the basis of the characteristic skin changes and a positive family history. None of these entities, except the Klippel-Trenaunay-Weber syndrome is associated with angiomatous lesions, the distinguishing feature of the Klippel-Trenaunay-Weber syndrome. Patients with the Maffucci syndrome, although having angiomatosis, are differentiated from the Klippel-Trenaunay-Weber syndrome by the presence of enchondromas and the absence of bone hypertrophy.

In conclusion, we can state that in some patients with the Klippel-Trenaunay-Weber syndrome, cerebral and cerebellar hemihypertrophy seems to be the cause of the macrocephaly; this finding is apparently benign since it is not accompanied by any neurologic signs or developmental delay. Visceral hemangiomas and varicosities may cause serious complications. Appropriate laboratory tests in addition to clinical observation must be used in the follow-up of these patients.

Summary

A case with Klippel-Trenaunay-Weber syndrome and macrocephaly in whom left cerebral and cerebellar hemihypertrophy were demonstrated by computerized cranial tomography is reported. The relevant literature is reviewed and the complications and the therapeutic methods of the syndrome are summarized.

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