Mod Rheumatol (2007) 17:330–332
10.1007/s10165-007-0585-8

CASE REPORT

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A case of pachydermoperiostosis treated by oral administration of a bisphosphonate and arthroscopic synovectomy

Received: December 22, 2006 / Accepted: February 26, 2007

Abstract Pachydermoperiostosis (PDP) is a rare hereditary disorder characterized by pachydermia, digital clubbing, and periosteal hypertrophy. Here, we report a case of PDP showing symptoms consistent with arthritis, which was treated by oral administration of risedronate sodium and arthroscopic synovectomy.

Key words Arthroscopic synovectomy · Bisphosphonate · Hypertrophic osteoarthropathy · Pachydermoperiostosis (PDP)

Introduction

Pachydermoperiostosis (PDP) is described as a primary hypertrophic osteoarthropathy (HOA), and its articular manifestations appear as polyarthritis, for which a differential diagnosis of rheumatoid arthritis is sometimes required.[1] In this article, a case of symptomatic PDP whose arthritis was treated by oral administration of risedronate sodium and arthroscopic synovectomy is reported.

Case report

A 22-year-old man who had a 1-year history of painful swollen knees and ankles was referred. Physical examinations revealed marked clubbing of the fingers (Fig. 1), furrowing of the facial skin, and swelling around the bilateral knees and ankle joints. The patient was born to unaffected parents, and the progressive enlargement of his fingertips, feet, and knees as well as facial furrowing at puberty was noted. From the facial findings, acromegaly was first suspected. Initial serum investigations revealed that C-reactive protein (CRP) was 2.3 mg/dl, whereas growth hormone and insulin-like growth factor-1 were in their normal ranges. Because of the polyarthritic symptoms and increased CRP level, an investigation of rheumatic diseases was performed. Tests for rheumatoid factor and antinuclear antibody were negative. For a bone marker, a urinary cross-linked N-telopeptide of type-1 collagen (NTx) was measured. Urinary NTx is expressed relative to creatinine (Cr) excretion in the urine, such that the units are nmol bone collagen equivalents (BCE)/mmol Cr. In the present case, urinary NTx was elevated to 170.6 nmol BCE/mmol Cr (normal range in young men 18.9–44.1 nmol BCE/mmol Cr)[2]. Radiographic examination revealed periosteal proliferation (Fig. 2), which is very typically found in HOA.[3] On the basis of these findings, namely, clubbing of the fingers, furrowing of the facial cutis, arthritis of the knees and ankles, and periosteal proliferation on radiographs, along with a lack of history of cardiac, pulmonary, and gastrointestinal diseases, PDP was finally diagnosed. Conventional treatments involving the use of nonsteroidal anti-inflammatory drugs (NSAIDs) and an oral low-dose steroid were carried out for 3 months, but the arthritic symptoms persisted. Because of the high level of urinary NTx and low effects of the NSAIDs, risedronate sodium 5 mg/day was administered. Over a period of 3 months, the number of swollen and painful joints gradually decreased, with the exception of the bilateral knees. The level of urinary NTx decreased to 128 nmol BCE/mmol Cr and serum CRP also decreased to 0.3 mg/dl. The arthritis of the knees persisted, and therefore, arthroscopic synovectomy of the knees was performed. Prior to the synovectomy, knee joint effusion was collected and tested. The results revealed a white blood cell count of 1200 cells/μl and an interleukin (IL)-6 level of 125 pg/ml, which were considered to indicate low-grade inflammation of the joints. The arthroscopic findings showed villonodular synovitis. After the arthroscopic synovectomy, the arthritic symptoms of the knees gradually decreased. The histology of the synovium revealed non-suppurative and low-inflammatory changes, which were considered to arise from reactive arthritis (Fig. 3). At present, risedronate sodium 5 mg/day is being maintained and no recurrence of the arthritis is observed.

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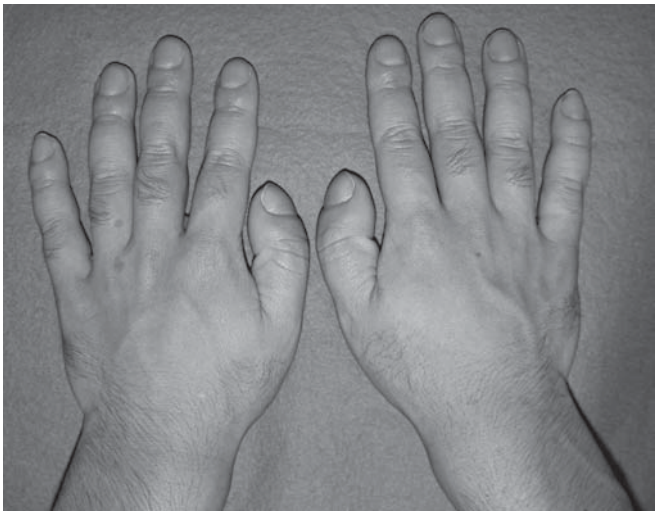

Fig. 1. Marked clubbing of the fingers is present

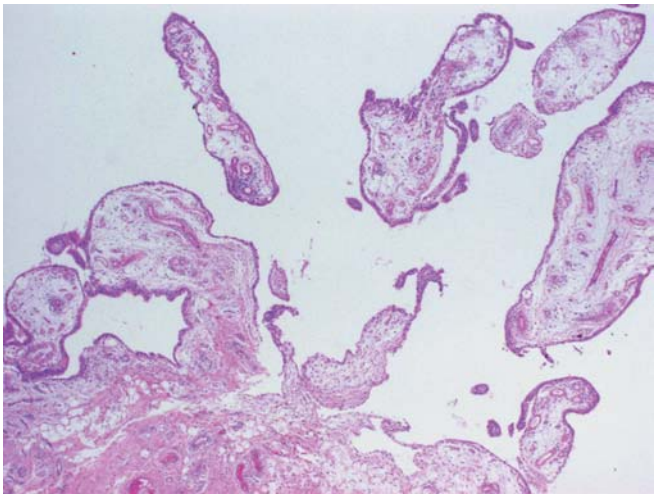

Fig. 3. Papillary hyperplasia accompanied by mild perivascular chronic inflammatory infiltrates is observed in the synovium of the knees

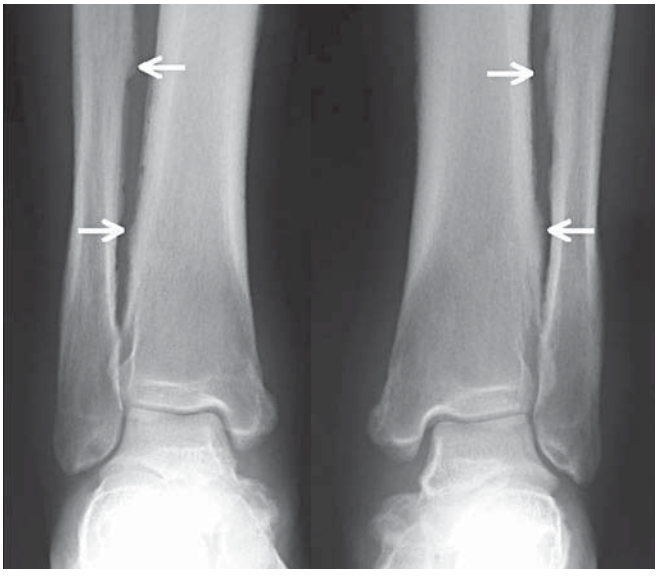

Fig. 2. Radiographs of the ankles. Periosteal proliferation is observed in the distal parts of the tibia and fibula

Discussion

Pachydermoperiostosis is a primary HOA, represents a rare hereditary familial disease occurring predominantly in men.[4] The present case was considered to show a sporadic pattern because the patient was born to healthy parents, and there were no PDP patients among his relatives. The diagnosis of PDP was made on the basis of the specific symptoms and radiographic lesions. The main symptoms appeared in the skin and bone tissue, and included digital clubbing, furrowing of the facial skin, and periosteal proliferation of the long bones. The collagen synthesis disorder identified in the soft tissue of our PDP patient is a cause of the furrowing of the facial skin.[5] The periosteal proliferation observed in the long bones of our patient leads to the thickening of the cortex and arthralgia of the affected joints, as Bomanji et al.[6] reported a high activity of bone turnover in the affected joints of PDP patients, as evaluated by bone scintigraphy.[6]

For cases where NSAIDs or oral steroids are ineffective, the administration of a colchicine[7] or steroid injection[8] to the affected joints has been reported. Guyot-Drouot et al.[9] reported the efficacy of bisphosphonate for severe arthritis associated with PDP. Specifically, they described that two patients of the five symptomatic PDP patients showed a significant improvement after treatment with intravenous pamidronate. In the light of their report, we used risedronate sodium, which is an oral bisphosphonate. After the administration of risedronate sodium, a decrease in the arthritic symptoms and a decrease in the urinary NTx and serum CRP levels were gradually observed. Risedronate sodium has been reported to work on osteoclasts, resulting in a decrease in urinary NTx.[10] Cooper et al.[11] reported an increased number of osteoclasts in the bone of PDP patients. It is considered that risedronate sodium inhibited the osteoclasts in the bones of our PDP patient. Osteoclast activity has an intimate relationship with the cytokine network.[12] Matsumoto[13] described PDP as an inflammatory disease resulting from the high level of IL-6 in the joint effusion and serum of symptomatic PDP patients. In the present case, the decrease in the arthritic symptoms and a low level of IL-6 in the knee joint effusion were observed after the administration of risedronate sodium. It is suggested that risedronate sodium has an anti-inflammatory effect, as previously reported for the aminobisphosphonate incadronate.[14]

In the present case, knee arthritis persisted after the administration of risedronate sodium, and arthroscopic synovectomy was performed. After the synovectomy, the symptoms of the knees gradually decreased. Schumacher[15] reported that the arthritis associated with HOA is a reactive arthritis from the histological and clinical findings. The synovial lesions in the present case showed inflammatory changes, although slightly lower changes were seen when compared with the previous report.

In conclusion, the authors experienced the usefulness of risedronate sodium in the treatment of a symptomatic PDP patient and the beneficial effects of arthroscopic synovectomy for reactive arthritis associated with the PDP.

Acknowledgments The authors did not receive any grants or industrial support.

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