fungus may have been dead at the time of the excision.

Our case of subcutaneous phaeohyphomycosis may be second only to that of South et al^2 as originating from California.

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Plantar fibromatosis responds to intralesional steroids

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A case of plantar fibromatosis that responded to five monthly intralesional steroid injections is reported. Improvement was noted after 3 to 4 months of therapy. Intralesional steroid injections may represent an alternative to surgery in patients with plantar fibromatosis or Dupuytren's contractures. (J AM ACAD DERMATOL **12**:212-214, 1985.)

Plantar fibromatosis is a disease that is rarely encountered in the clinical practice of dermatology. It is characterized by a benign nodular proliferation of fibrous tissue associated with the plantar fascia. Over time, the steady growth of the fibrous nodules makes walking difficult. The usual therapy for this problem is wide excision of the plantar fascia. This procedure is painful and can be complicated by postoperative recurrences. We report a case of plantar fibromatosis successfully treated by intralesional steroid injections, as an alternative mode of therapy.

CASE REPORT

A 52-year-old white woman in good general health presented for evaluation of slowly enlarging nodules on the plantar surface of both feet. The lesions first appeared 20 years ago. When they became large enough to cause discomfort while walking, about 10 years ago, she consulted a surgeon, who excised the lesions on the

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Volume 12 Number 1, Part 2 January, 1985



Fig. 1. Appearance of plantar fibromatosis on left foot before initiation of therapy with intralesional steroids.

right foot. Postoperatively, the lesions slowly recurred. Because of the pain involved, the patient elected not to have the same procedure done on the left foot. The patient presented to our clinic because the lesions on both feet were large enough to make walking even short distances painful, "like walking on marbles."

On physical examination, the patient was well nourished and well developed. On the plantar surface of each foot were three or four 1-2 cm firm, discrete, flesh-colored nodules (Fig. 1). They were not tender on palpation and were minimally mobile. The masses on the right foot were adjacent to a scar running the length of the instep. No similar lesions were noted on the palms. The remainder of the physical examination and history was unremarkable.

The biopsy specimen from the previous surgery (10 years ago) was obtained for review. The typical histologic features of plantar fibromatosis were seen. In the deep dermis a markedly sclerotic spindle cell proliferation was present. Areas of intense dermal sclerosis alternated with more cellular areas. No evidence of atypia was seen.

Since the patient was reluctant to undergo further surgery, a trial of intralesional steroid injections was begun. During five consecutive monthly visits, the nodules on each foot were injected with 0.5 to 1.0 ml of triamcinolone acetonide, 40 mg/ml (Aristocort), diluted 3:1 with 1% lidocaine hydrochloride to a final concentration of 30 mg/ml. During the course of therapy, considerable softening of the lesions occurred. Care was taken to avoid injecting the steroid suspension



Fig. 2. Appearance of left foot 4 months after final treatment.

in an area of significant atrophy from previous injections or deeper than the fibromatosis, in order to minimize any effect to vital ligaments or articular structures of the foot. Four months after the final injection, the lesions were much smaller (Fig. 2). The patient felt sufficiently improved to begin jogging.

DISCUSSION

Plantar fibromatosis is a clinical entity characterized by a nodular thickening of the plantar aponeurosis. Nodules may be 0.5 cm to 7 cm in size and are usually located on the medial aspect of the plantar fascia.^{1,2} In most cases an initial solitary lesion appears, followed by more adjacent nodules in sequence.² They are usually asymptomatic until they become large enough to cause pain from pressure while the patient is standing.¹ In a series of sixty-nine cases reported by Allen et al,³ plantar fibromatosis affected men twice as often as women, with most patients presenting in the fourth or fifth decade. In two other series, however, the mean age at diagnosis was younger, with two thirds of the patients presenting in their thirties.³⁻⁵ The disease occurred over a broad age range, patients ranging in age from 10 to 70 years.^{3,6} In 26% of the cases the right foot was involved, in 35% the left foot was involved, and in 39% of the cases, both feet were affected.³

In some patients with plantar fibromatosis, there is a coexistence of some other benign fibroproliferative process. Dupuytren's contracture, a fibromatosis of the palmar fascia, has been reported as coexisting in patients with plantar fibromatosis in 9% to 65% of the cases.^{3,6} Coexistent Peyronie's disease (fibrous cavernitis of the penis) has been reported in 1% to 3%, and knuckle pads were reported in 42%² of patients.^{3,4} The coexistence of these entities may reflect a common pathogenesis. Heredity,^{4,5} alcoholism,^{7,8} and reactive fibroplasia⁹ are cited most frequently as possible causes.

It is interesting to note that there is also an increased incidence of epilepsy in patients with fibromatosis.^{1,2,7,9} This may be related to the fibrogenic effect of anticonvulsant therapy. This effect has been most thoroughly studied in patients treated with phenytoin (diphenylhydantoin). It has been shown in fibroblast cultures that this drug is able to inhibit cellular production of collagenase by 50% to 60%.¹⁰ The result is a net accumulation of collagen, which may be responsible for plantar fibromatosis in genetically susceptible individuals.

The histologic study of plantar fibromatosis shows stellate or spindle-shaped nuclei arranged in whorls. Initially, fibroblasts predominate. In older lesions there is a marked increase in the collage-nous component of the tumor, although cellular areas persist. No atypia is seen.^{5,7,9}

The usual therapy for plantar fibromatosis is excision of the involved tissue. Since excision of the nodules alone results in a 75% recurrence rate,^{1,5} most authors recommend that surgery be deferred as long as possible. When surgery becomes necessary, they recommend complete excision of the plantar fascia.^{1,4,11} Obviously, this procedure is painful, and poor results, such as delayed wound healing and recurrence, can occur.¹¹

Intralesional injection of steroids has been a mainstay of dermatologic therapy for many years. Steroids have been shown to inhibit collagen formation at the level of gene transcription¹² and are well known in clinical practice for their ability to produce dermal atrophy.^{13,14} The mechanism by which atrophy is produced is poorly understood. It seems unlikely that the rapid response observed in our patient was entirely due to inhibition of collagen synthesis. Conflicting results have been reported concerning the effect of corticosteroids on in vitro fibroblast collagen production.¹⁵ It has also been reported that steroids may increase collagenolysis¹⁶ or promote degradation of the pro-

teoglycans and glycosaminoglycans that make up the extracellular matrix.^{17,18} Exactly how steroids participate in the degradation of these dermal extracellular components has not been worked out.

In our patient we were able to produce marked clinical improvement with intralesional steroids. We believe that this therapy may present an alternative to surgery for patients with histologically documented benign fibromatoses, such as plantar fibromatosis and Dupuytren's contractures.

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