CASE REPORT

# Port-wine-stain with rare associations in two cases from Kuwait: Phakomatosis pigmentovascularis redefined

Arun Joshi MD, Yashpal Manchanda MD, Manish Rijhwani MD

*Department of Dermatology, Farwaniya Hospital, Kuwait*

## ABSTRACT

The association of a vascular lesion with melanocytic nevi was first described by Ota *et, al* in 1947, and given the name phakomatosis pigmentovascularis(PPV). Later on this term was used for the cases with simultaneous occurrence of congenital vascular and pigmented (epidermal or melanocytic) anomalies.

Our first case is a 12-year-old Kuwaiti boy who had extensive port-wine stain (nevus flammeus) on his left upper limb and left side of the chest, and Becker's nevus (BN) on the right shoulder. This is the first report of PPV from Kuwait, and it illustrates that although rare PPV may be prevalent worldwide but an under-reported entity.

Our second case is a 31-year-old Kuwaiti female with a congenital port-wine stain on left side of the face along with Neurofibromatosis Type I. To the best of our knowledge this association has not been described in the literature so far. To accommodate such cases in the PPV group, we have suggested a modified classification of PPV.

## INTRODUCTION

PPV is a rare condition first reported by Ota et, al in 1947.[1] It is defined as the simultaneous occurrence of congenitally present cutaneous vascular and pigmented anomalies in an individual. The first patient described by Ota et, al had nevus flammeus and an epidermal nevus. Five types and 10 subtypes of PPV have been described.[2] The combination of nevus flammeus and Becker's nevus has been reported only once in the past.[3] Our first case is a new case of PPV type Ia having these two nevi in a Kuwaiti boy. Our second case is of port-wine stain (PWS) occurring in association with neurofibromatosis type 1(NF-1). And we have also proposed a new classification of phakomatosis pigmentovascularis to accommodate such cases.

## Clinical presentation:

**Case 1.** A 12-year-old Kuwaiti boy presented with multiple, asymptomatic, erythematous and brown lesions on his upper limbs and trunk since birth. The lesions had increased in size proportionate to the growth of the body. There was no history of similar lesions in his family members. There was no history of consanguinity in his parents. The lesions had not been treated. His general physical and systemic examinations were within normal limits. Cutaneous examination revealed multiple dusky red, partially blanching, 5mm to 2-3cm macules present in a linear band like pattern on his left upper limb, extending from the thumb to the left side of his chest (Fig. 1). Multiple brown macules in a geographic configuration were present on his right shoulder and right infraclavicular region (Fig. 2). No thick terminal hairs were noted over

***Correspondence:*** *Dr. Arun Joshi MD, Department of Dermatology, Farwaniya Hospital, Kuwait.*

these brown lesions. His nails, scalp, mucosae and rest of the cutaneous examination were normal. Clinical diagnoses of PWS (nevus flammeus) for the erythematous lesions, and congenital BN for the brown macules were made. A biopsy from the brown macular lesion showed elongation of rete ridges and increased pigmentation of the epidermal basal layer. Biopsy from the PWS lesion showed numerous dilated vascular channels lined with a single layer of endothelial cells in the dermis.

**Case 2.** A 31-year-old lady presented with a congenital erythematous lesion on face along with multiple asymptomatic hyperpigmented macules over the trunk which evolved progressively from birth through adolescence. All her three siblings had similar pigmented lesions. Apart from the cutaneous lesions, the patient was otherwise in good health. There was no history of seizures, glaucoma or skeletal deformity. She was born to non-consanguineous parents. Family history was positive, similar pigmented lesions being present in her brother.

General physical and systemic examinations were normal. Cutaneous examination revealed a deep red to violaceous patch on the lateral half of left side of the face extending from the forehead to the level of upper lip (Fig. 3).The lateral half of the left eye had dilated conjunctival vessels. These findings were consistent with a clinical diagnosis of PWS. There was slate-grey pigmentation in sclerae of both eyes (Fig. 4). Multiple café-au-lait macules (CALM) varying from 0.5 to 3 cm in diameter were present on the trunk and the extremities (Figure 5). Innumerable freckles were present over the entire body including the axillary and inguinal regions. Also there were multiple cutaneous neurofibromas scattered over the entire torso.

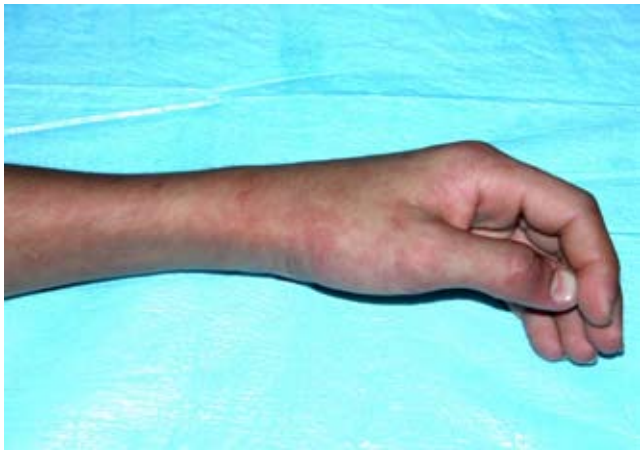

**Fig. 1** Multiple dusky red macules of port-wine-stain in a linear distribution on left upper limb.

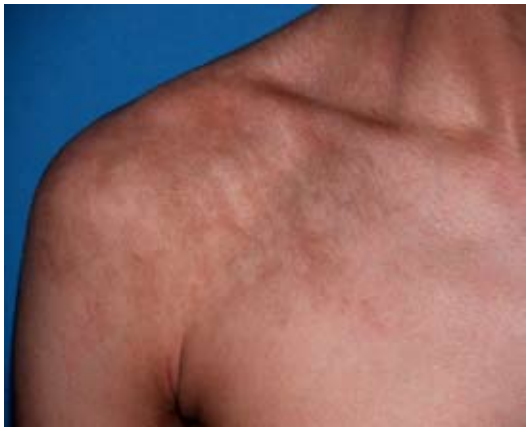

**Fig. 2** Multiple brown macules of Becker's nevus in a geographic pattern on right shoulder and right infraclavicular area of the chest

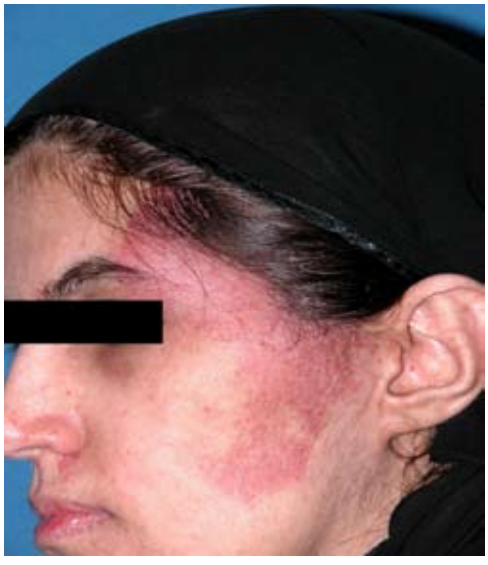

**Fig. 3** Deep red to violaceous patch on the lateral half of left side of the face

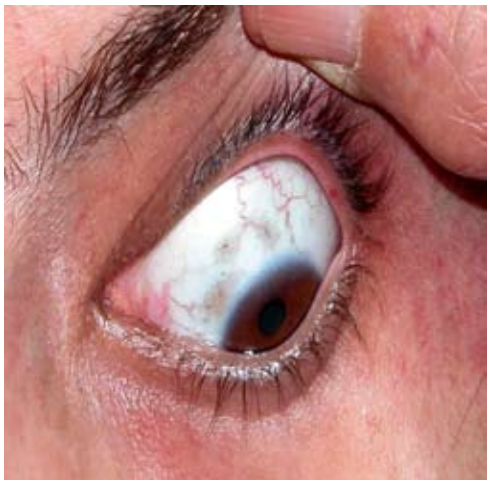

**Fig. 4** Slate-grey pigmentation in sclerae of both eyes

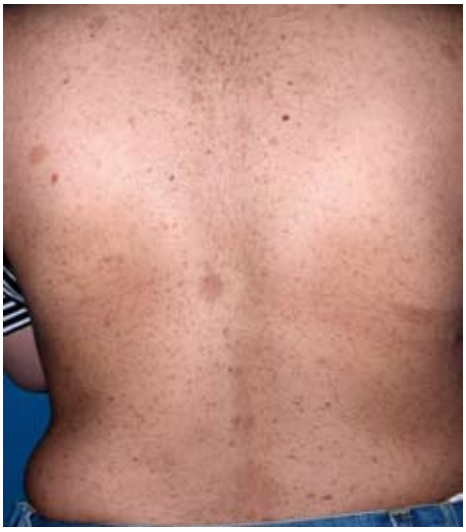

**Fig. 5** Multiple café-au-lait macules, freckles and cutaneous neurofibromas present on trunk and limbs.

Biopsy specimens of the vascular lesion on the face showed an increased number of blood vessels and some dilated capillaries in the upper and mid dermis, consistent with the diagnosis of PWS. Histologic examination of the CALM showed increased melanin pigment in the epidermis. Keratinocytes contained increased number of melanosomes. These features agreed with the clinical diagnosis of CALM. Laboratory examination revealed a normal blood cell count, hepatic and renal function tests, and urinanalysis. Chest roentgenogram was normal. Imaging studies of the central nervous system and skeletal system did not reveal any abnormality. Ophthalmologic examination revealed Lisch nodules. Tension in both eyes seen by tonometry was normal.

All her siblings were also examined. They had multiple CALMs varying in size from 0.2 - 2 cm. They were referred to paediatrics, neurology and ophthalmology departments for evaluation but the examination did not reveal any other abnormality. However they have been advised to be under regular follow-up with the pediatrician for any abnormality which may arise eventually.

Presence of PWS, ocular melanosis and café-au-lait macules representing a combination of capillary malformation with melanocytic lesions led us to make a diagnosis of PPV. More than 5 CALMs of size more than 1.5 cm, axillary freckling, neurofibromas and lisch nodules are consistent with a diagnosis of NF-1 as per the criteria of the National Institute of Health Consensus Developmental Conference.

## DISCUSSION

Since its first description in 1947 by Ota et, al[1], nearly 200 cases of PPV have been reported worldwide in the last 57 years, most of them of Japanese origin.[2] Both males and females are affected. PPV were classified into 4 types namely, Type I-nevus flammeus and epidermal nevus, Type II – nevus flammeus, Mongolian spots+/- nevus anemicus, Type III- nevus flammeus, nevus spilus, +/-nevus anemicus, Type IV- nevus flammeus, Mongolian spots, nevus spilus +/- nevus anemicus.[4] Each type is subdivided into two subtypes; subtype a- cutaneous involvement only, and b- cutaneous and systemic involvement both. A second case of cutis marmorata telangiectatica congenita and extensive mongolian spots was re-

ported by Torrelo et, al in 2003, and proposed to be included as a new type of PPV, type V.[5] Systemic involvement in PPV may affect any organ system, varying from benign to severe and extensive. Type II is the most common type of PPV reported. Vidaaurri de-la Cruiz et, al.[2] reported 24 cases of PPV with an average follow up of 5 years. PPV Type IIb in 18 (7 M, 11 F) and Type IIa in 6 (4 M, 2 F) patients was present. The relative frequency of PPV at their center (National Institute of Pediatrics, Mexico City, Mexico) was 5.8 per 100,000 pediatric patients and 0.634 per 100,000 dermatological patients. During the follow-up time of 60 months, progressive fading of melanotic and vascular macules were observed in 7 patients. Systemic involvement in PPV was related to the body surface area affected by the vascular macules. They speculated that ectodermal and mesodermal migration disorders might be involved in the pathogenesis of PPV. It has also been theorized that PPV probably results from developmental abnormalities of the neural crest derived vasomotor nerves and melanocytes.[6] However Happle and Steijen proposed the genetic concept of twin spotting phenomenon to explain its etiology.[7] Presence of BN alone since birth has been reported.[8, 9] BN is considered an organoid epidermal nevus of late onset.[10] Hence its occurrence in association with congenital vascular anomalies such as a PWS as seen in this patient should be considered as PPV. A similar case of PWS and congenitally present BN in a Nepalese boy was reported earlier by one of the authors.[3] To the best our knowledge, our first patient represents the second such report of a combination of PWS and BN, and probably the first case of PPV in an Arab child from the Gulf region. It appears that this peculiar combination of two different congenital cutaneous anomalies is present worldwide, but underreported.

In our second patient, the presence of a PWS and the bluish-grey ocular pigmentation of sclerae in both the eyes that may represent the dermal melanotic component of an incomplete form of a Nevus of Ota (without the typical bluish pigmentation of skin around the eyes) led us to consider this as a case of PPV type IIa according to the currently used classification of PPV.

Torrelo et, al, failing to fit their case in the above classification proposed to categorize the association of cutis marmorata telangiectatica congenita and dermal melanocytosis as a new distinct entity in the form of PPV type 5.[5]

We suggest a simpler approach to classify PPV as broadly encompassing all cases with capillary

**Table I**. Classification of phakomatosis pigmentovascularis (PPV)[6]

| Type | Features |
|---|---|
| Ia, b* | Nevus flammeus + Nevus pigmentosus et verrucosus |
| IIa, b | Nevus flammeus + Dermal Melanocytosis± Naevus anemicus |
| IIIa, b | Nevus flammeus + Nevus spilus ± Nevus anemicus |
| IVa, b | Nevus flammeus +Dermal Melanocytosis +Nevus spilus ± Nevus anemicus |

*a, Cutaneous disease; b, Systemic disease.

malformation irrespective of the specific type (i.e., whether nevus flammeus or cutis marmorata telangiectatica congenita) with dermal melanocytosis alone(e.g. Mongolian spots, nevus of Ito); with epidermal melanocytosis alone (e.g nevus spilus, CALM); and with both dermal melanocytosis and epidermal melanocytosis respectively as types I, II and III as follows:

Type I: Capillary malformation and dermal melanocytosis

Type II: Capillary malformation and epidermal melanocytosis

Type III: Capillary malformation, and, dermal and epidermal melanocytosis

These can be further subdivided into subtypes a and b, depending on the absence or presence of systemic manifestations. Nevus anemicus though frequently seen in cases of PPV does not influence the classification of a particular case, as nevus anemicus could be present or absent in types II, III and IV. This classification would also be more useful prognostically as regards cutaneous pigmentation, as epidermal melanocytosis is more responsive to treatment modalities.

Ruiz et, al wrote about a case of PPV with Lisch nodules and an intraventricular communication representing Von Recklinghausen disease.[12] The present case, to the best of our knowledge, is the first case of its kind having the combination of PPV type 1 ( PWS + ocular melanosis) and a co-existing NF-1. The exact pathogenesis of the coexistence of port-wine stain and the pigmented lesions of neurofibromatosis 1 is not clear. Some authors explain it as a developmental disorder of vasomotor nerve cells and melanocytes both of which are derived from the neural crest.[13] Happle et, al, on the other hand, propose the twin spot theory to explain the combination.[7] Most case reports in literature are sporadic. Therefore whether the coexistence of these lesions is a mere coincidence remains another speculation. Further case reports of same nature might resolve this dilemma.

## REFERENCES


1. Ota M, Kawamura T, Ito N: Phacomatosis pigmentovascularis (Ota). Jpn J Dermatol 1947; 52: 1-3.
2. Vidaurri-de la Cruz H, Tamayo-Sanchez L, Duran-McKinster C, Orozco-Covarrubias Mde L, Ruiz-Maldonado R: Phakomatosis pigmentovascularis II A and II B: clinical findings in 24 patients. J Dermatol 2003; 30: 381-88.
3. Joshi A, Garg VK, Agrawal S, Agarwalla A, Thakur A: Port-wine-stain (nevus flammeus), congenital Becker's nevus, cafe-au-lait-macule and lentigines: phakomatosis pigmentovascularis type Ia--a new combination. J Dermatol, 1999;26: 834-36.
4. Hasegawa Y, Yasuhara M: Phakomatosis pigmentovascularis type IVa. Arch Dermatol 1985;121: 651-55.
5. Torrelo A, Zambrano A, Happle R: Cutis marmorata telangiectatica congenita and extensive mongolian spots: type 5 phacomatosis pigmentovascularis. Br J Dermatol 2003;148: 342-45.
6. Libow LF: Phakomatosis pigmentovascularis type IIIb. J Am Acad Dermatol 1993;29: 305-7.
7. Happle R, Stejlen PM: Phacomatosis pigmentovascularis interpreted as a phenomenon of twin spots. Hautarzt 1989;40: 721-24.
8. Picascia DD, Esterly NB:Congenital Becker's nevus. Int J Dermatol 1990; 24:158.
9. Sood A, D'Souza P, Verma KK:Becker's nevus occurring at birth and in early childhood. Acta Derm Venereol 1998; 78: 311.
10. Atherton DJ. Nevi and other developmental defects; In: Champion RH, Burton DA, Breathnach SM, eds. Textbook of Dermatology, 6th ed. Oxford: Blackwell Science Ltd. 1998: pp 445-526.

11. Mandt N, Blume-Peytavi U, Pfrommer C, Krengel S, Goerdt S: Phakomatosis pigmentovascularis type 2 a. J Am Acad Dermatol 1999;40: 318-21.
12. Ruiz Villaverde R, Viera Ramirez A, Linares Solano J, Naranjo Sintes R, Gutierrez Salmeron MT: Phakomatosis pigmentovascularis and Lisch nodules. Relationship between Von Recklinghausen and phakomatosis pigmentovascularis? J Eur Acad Dermatol Venereol 2003;17(1): 53-55.
13. Libow L F : Phakomatosis pigmentovascularis type 3 b. J Am Acad Dermatol 1993;29: 305-7.