PACHYDERMOPERIOSTOSIS
(Idiopathic hypertrophic osteoarthropathy)
REPORT OF A CASE IN THE CHINESE WITH A SHORT REVIEW OF THE LITERATURE

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SYNOPSIS

A patient with the complete form of Pachydermoperiostosis (idiopathic hypertrophic osteoarthropathy) is reported for the first time in the Chinese. Familial occurrence was not detected. A brief review of the condition is given.

INTRODUCTION

Pachydermoperiostosis is a syndrome characterised by hypertrophic osteoarthropathy combined with an acromegaloid feature, but without any associated malignancy. It begins around adolescence and follows a benign self-limiting clinical course over the next ten years. Male predominance has been observed. The genetic inheritance was that of an autosomal dominance with marked variability in expressivity, phenotypically more severe in the males (Rimoin, 1965).

The condition was first recognised as a distinct clinical entity by Touraine, Solente and Gole in 1935 (sometimes known as the Touraine-Solente-Gole syndrome). By 1966, only 35 cases were noted in the English Literature (Hambrick and Carter, 1966). The patients were Europeans and Africans (Carruther, 1943; Findley and Oosthuizen, 1951; Angel, 1957; Vogl and Goldfischer, 1962) and as far as we are aware, no cases have been recorded in the Chinese.

In this paper, we were presenting a young Chinese male with the classical features of Pachydermoperiostosis and its differentiation from the acquired forms of hypertrophic osteoarthropathy, hereditary clubbing and acromegaly.

CASE REPORT

A 23 years old Chinese male soldier (LKT) was admitted to the Department of Medicine, Singapore General Hospital on 11th March 1975 with a 4 months history of aching pain over both knees. The arthralgia was present only when squatting down or getting up from squatting position. Other joints were uninvolved. He had no physical injury to his knees. When he consulted his Army doctor, digital clubbing was noted and he was then referred for further investigations.

On direct questions, he noticed the increased swelling of all terminal phalanges over the hands and feet since the age of 18 years. He then also started to have excessive sweating over both palms and soles, with enlargement of hands and feet. His facial acne increased in numbers. There was no other significant history.

The patient was a bachelor and teetotaller but smoked 10 to 20 cigarettes a day for the last 6 years. He was quite capable in his studies until 18 years old. In his family of 4 (2 girls and 2 boys) he was the eldest. The parents were unrelated, and there was no evidence suggestive of Pachydermoperiostosis to be found among the parents and siblings.

Physical Examination

He had a worried and anguish facial expression and measured 162 cms. in height and weighed 53.64 Kgms. There were no cyanosis, fever, jaundice, anaemia, oedema and dyspnoea. The coarse facial appearance was well shown in Fig. 1. There was diffuse thickening of skin over the face and scalp. 3 deep horizontal furrows with large fixed folds were present over the forehead. Similar furrowing over the scalp was noted (Cutis verticis gyrata). Both eyelids were thickened. The face also had patches of greasy scaly dermatitis, comedones, pustules and scars. The hairs and its distribution were normal. The skin over the extremities was also thickened and the hands and feet appeared spade-like (Fig. 2). In contrast to acromegaly, he had no enlargement of the bony sinuses, jaw or tongue. The palms and soles were not hyperkeratotic but had marked hyperhidrosis. The periungual skin was markedly hypertrophied, bullous and grotesque, with a watch-glass appearance in the nailplates. Skeletal examination revealed bony enlargement and soft tissue swelling over the wrists (Fig. 2), knees and ankles. There was

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no synovial thickening or evidence of inflammation over the joints. Blood pressure was 120/75. All other physical findings were normal.

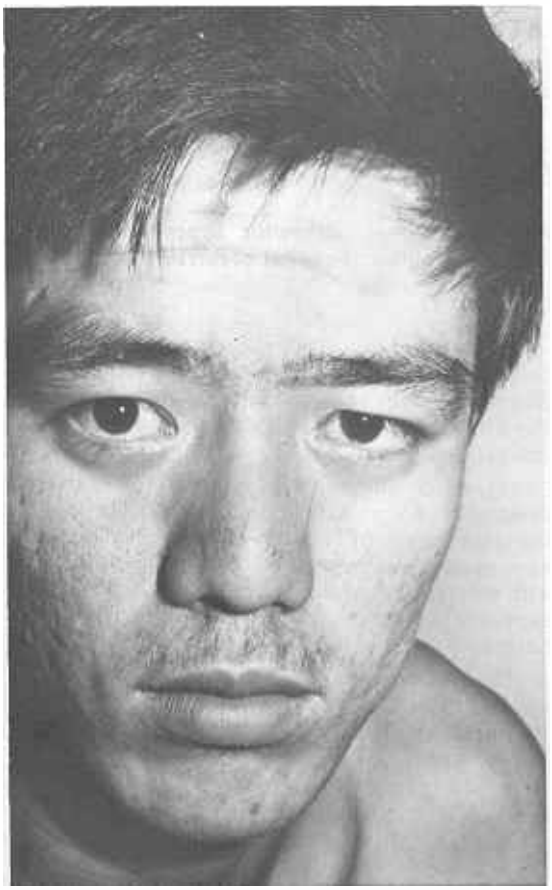

Fig. 1. The worried and anguish facial appearance with thickened and furrowed skin over the forehead.

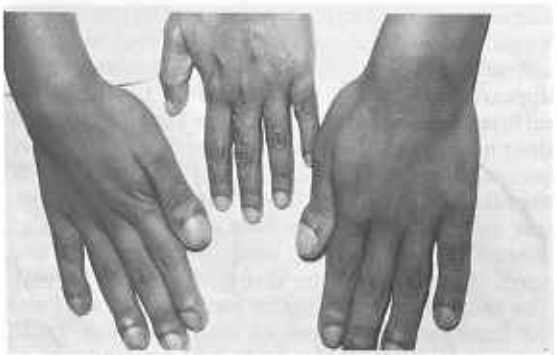

Fig. 2. Grossly enlarged hands compared to normal in the centre, with digital clubbing and enlarged wrist joints.

Investigations

The following were normal—haemoglobin, total white and differential count, urinalysis, serum electrolyte, blood urea, serum albumen and globulin, serum immunoglobulins (IgG, IgM and IgA), serum calcium and phosphate, serum alkaline phosphatase, plasma bound iodine, glucose tolerance test, growth hormone assay, blood uric acid; chest, abdominal and skull X-rays, electrocardiogram, a barium gastrointestinal series and a throat swab culture. LE cells, RA factor, Antinuclear factor, VDRL and GCFT were negative. ESR was 10 mm/1st hr.

Radiological Examination

Hands—(Fig. 3) There was periosteal new bone formation in the shafts of right second, third and fourth metacarpals and proximal phalanges. Similar changes were found in the lower end of ulna, radius and humerus. Knees—Periosteal reaction seen on the upper end of tibia and fibula.

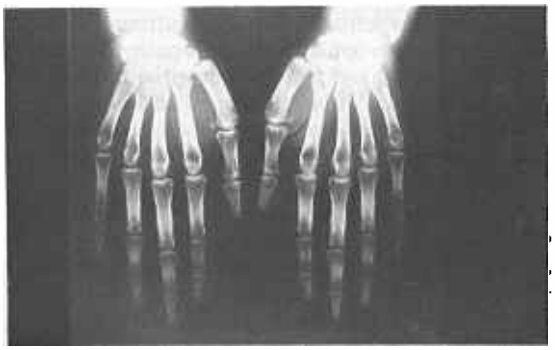

Fig. 3. X-rays of hands showing periosteal new bone formation in the shafts of the right 2nd, 3rd and 4th metacarpals and proximal phalanges.

Ankles—(Fig. 4) Gross periosteal new bone formation in the lower end of tibia and fibula was noted. There was thickening of the cortical bone as the periosteal bone consolidated.

Feet—Bilateral metatarsals of first, third and fifth toes showed marked periosteal thickening.

Skin Biopsy (Right foot)

The entire skin and subcutaneous tissue were diffusely thickened. Mild hyperkeratosis with some degree of papillomatosis was observed. The dermis, sebaceous and sweat glands were normal. Acid mucopolysaccharide in the ground substance was not increased.

DISCUSSION

Primary Pachydermoperiostosis or idiopathic hypertrophic osteoarthropathy was first reported in the Hagner brothers by Friedreich in 1868 and it was then thought to be examples of acromegaly (Friedreich, 1868). In 1902, Newton and Mereceles recognised the significance of the bony changes as seen in

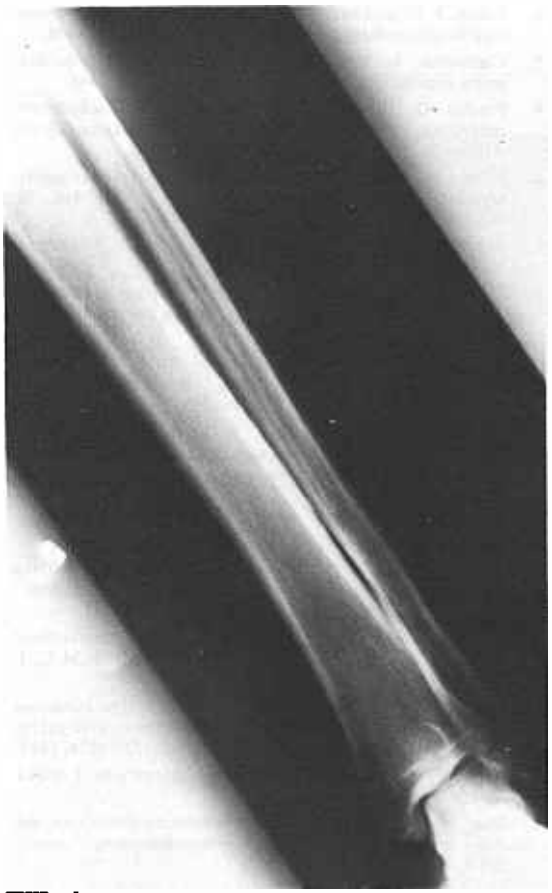

Fig. 4. Gross periosteal new bone formation in the tibia and fibula of left leg.

some new cases and they considered these as examples of acromegaly or pulmonary hypertrophic osteoarthropathy. Although the 'cutis verticis gyrata' was discussed by Unna in 1907, it was only in 1927 that Gonberg associated the skin changes with the bony changes.

The first to recognise Pachydermoperiostosis as a distinct entity from acromegaly or pulmonary hypertrophic osteoarthropathy was Touraine, Solente and Gole in 1935 (sometimes referred to as Touraine-Solente-Gole syndrome). Other names had since emerged; Idiopathic familial generalised osteophytosis, acropachyderma with pachyperiostosis, chronic hypertrophican and lastly pachydermoperiostosis (Vogl and Goldfischer, 1962; Shawarby and Ibrahim, 1962; Lehman *et al*, 1963; Camp and Scalan, 1948). Pachydermoperiostosis has gained universal acceptance as the term refers to both skin and bone pathology without over-emphasis on either pathology.

According to Touraine *et al* (1935) the complete form of Pachydermoperiostosis has all the features of pachyderma and pachyperiostosis as seen in our patient. His features began during adolescence and he presented with digital clubbing, enlargement of limbs, thickened skin folds with deep furrows over the forehead, face and scalp, increased seborrhea and hyperhidrosis of palms and soles and marked periosteal proliferation and ossification over the long bones, primarily at the distal ends, metacarpals, metatarsals and proximal two phalanges. The clinical course is self-limiting over the next decade and benign.

Although the family history was absent in our patient, 30 out of 78 reported cases had familial occurrence and the transmission was of an autosomal dominant inheritance with marked variability in expressivity and phenotypically more severe in the males (Rimoin, 1965). Whether the sisters and brother of the patient would eventually develop the complete or incomplete form of Pachydermoperiostosis is yet to be seen. Those manifesting all features but lacking cutis verticis gyrata were the incomplete form. The third type called forme fruste, had digital clubbing with thickened skin over the face and scalp but minimal or absent periosteal changes.

The increased thickness of the skin over the face, forehead, scalp and limbs is due to the hypertrophy of collagen tissue, epidermis and epidermal appendages. Sometimes there is an increase in acid mucopolysaccharide (Hambrick and Carter, 1966). Histological features of the disease are not constant. Widening of stratum corneum, marked seborrhoeic hyperplasia, large and numerous eccrine glands, diffuse increase of connective tissue and elastic fibres, perivascular round cell infiltration or a diffuse widening of the entire skin and subcutaneous tissue (as in our patient), had been reported (Brugsch, 1941; Camp and Scanlon, 1948; Hambrick and Carter, 1966). Although the majority of cases were asymptomatic, joint pain of variable degree (as in our patient) had been documented—16 out of 35 cases reviewed by Hambrick (1966). The arthralgia was not due to arthritis or synovitis.

The physical appearance of Pachydermoperiostosis was almost identical to acquired or pulmonary hypertrophic osteoarthropathy (associated with bronchogenic carcinoma, congenital heart disease, chronic suppurative diseases and chronic liver disease) except for cutis verticis gyrata. Sometimes the more acute onset especially in the older age group together with the rapid progression associated with more pain over the distal part of the extremity eg. leg, would favour the secondary form of hypertrophic osteoarthropathy. Radiographically, the peripheral blood flow was demonstrated to be increased in the secondary form but decreased in the primary or idiopathic form (Rimoin, 1965), but the reasons are unknown. In the secondary disorders, complete or partial disappearance of the clinical features have been known to follow excision of lung lesions or successful treatment of the underlying disease (Fried, 1943).

Besides pulmonary hypertrophic arthropathy, digital clubbing may occur as a congenital condition

or in families. The inheritance is also autosomal dominant with variable penetrance. Hence it could be possible that familial or hereditary clubbing idiopathic hypertrophic osteoarthropathy without skin changes and the idiopathic pachydermoperiostosis are variable expressions of the same genetic abnormality.

Acromegaly also resembles pachydermoperiostosis except for the overgrowth of skull bones, abnormal sella turcica, large tongue and abnormal pituitary functions especially excessive growth hormone. Other diseases to be excluded in the diagnosis of Pachydermoperiostosis are thyroid acropathy, congenital syphilis, Pagets' disease and the rare Rosenthal-Kloepfer syndrome.

The basic defect of Pachydermoperiostosis has not been established. Both endocrine and neurocirculatory abnormalities have been implicated. However these disturbances could just be the peripheral response or expression of a central mechanism defect perhaps in the neurohypophysis of thalamus via the action of a hormonal releasing substance.

At present therapy is limited to the plastic and reconstructive surgery in improving facial appearance. There is no treatment for skeletal abnormalities. Fortunately, the condition is self-limiting and benign.

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