Ischaemic infarct of the brain stem combined with bisymptomatic Klippel-Trénaunay-Weber syndrome and cutis laxa

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SYNOPSIS The combination of Klippel-Trénaunay-Weber syndrome (KTWS) with intracranial vascular malformations is documented by angiography in a 25 year old man with the classical features of KTWS: systematized naevi, hypertrophy of the right side, and varicosis. In addition, the syndrome was associated with 'cutis laxa', a coincidence of some rarity. The patient suffered from an ischaemic infarct of the brain stem with several neurological deficits.

In 1900, Klippel and Trénaunay described a triad of symptoms consisting of a naevus telangiectaticus in metameric distribution affecting the entire lower extremity, unilateral varicectasia, and hypertrophy of the affected side (unilateral macrosomia).

In combination with the syndrome described above, Parkes Weber in 1918 observed arterio-venous deformities occurring in addition to varicectatic changes. Therefore, this clinical entity is now generally called the Klippel-Trénaunay-Parkes-Weber syndrome (KTPWS). Other synonyms are: naevus osteohypertrophicus, macrosomia, angiomas osteohypertrophica, haemangiectasia hypertrophicans, telangiectasia and angioelephantiasis, angioplastic macrosomia, angio-osteo-hypertrophic syndrome, phlébectasies ou phlébartériectasies étendues congénitales complexes (Kramer, 1972).

In 1953, Fegeler *et al.* differentiated between the three cardinal symptoms, systematized haemangiomas, hypertrophy, and varicosis, and the secondary symptoms which include changes in the peripheral nervous system such as perception and vegetative disorders. Epileptic fits, changes in the electroencephalogram,

or oligophrenia have been described in this context only very infrequently (André, 1973).

This paper describes a rare combination of the Klippel-Trénaunay-Parkes-Weber syndrome with 'cutis laxa' and intracranial vascular deformities leading to the clinical picture of an ischaemic infarct of the brain stem. The author believes that this is the first description of a clinical course of this kind.

CASE HISTORY

The patient K.B., aged 25 years, was admitted on 3 March 1974 and discharged home on 20 April 1974.

There was no history of previous serious illness. The patient had performed hard physical work for eight years. Headaches, limited to the occipital region for three days, started eight days before admission. After four days without complaint, the patient woke up with splitting headache; vomiting occurred some hours later. This had been preceded by particularly strenuous work the day before. One day later, the patient complained of dryness in the mouth and continuing occipital headache, later followed by a sensation of numbness in the legs spreading to the upper extremities. The patient was admitted for treatment.

NEUROLOGICAL FINDINGS ON ADMISSION The patient had to be supported on both sides when walking. There was an ataxic gait, predomina-

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(Accepted 2 February 1976.)

antly of the right leg, sensorimotor proportional hemiparesis of the right side and impaired co-ordination of the right. There was anisocoria (left pupil more dilated than right pupil); paralysis of the right 6th cranial nerve, dysadaptation and course and jerking end position nystagmus in both eyes. There was also nuclear paresis of the left facial nerve, strangled voice, paralysis of deglutition and profuse salivation. Slight drowsiness was noted. During physical examination of the patient it was found that dermatomes C4-T4 and S1/S2 on the right side of the body showed several palm-sized naevi telangiectatici, whereas on the left side, at T6 and T11, only two naevi telangiectatici were located, each one being the size of a shilling. The right side of the body was hypertrophied, the difference in circumference of the extremities varying from 1 to 2 cm. This was particularly obvious in the right hallux. Moderate varicosis was present in the right foot and small herniae in the fatty tissue of the heels. The skin, predominantly on the right-hand side of the body, was found to be excessively elastic and the joints of the same side were slightly hyperextensible.

ADDITIONAL FINDINGS A chest radiograph was

normal. A film of the pelvic region showed phleboliths located in the minor pelvis. The lowest lumbar vertebra was partially united with the os sacrum on the right side. Radiography of both hands showed asymmetry due to macrosomia of the right hand. An EEG was normal. Lumbar puncture yielded CSF containing 11-3 cells per mm³, albumin level was normal. Laboratory findings were within normal limits.

ARTERIOGRAPHY Retrograde arteriography of the left brachial artery revealed subnormal diameter of the left vertebral artery which supplied exclusively the left inferior cerebellar artery.

A percutaneous arteriogram of the left carotid artery showed a wide-arched course of the thalamostriate vein.

A retrograde arteriogram of the right brachial artery (Fig. 1) showed aneurysmal dilatation of the terminal part of the basilar artery, and ectasis at the junction of the right vertebral artery (which was of wide diameter) and the basilar artery. Vascular abundance of the superior cerebellar artery was noticeable.

FIG. 1. Retrograde arteriogram of the right brachial artery. (a) AP view. (b) Lateral view.

PROGRESS Some days after the attack the patient was able to swallow again. His dexterity, which at first had been most adversely affected on the right side of the body, improved as well. After one month there was still a noticeably ataxic gait, an obstinate nystagmus, and recurrent attacks of headache. On discharge from hospital the patient still showed ataxia on the right, vertical spontaneous nystagmus, and nystagmus on deviation of the eyes. Pupillary reaction on convergence was sluggish. At the follow-up examination five months later the patient still complained of clumsiness on the right side, and of blurred vision when turning his head or when looking sideways. His speech continued to return to normal. One year after the attack there was still evidence of spontaneous nystagmus with a rotatory component, and of paralysis of the right 6th nerve, with the soft palate sagging on the left, comparatively feeble gag reflex on the left, deviation of the protruded tongue to the left, sluggish pupillary reaction, and some remaining signs of ataxia on the right side. Eighteen months after the infarct the patient complains of sporadic headaches limited to the occipital region and of 'blurred pictures' when walking. There is still evidence of spontaneous nystagmus with a rotatory and a vertical component and of nystagmus on deviation of the eyes caused by a slight residual paralysis of the right 6th nerve. The right side of the body shows increased tendon reflexes, whereas the abdominal reflex is absent. Co-ordination of the right side of the body is still clearly impaired.

DISCUSSION

In 1954, Burke *et al.*, in their discussion of disseminated haemangiomas, stated that the existence of such vascular deformities should give rise to the consideration that they might occur together with intracranial angiomatous malformations. Cases of KTPWS coinciding with such disturbances of the vascular system supplying blood to the CNS have relatively rarely been described in the literature. Den Hartog Jager (1949) reported on a venous angioma in the spinal region, and Krakenbühl *et al.* (1970) reported an atrio-ventricular fistula located in the thoracic part of the spine which led to compression of the spinal cord. Brüning (1956) discovered cases of angiomatosis in the diencephalon, in the

medulla oblongata, and in the spinal cord; Thierbach and Hübner (1964) described angiomatosis and regressive changes mainly in the lower brain stem and in the cerebellum of a 20 year old patient. Haberland and Perou (1966) reported on venous angiomatosis of the skull vault. In 1968, Avasthey and Roy described cases of arteriovenous deformities in the cerebrum.

A considerable number of cases of KTPWS are combined with phacomatoses, the latter sometimes necessarily involving vascular deformations in the area of the CNS: Sturge-Weber syndrome (Laxenaire, 1961); Von Hippel-Lindau syndrome (Den Hartog Jager, 1949); tuberous sclerosis (Laxenaire, 1961; Troost *et al.*, 1975); multiple neurofibromatosis or Recklinghausen's disease (Laxenaire, 1961). Schnyder *et al.* (1956) compiled the interrelations between some of the syndromes (Fig. 2). The case of KTPWS described by the author in this paper is to be deemed bisymptomatic because the varicosis component of the triad (cutaneous symptoms, naevi, osteohypertrophy, and vascular symptoms) is rather imperfectly developed. Arterial thromboses show a marked inclination to develop in vascular anomalies located in the cerebrobasilar circulatory system. This may evolve into a secondary embolism and a consecutive ischaemic infarct within this vascular region. The protracted clinical course of the case described here supports the assumption that this infarct was caused by a thrombotic process. Clinical examination yielded no evidence of heart disease or of inflammatory disease. In view of the age of the patient, however, the thrombocyte aggregation test must be considered pathological. It is probable that the brain stem infarct caused an extensive lesion affecting the lower portion of the pons and the medulla oblongata. This case also presents an unusual feature by combining KTPWS with intracranial vascular deformities and cutis laxa. The only other case of a similarly diffuse dystrophy of the elastic tissue was reported by Thiers *et al.* (1964) in a 6 year old child. In this case disturbance of tissue metabolism was evidenced by increased diuresis of acid mucoproteins.

FIG. 2 Interrelation of Klippel-Trénaunay, Parkes Weber, and Sturge-Weber syndrome (Schnyder et al., 1956).

Cutis laxa may be either of a general nature or segmentally restricted. A mesenchymal dysplasia of this kind is presented in its fully developed state by the Ehlers-Danlos syndrome, combining fragility and hyperelasticity of the skin (note: the skin was not fragile in our case), hyper-extension of the joints, and changes in the eyes and blood vessels. This syndrome may also combine with KTPWS (Lynch *et al.*, 1965; Servelle, 1962), leading to the conclusion that any appreciable deficiency in the tissue metabolism may constitute an additional factor causing the development of certain symptoms such as vascular deformations and changes in the cutaneous structure. There are many primary defects which may lead to the above symptoms. The Ehlers-Danlos syndrome, for instance, is caused by a disturbance in the formation of the collagenous dystrophy, and osteogenesis imperfecta by an impaired maturation of collagen. The Pfaundler-Hurler syndrome involves a qualitatively and quantitatively abnormal formation of mucopolysaccharides or structural polysaccharides, and Marfan's syndrome consists of a complex deficiency phenomenon in the connective tissue (McKusick, 1959; Deckers, 1965; Laitinen *et al.*, 1966; Alberti, 1970).

We may, therefore, conclude that hereditary factors disturbing the tissue metabolism may be of some relevance in symptom combinations similar to the case described in this paper. On the other hand, the presence of

angiomatous and structural changes of the skin, especially in coincidence with neurological symptoms, may indicate that the structure of intracranial and spinal arteries and veins has been affected. The coincidence of KTPWS, cutis laxa, and intracranial vascular deformities is rare.

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