Case Report

Proteus syndrome: A rare case report

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Proteus syndrome (PS) is a rare hamartomatous disorder characterized by various cutaneous and subcutaneous lesions, including vascular malformations, lipomas, hyperpigmentation, and several types of nevi. Partial gigantism with limb or digital overgrowth is pathognomonic of PS. We report a rare case of PS in a 50-year-old man who presented with inferior wall myocardial infarction and was incidentally detected to have hypertrophy of index and middle fingers of both the hands.

Key words: Gigantism, hamartoma, mosaicism, proteus syndrome

Introduction

Proteus syndrome (PS) is a rare and sporadic disorder that causes postnatal overgrowth of tissues in a mosaic pattern.[1] It produces multifocal overgrowth of tissue derived from any of the three germinal layers. This causes a complex disorder with multisystem involvement and great clinical variability. The complications of PS include, progressive skeletal deformities, invasive lipomas, benign and malignant tumors, and deep venous thrombosis with pulmonary embolism.[1] We report a rare case of PS that presented with hypertrophy of index and middle finger without any other abnormalities or complications.

Access this article online	
Quick Response Code:	Website: www.ijhg.com
	DOI: 10.4103/0971-6866.108036

Case Report

A 50-year-old farmer presented to our emergency services with anginal pain. ECG revealed inferior wall myocardial infarction (MI). As patient presented in window period he was thrombolysed. Incidentally we noticed that he had enlarged index and middle fingers of both hands and thumb of right hand [Figure 1]. On probing patient revealed that it was present since childhood with onset around the age of 5 years and gradual progression over years to the present size. No similar tissue growth in other parts of the body and there was no one in the family with similar features. On examination there was hypertrophy of the involved fingers with limitation of movements. His systemic examination was otherwise normal.

Laboratory investigations revealed normal renal and liver function tests. His X-ray of hands showed

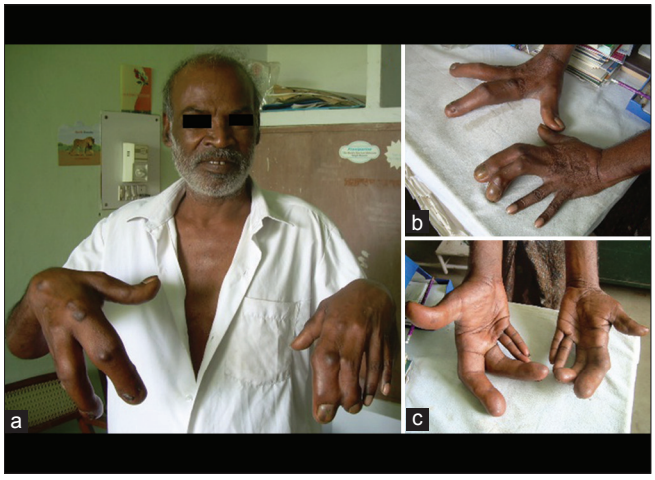

Figure 1: Hypertrophy of index and middle finger of both the hand (a,b,c) and thumb of the right hand (c)

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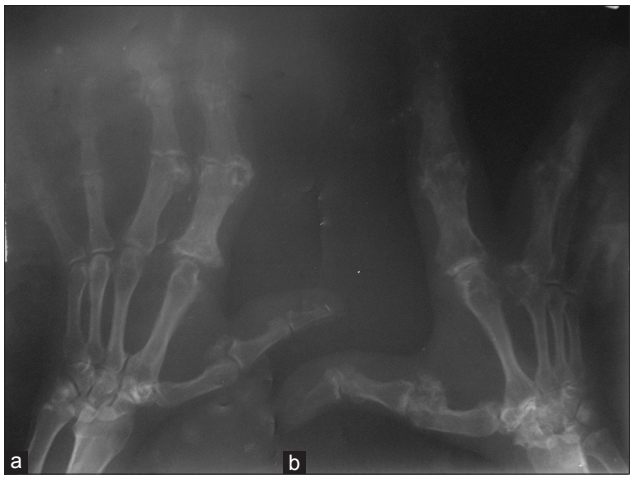

Figure 2: X-ray hands showing hyperostosis of both index and middle fingure (a,b) and thumb of right hand (b)

hyperostosis of involved fingers [Figure 2]. The chest X-ray and other skeletal survey were normal.

Discussion

Cohen and Hayden[2] first described this disease in 1979. The name Proteus comes from the Greek god 'Proteus' who had the ability to change his shape and was proposed by Wiedemann, *et al.*[3] in 1983.

The exact cause of PS remains unclear till date. Happle, *et al.*[4] in 1987 hypothesized that the syndrome might be due to somatic alteration of a gene leading to mosaic effects that would be lethal if the mutation were carried in nonmosaic fashion. The dysregulated tissue growth in mosaic pattern results in various phenotypic presentations and hence the clinical manifestations of PS are highly variable.[5]

The tissue overgrowth is usually absent or mild at birth and progressive in nature but usually appears to plateau after adolescence.[5] The disproportionate overgrowth of tissue is usually asymmetrical and involves the arms, legs, hands, feet, and digits. Characteristic manifestations include hyperostoses, often near epiphyses with associated impaired mobility and cerebriform connective tissue nevus seen most commonly on plantar surface. Other findings are lipomas, epidermal nevi and capillary vascular malformations [Table 1].

There is no specific molecular marker, or laboratory test, for the diagnosis of PS. The diagnosis is mainly based on history, clinical examination and imaging studies. The proposed criterion for the diagnosis of PS is shown in Table 1.

Table 1: Criteria for the diagnosis of proteus syndrome[6]

Category	Manifestations	Frequency
A	Connective tissue nevus	Common
B	Epidermal nevus	Common
	Disproportionate overgrowth (one or more)	
	Limbs-arms/legs hands/feet/digits	Common
	Skull-hyperostoses	Common
	External auditory meatus-hyperostosis	Uncommon
	Vertebrae-megaspondylodysplasia	Common
	Viscera-spleen/thymus	Uncommon
	Specific tumors before end of second decade (either one)	
	Bilateral ovarian cystadenomas	Uncommon
	Parotid monomorphic adenoma	Uncommon
C	Dysregulated adipose tissue (either one)	
	Lipomas	Common
	Regional absence of fat	Common
	Vascular malformations (one or more)	
	Capillary malformation	Common
	Venous malformation	Common
	Lymphatic malformation	Common
	Facial phenotype	Uncommon
	Dolichocephaly	
	Long face	
	Minor down slanting of palpebral fissures and/or minor ptosis	
	Low nasal bridge	
	Wide or anteverted nares	
	Open mouth at rest	
General criteria (Mandatory)		
Mosaic distribution of lesions		
Progressive course		
Sporadic occurrence		

The diagnosis of Proteus syndrome requires all three general criteria plus either one criterion from category A, two criteria from category B, or three criteria from category C

Table 2: Differential diagnosis of proteus syndrome[5]

Klippel-Trenaunay syndrome
Hemihyperplasia/lipomatosis syndrome
Parks weber syndrome
Maffucci syndrome
Neurofibromatosis, type 1
Epidermal nevus syndrome
Bannayan-riley-ruvalcaba syndrome
Familial lipomatosis
Symmetrical lipomatosis
Encephalocraniocutaneous lipomatosis

Because of its variable presentation, PS may be confused with other conditions. The two disorders most commonly confused with PS are Klippel-Trenaunay syndrome and hemihyperplasia/lipomatosis syndrome.[6] The others being those listed in Table 2. The important points in PS that help in the differential diagnosis are:

- Sporadic and progressive nature of tissue overgrowth
- The absent or mild tissue growth at birth
- Absence of bone tumor, enchondromas
- Absence of specific gene mutations differentiates from neurofibromatosis
- Absence of familial inheritance (postzygotic somatic mutation of genes)

There are no effective treatment modalities for PS. The patients should be followed up regularly for development of complications and their management. The management is also challenging because of progressive nature of tissue growth. Both benign and malignant tumors are associated with PS.[7] Two relatively common tumors include cystadenomas of the ovary and monomorphic adenomas of the parotid gland. The patients are also at risk of developing psychological and social problems.

Our patient presented with macrodactyly of index and middle finger of both the hands and thumb of right hand (one criteria of category B) and he met all the three general criteria. His skeletal survey was normal except for hyperostosis of index and middle finger and there were no associated complications except for the limitation of his affected finger movements. Although the patient did not satisfy the proposed criteria [Table 1], a literature search revealed that out of the 205 cases reported 90 satisfied the criteria highlighting the variability in clinical presentation in cases of PS.[6]

Our patient was managed as a case of inferior wall MI and is presently on anti-ischemic medications with no new complications.

In conclusion, PS is a very rare and highly variable, progressive tissue overgrowth disorder. Patients should be kept under regular follow-up for the development of complications and their management.

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Cite this article as: Talari K, Subbanna PA, Amalnath D, Krishna Suri SD. Proteus syndrome: A rare case report. Indian J Hum Genet 2012;18:356-8.

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