Case Report

Klippel-Trenaunay Syndrome - A Case Report

Anju kapoor, Dipankar Sarkar, *Garjesh Singh Rai, **Shweta Anand

Department of Pediatrics, *Department of Radiology, People's College of Medical Sciences & RC, Bhanpur, Bhopal, **Chirayu Medical College and Hospital, Bhopal

(Received February, 2012) (Accepted July, 2012)

Abstract:

Klippel-Trenaunay Syndrome (KTS) is a sporadic disorder characterized by the triad of vascular malformation (capillary hemangioma or port wine stain), venous varicosity and soft tissue and/ or bony hypertrophy. We report here a case of Klippel-Trenaunay syndrome with review of literature.

Key Words: Klippel-Trenaunay syndrome, KTS, Port wine stain, venous varicosity.

Introduction:

Klippel-Trenaunay syndrome (KTS) is a rare disorder with an incidence of 3-5/1,00,000 (Suchithra et al, 2008) . It is characterized by the triad of vascular malformation (capillary hemangioma or port wine stain), venous varicosity and soft tissue and/ or bony hypertrophy. The vascular malformation is usually limited to a single extremity, though multiple extremities can be involved. Alternative names given for Klippel-Trenaunay Syndrome are Klippel-Trenaunay-Weber syndrome; Angio-osteohypertrophy; Nevus varicosus osteohypertrophicus syndrome; Hemangiectasia hypertrophicans and Nevus verucosus hypertrophicans.

Case report

One year old child born out of non-consanguinous marriage presented in the OPD with history of progressive enlargement of left lower limb since birth (Fig. I). He had high grade fever for last 3 days. On examination, he had marked hypertrophy of the left lower limb. There was a large port wine stain on left gluteal area and posterior aspect of thigh along with few small stains over left leg (Fig. II). Multiple discrete and grouped deep red to bluish black papules and nodules were present over the port wine stain. He was pale with hepato-splenomegaly. Routine hematological examination showed microcytic, hypochromic anemia with moderate anisocytosis. Peripheral smear was positive for P. vivax which explained the cause of fever. Liver function test revealed raised indirect serum bilirubin, which could be explained by hemolysis due to malaria.

Corresponding Author: Dr. Anju Kapoor,
HIG - A / 9, People's College of Medical Sciences and Research Centre, Bhanpur, Bhopal - 462037
Phone No.: 09993958512, 07554005159
E-mail : dranjukapoor@gmail.com

Doppler of the local area showed venous malformation with diffuse hypertrophy of soft tissue of the left leg and thigh with no arterial malformation in the region.

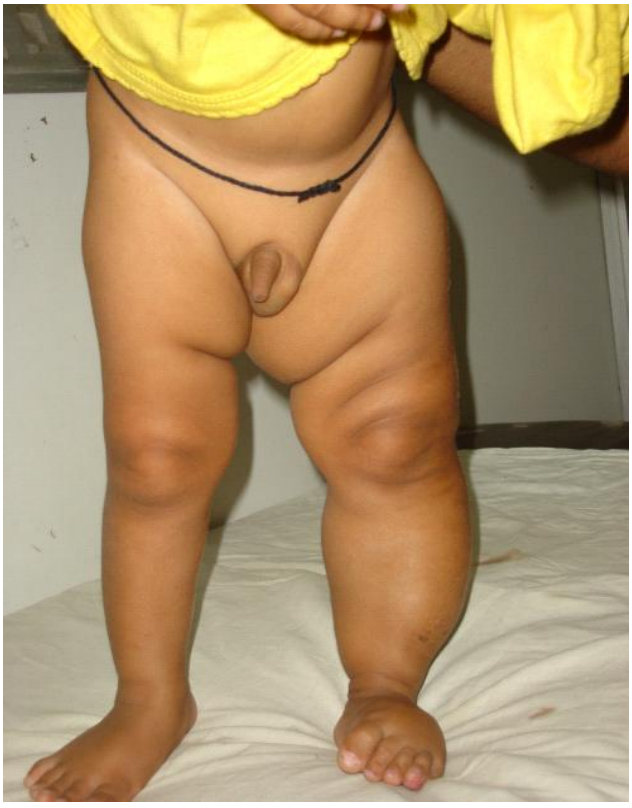

Fig. I: Left lower limb hypertrophy.

T2 weighted MR angiography revealed markedly hyperintense contrast enhancing soft tissue swelling predominantly in subcutaneous tissue in left gluteal region, extending medially to left scrotal sac and inferiorly involving thigh. It also involved significant part of muscles on the posterior aspect of leg and some involvement of postero-lateral aspect of thigh. It showed mild prominence of draining vein (Fig. III). These findings confirmed that it was a predominantly

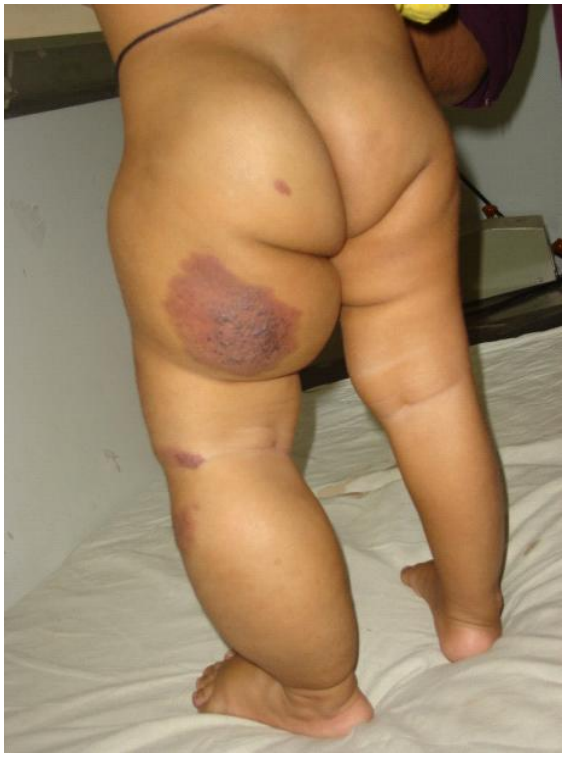

Fig. II: Port wine stain on left gluteal area and posterior aspect of thigh with few small stains over left leg.

soft tissue swelling containing pauci vascular hemangioma. As the child did not have any complication, parents were reassured and appraised of the possible complications and were advised to come for regular follow up for limb length monitoring.

Discussion:

Klippel-Trenaunay Syndrome was first described by two French doctors, Klippel and Trenaunay in 1900. It is a triad of vascular malformation, venous/lymphatic varicosity and soft tissue and bony hypertrophy (Klippel & Trenaunay, 1900). Hemangiomas are often apparent at birth or by second week of age (Samuel & Spitz, 1995).

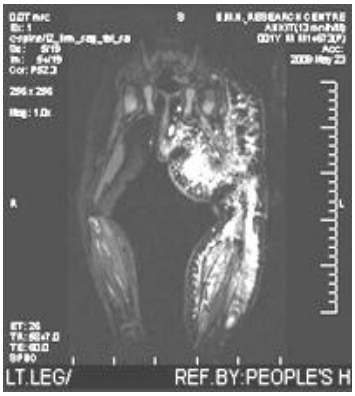

Fig. III: T2 weighted fat saturation image of left lower limb.

Capillary hemangiomas are the most common type and are called port wine stains due to its red and purple coluor. If large enough, cutaneous hemangiomas may cause sequestration of platelets, leading to Kasabach-Merritt syndrome, a type of consumptive coagulopathy. The hemangioma often overlies the vascular malformation. Varicose veins result from damaged or defective valves in a vein. Vein gets damaged when the smooth muscle in the wall of vein weakens and the valves cannot support the weight of blood. Bone and soft tissue hypertrophy is a result of increased growth. In many cases, limb length is affected. In most cases, the girth of the limb is larger, although atrophy is seen in some patients. The lower limb is involved in about 95% of patients while upper limb involvement is seen in 5% (Phadke, 2009). Rarely only the trunk is involved. It affects males more than females.

When Klippel-Trenaunay Syndrome is associated with arteriovenous fistula, it is known as Klippel-Trenaunay-Weber Syndrome (KTWS; Weber, 1907).

A series of 252 patients with KTS was studied at Mayo Clinic, Rochester between January 1956 and January 1995. It showed presence of capillary malformations (port-wine stains) in 246 patients (98%), varicosities or venous malformations in 182 (72%), and limb hypertrophy in 170 (67%). All three features of KTS were present in 159 patients (63%), and 93 (37%) had two of the three features. Atypical veins, including lateral veins and persistent sciatic vein, occurred in 182 patients (72%; Jacob et al, 1998). Other less common manifestations of KTS include thromboembolic episodes, thrombophlebitis, Kasabach-Merritt syndrome, haematuria, rectal or colonic bleeding, vaginal, vulval or penile bleeding in children with visceral and pelvic haemangiomas. Kasabach-Merritt syndrome can present as high output failure. Neoplastic risk is not increased in KTS.

Although the cause of KTS is still unknown, it is hypothesized that it is caused by a mesodermal abnormality during fetal development leading to vascular and soft tissue malformations in the affected limb (Baskerville et al, 1985). McGrory & Amadio (1993) believed that an underlying mixed mesodermal and ectodermal dysplasia was responsible for development of KTWS. Klippel-Trenaunay Syndrome might develop due to a single gene defect (Happle, 1993). Rarely it can be inherited as an autosomal dominant trait (Cebllos-Quintal et al, 1996). Whelan et

al (1995) reported a case of a girl with KTW syndrome associated with a reciprocal translocation: t (5;11)(q13.3;p15.1). The de novo translocation t (8;14)(q22.3;q13) has also been reported (Wang et al, 2001). The association between the angiogenic factor gene *AGGF1* and KTS appears to be significant (Hu et al, 2008).

No definitive treatment is possible for KTS. Imaging studies like contrast enhanced MRI, Ultrasonography and Doppler study may be needed for diagnosis and to find out the extent of lesion that helps in planning the interventions if indicated. Treatment is indicated to reduce the symptoms and the risk of complications. Active intervention needs to be attempted only for localized lesion or in presence of serious complications like bleeding or cardiac failure. Options available to treat the symptoms of KTS are surgery, sclerotherapy, and compression therapy. Laser treatment of the hemangioma can be effective in lightening the color of the port-wine stain. Currently, the flashlamp-pumped pulsed dye laser is the treatment of choice in vascular lesions. It is also indicated in the presence of ulceration. When treated with laser, ulcers heal more quickly. Laser treatment is most effective when performed early. Multiple sittings are required to achieve the desired effect.

Different surgical interventions for varicose veins include vein ligation, vein stripping, vein resection, and amputation. Vein ligation is a procedure which clamps or ties off a section of veins. It prevents blood flow through the damaged veins and promotes blood flow through normal veins. Vein stripping uses a metal wire to remove varicosities from within the damaged vein. Lindenauer (1965) suggested that the deep venous system is atretic in KTW syndrome, so stripping of varicose veins is unwise. Vein resection, or excision removes a section of damaged veins from the body. Endovenous Thermal Ablation is a newer version of ligation and stripping of veins. In the procedure a laser or high frequency radio waves are given to produce intense heat locally in the varicose vein. It is less painful with fast recovery. In some cases, amputation of involved digits or extremity have to be done.

Sclerotherapy can be done by using chemicals like sotradecol, ethanolamine, and absolute ethyl alcohol. It stops the blood flow through defective veins by causing inflammation in the inner lining of the veins. The vein later collapses and absorbed by the body. Debulking procedures have limited use and may damage venous and lymphatic structures leading to increased edema in the affected limb.

Compression garments are indicated for chronic venous insufficiency, lymphedema, recurrent cellulitis and recurrent bleeding from capillary or venous malformations. Compression garments also protect the limb from trauma. Various compression garments available are compression socks, elastic wraps, neoprene wraps and other more complex devices. Many studies have given positive results in patients using compression therapy (Stringel & Dastous, 1987). Cellulitis and thrombophlebitis can be managed with analgesics, elevation, antibiotics, and corticosteroids. Radiotherapy may help to induce regression of hemangiomas though the results are slow to develop. Complications due to hemangioma include ulceration, bleeding, and secondary infection.

Complications of varicosities include paresthesia, ulcers, dermatitis, pulmonary embolism, thrombophlebitis, hemorrhage, and cellulitis.

Hypertrophy of a limb may lead to vertebral scoliosis and gait abnormalities. It can cause degenerative joint disease also.

Regarding limb hypertrophy, heel inserts are generally sufficient for limb length discrepancies of 1.5 cm or less. If projected leg length discrepancy exceeds 2.0 cm at skeletal maturity, it can be treated by epiphysiodesis in the growing child.

Patients with KTS should be monitored at least annually and more often if clinically indicated. Stable disease can be followed clinically. If the disease progresses, imaging studies should be performed and medical or surgical intervention should be pursued if indicated.

Bibliography:

1. Baskerville PA, Ackroyd JS, Browse NL: The etiology of the Klippel-Trenaunay syndrome. *Annals of Surgery*, 1985; 202(5):624-627.
2. Ceballos-Quintal JM, Pinto-Escalante D, Castillo-Zapata I: A new case of Klippel-Trenaunay-Weber (KTW) syndrome: evidence of autosomal dominant inheritance. *American Journal of Medical Genetics*, 1996;63(3): 426-427.
3. Happle R: Klippel-Trenaunay syndrome: Is it a paradominant trait? *British Journal of Dermatology*, 1993; 128(4): 465.
4. Hu Y, Li L, Seidelmann SB, Timur AA, Shen PH, Driscoll DJ, Wang QK: Identification of association of common AGGF1 variants with susceptibility for Klippel-

Trenaunay syndrome using the structure association program. *Annals of Human Genetics*, 2008;72(5):636-643.
5. Jacob AG, Driscoll DJ, Shaughnessv WJ, Stanson AW, Clay RP, Gloviczki P: Klippel- Trenaunay syndrome: spectrum and management. *Mayo Clinic Proceedings*, 1998; 73(1):28-36.
6. Klippel M, Trenaunay P: Du naevus variqueux osteo-hypertrophique**.** *Archives Generales de Medicine*, 1900;185: 641-672.
7. Lindenauer SM: The Klippel-Trenaunay-Weber syndrome: varicosity, hypertrophy and hemangioma with no arteriovenous fistula. *Annals of Surgery*, 1965;162(2): 303-314.
8. McGrory BJ, Amadio PC: Klippel-Trenaunay syndrome: orthopaedic considerations. *Orthopedic Review*, 1993; 22(1):41-50.
9. Phadke SR: Klippel Trenaunay syndrome. *Atlas of Genetics and Cytogenetics in Oncology and Haematology*, 2009;13(2):153-155.
10. Samuel M, Spitz L: Klippel-Trenaunay syndrome: clinical features, complications and management in children. *British Journal of Surgery,* 1995; 82(6):757-761.
11. Stringel G, Dastous J: Klippel-Trenaunay Syndrome and other cases of lower limb hypertrophy: Pediatric surgical implications. *Journal of Pediatric Surgery*, 1987;22(7): 645-650.
12. Suchitra G, Madhu.R, Srinivasan MS: Klippel Trenaunay Syndrome. *e-Journal of the Indian Society of Teledermatology*. 2008; 2(4):7-14.
13. Wang Q, Timur AA, Szafranski P, Sadgephour A, Jurecic V, Cowell J, Baldini A, Driscoll DJ: Identification and molecular characterization of de novo translocation t (8;14)(q22.3;q13) associated with a vascular and tissue overgrowth syndrome. *Cytogenetic & Cell Genetic*, 2001; 95(3-4): 183-188.
14. Weber FP. Angioma formation in connection with hypertrophy of limbs and hemihypertrophy. *British Journal of Dermatology*, 1907;19: 231-235.
15. Whelan AJ, Watson MS, Porter FD, Steiner RD: Klippel-Trenaunay-Weber syndrome associated with a 5:11 balanced translocation. *American Journal of Medicine Genetic*, 1995;59(4):492-494.

Source of Support : Nil.
Conflict of Interest: None declared.