CHRONIC TENOSYNOVITIS OF THE POSTERIOR TIBIAL TENDON
WITH NEW BONE FORMATION

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Chronic non-specific tenosynovitis of the posterior tibial tendon is a well-known clinical entity, characterised by pain, swelling and tenderness behind the medial malleolus. There are no reports in the literature of any case associated with any radiological abnormality. Three such cases are discussed, each presenting with the clinical findings typical of the syndrome but with associated radiological changes. These changes may pose diagnostic problems and several primary conditions need to be excluded. Surgical decompression of the tendon may be necessary to relieve symptoms, to prevent erosion and rupture of the tendon, and to establish the diagnosis.

Chronic non-specific tenosynovitis affecting the posterior tibial tendon is characterised by pain, limitation of movement, diffuse swelling and tenderness over the medial side of the ankle.

The first recorded description of the syndrome was by Kulowski (1936) and there followed a large series from the Mayo Clinic (Lipscomb 1950). Lapidus and Seidenstein (1950) reported three cases associated with an effusion about the ankle but with no known cause. Further descriptions by Fowler (1955) and Williams (1963) followed. Key (1953) and Kettelkamp and Alexander (1969) were the first to describe the complication of partial or complete rupture of the tendon. Cozen (1965) suggested that a postural deformity of the foot might be responsible for the syndrome, and Ghormley and Spear (1953) suggested an underlying anatomical anomaly of the posterior tibial tendon.

In none of the reported cases is there any mention of any radiological abnormality. It is the purpose of this paper to present three cases, all of which had the typical clinical findings of chronic tenosynovitis of the posterior tibial tendon and, in addition, radiological evidence of new bone formation, erosive changes and osteoporosis. Such findings have not previously been reported as associated with the syndrome, and they may pose diagnostic problems.

CASE REPORTS

Case 1. A forty-four-year-old man presented to the Massachusetts General Hospital with a three-year history of pain and swelling of the left ankle. His symptoms had developed spontaneously, without precipitating injury or injury. The pain was worse on walking, causing a marked limp and he needed a stick. Despite treatment with a variety of drugs, several trials of short leg plasters and various inserts for his shoe, he had had no relief from his symptoms. The past medical history and a review of the present state provided no contributory factor. Initial examination revealed swelling of the lower leg and foot with tenderness over the posterior tibial tendon behind the medial malleolus. Movement of the ankle was restricted but there was no rupture of the tendon. No other joints were involved, and nothing else abnormal was demonstrated on physical examination. Laboratory tests showed the erythrocyte sedimentation rate to be 16 and 20 millimetres per hour on two occasions. The rheumatoid factor was negative, as were the tuberculin skin test and serological test for syphilis. Complete laboratory studies including enzymes, immunoelectro- phoresis, antinuclear antibody and tests for lupus erythematosus cells were normal. Radiographs of the ankle showed new bone formation over the medial malleolus. Xerography confirmed this finding (Fig. 1) and the 99mTc-diphosphonate bone scan showed increased activity in the left ankle.

Surgical exploration of the medial compartment adjacent to the ankle showed the sheath of the posterior tibial tendon to be fibrotic and oedematous. Within the sheath was found abundant inflamed synovium surrounding not only the posterior tibial tendon, but also the tendon of the flexor digitorum longus. The fibrous flexor sheath and synovium were excised and found to be sterile when cultured for bacteria, fungi and acid-fast bacilli. Histological sections revealed the findings typical of non-specific tenosynovitis (Fig. 2).

The patient has shown a slow but steady improvement. One year after operation he no longer has pain or swelling and is able to walk without a limp and without support. He has returned to work. The sedimentation rate is normal, and his rheumatoid factor has remained negative. The radiographic abnormality is less prominent but still present.

Case 2. A fifty-eight-year-old woman was admitted to the Massachusetts General Hospital with an eleven-month history of pain, swelling and redness about the inner side of her left ankle. She had no history of precipitating injury or illness and had had no previous rheumatological complaints. Despite trials of immobilisation in plaster and anti-inflammatory drugs she had experienced no long-term relief from her symptoms.

Examination of her ankle revealed swelling over the medial malleolus and tenderness on palpation of the posterior tibial tendon. There was limitation of movement but no evidence of rupture of the

Requests for reprints should be sent to Mr S. H. Norris.
Case 1. Figure 1—Xerogram of the left ankle showing new bone formation over the medial malleolus. Figure 2—Histological section showing chronic inflammation of the tendon sheath. (Haematoxylin and eosin, ×200.)

Case 2. Histological section showing chronic non-specific tenosynovitis. (Haematoxylin and eosin, ×200.)

Case 3. Figure 4—Xerogram of the left ankle showing marked osteoporosis and new bone formation. Figure 5—Bone scan showing generalised increased activity in the left ankle and foot. The isolated hotspot on the left of the illustration is an isotopic marker and does not represent an abnormality.
tendon. Nothing else abnormal was demonstrated on physical examination.

Laboratory tests revealed, in addition to normal routine blood values, an erythrocyte sedimentation rate of 13 millimetres, and negative rheumatoid factor, tuberculin skin test, antinuclear antibody, and lupus erythematosus tests and immunoelectrophoresis. A plain radiograph revealed very slight new bone formation and minimal destruction of bone both on the medial side of the medial malleolus and on the medial aspect of the talus. These findings were confirmed by xerography and a 99mTc-diphosphonate bone scan showed increased activity over the medial side of the left ankle.

Because of the length of her history and the chronic nature of her symptoms it was decided to explore the medial compartment at the level of the ankle joint. At operation the fibrous sheath around the posterior tibial tendon was found to be grossly thickened and there was adherent synovium investing the tendon. Both sheath and synovium were excised. Swabs taken for bacteria, fungi and acid-fast bacilli, were sterile on culture. Histological sections (Fig. 3) revealed chronic inflammation of the synovium. Ten months later the patient is free of symptoms and requires a stick only occasionally for stability. Swelling and local tenderness are absent, and the range of movement in the ankle is now normal.

Case 3. A sixty-year-old man presented with a history of pain in his left ankle for six months after a sprain. The pain became so severe that he was unable to bear weight on the foot and needed crutches when walking. He had been treated with a three-week course of a non-steroidal anti-inflammatory agent but had obtained no relief. Apart from a myocardial infarction four years previously and mild chronic bronchitis, he was in good health. He complained of no previous joint disease and systematic review was normal.

Physical examination of the left leg and ankle revealed marked oedema and reduced movement of the ankle compared with the other side. There was very marked tenderness behind the medial malleolus over the region of the posterior tibial tendon. Laboratory findings were all within normal limits with the exception of an erythrocyte sedimentation rate of 34 millimetres per hour. Rheumatoid factor, antinuclear antibody and lupus erythematosus tests were negative. The intermediate-strength tuberculin test was mildly positive but cultures of the urine and sputum were negative for acid-fast bacilli. Radiographs showed marked osteoporosis of the bones of the ankle and foot, and periosteal new bone formation above the medial malleolus was seen on the xerogram (Fig. 4). The 99mTc-diphosphonate bone scan produced a marked increase in the isotope in the region of the ankle and foot (Fig. 5).

At operation the synovium around the posterior tibial tendon was oedematous and thickened but was not seen to invade the tendon. All the involved tissue was removed and the bone biopsied. Cultures of the tissue for bacteria, acid-fast bacilli, and fungi were all negative. Histologically the synovium was chronically inflamed (Fig. 6) but the bone, apart from being osteoporotic, showed no abnormality. Two months after operation the patient is making slow but steady progress.

DISCUSSION

Three patients with classical non-specific tenosynovitis of the posterior tibial tendon have been described. All three are middle aged and are of Italian extraction; in two there was no precipitating injury, and in the third the onset of symptoms followed only a mild sprain. All complained of pain, swelling and tenderness and radiographs showed changes of periosteal new bone formation over the posterior aspect of the medial malleolus. At operation the tendon sheath was found to be fibrotic and the synovium oedematous, but cultures were negative in all cases. Two of the patients have recovered well approximately one year after operation and the third, after approximately two months, appears to be improving.

The cause of the syndrome and of the associated new bone formation remains uncertain despite extensive laboratory evaluation of these (and previously reported) patients. None had complaints or findings suggestive of previous or co-existent rheumatoid arthritis (Potter and Kuhns 1958); and this disease, known to be associated with periosteal bone formation (Martel 1964), could not be the cause as in each case the history was negative and the histological and laboratory findings uncharacteristic. Two patients had no major systemic disease. The patient in Case 3 complained of chronic bronchitis, but had no evidence of hypertrophic pulmonary osteoarthropathy which is a known cause of pain in the extremities and of periosteal new bone formation (Gall, Bennett and Bauer 1951), but occurs bilaterally. No evidence was found of pyogenic (Capitanio and Kirkpatrick 1970), tuberculous (Bickel, Kimbrough and Dahlin 1953) or fungal infection (Gehweiler, Capp and Chick 1970), and the histological findings were not consistent with pigmented villonodular synovitis, a rare cause of new bone formation (Sherry and Anderson 1955).

The presence of new bone formation in association with tenosynovitis of the posterior tibial tendon appears to be a rather unusual finding and warrants careful evaluation to exclude some of the disorders described above. Surgical decompression was performed in these patients not only to relieve their symptoms but also to exclude the possibility that some more pernicious process such as infection was present. In theory, this decreased the risk of rupture of the tendon, which is a much more difficult problem to treat especially if unrecognised. It is gratifying to report that the patients seem to have been improved by this procedure.
REFERENCES


