The Injection of Nodules of Dupuytren's Disease With Triamcinolone Acetonide

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Over a 4-year period 63 patients (75 hands) with Dupuytren's nodules were treated with a series of injections with the steroid triamcinolone acetonide directly into the area of disease. The purpose of this study was to determine whether intralesional injections of triamcinolone acetonide could produce softening and flattening in nodules of Dupuytren's disease as seen in the intralesional injections of hypertrophic scars and keloids. After an average of 3.2 injections per nodule 97% of the hands showed regression of disease as exhibited by a softening or flattening of the nodule(s). Although some patients had complete resolution of the nodules, most experienced definite but incomplete resolution of the nodules in the range of 60% to 80%. Although a few patients did not experience recurrence or reactivation of the disease in the injected nodules or development of new nodules, 50% of patients did experience reactivation of disease in the nodules 1 to 3 years after the last injection, necessitating 1 or more injections. The findings of this study indicate that the intralesional injection of nodules of Dupuytren's disease with triamcinolone acetonide may modify the progression of the disease. (J Hand Surg 2000;25A:1157–1162. Copyright © 2000 by the American Society for Surgery of the Hand.)

Key words: Intralesional, injection, triamcinolone, nodules, Dupuytren's disease.

A clinical[1] series demonstrating softening and flattening of hypertrophic scars and keloids by the intralesional injection of triamcinolone acetonide was published in 1966.[1] Although some scars showed complete resolution, most scars were reduced by at least 50%. No physical agent, such as x-rays or a chemical, including any form of cortisone, had been previously shown to produce softening and reduction in size of hypertrophic scars and keloids. Triamcinolone is 9-alpha flouro-hydrocortisone. Triamcinolone degrades the insoluble collagen in hypertrophic scars and keloids to salt-soluble collagen, which is absorbed by the body and excreted.[2]

The purpose of this study was to determine whether the intralesional injection of triamcinolone acetonide into nodules of Dupuytren's disease would achieve softening and flattening of the nodules, which are composed of collagen, capillaries, and fibroblasts, which secrete the collagen. It has been our practice to offer patients in the early stages of Dupuytren's disease a series of injections with the steroid triamcinolone acetonide in an effort to modify the progression of the disease. Although we have used this technique for 30 years, our analysis focused on a 4-year period of intralesional injections, which provided data showing the beneficial effects of intralesional injection of triamcinolone.

Materials and Methods

Between January 1986 and January 1990, 63 patients (75 hands) with a diagnosis of Dupuytren's

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disease were evaluated and treated because of a mass in the palm. Although the conventional approach to a patient with a nodule of Dupuytren's disease is to wait until a joint contracture develops and then surgically release it, in our office patients were also given the option of intralesional injection of the nodule with triamcinolone acetonide. The nodule could be any size and there could be more than one. In his experience with injecting nodules of Dupuytren's disease since 1970, one of us observed noteworthy resolution of nodules in the majority of patients who were injected and felt that this form of treatment was a reasonable alternative to waiting for the development of a joint contracture.

During the early stages of this experience of injecting nodules of Dupuytren's disease with triamcinolone several digits with joint contractures were injected. Although resolution of the nodules was frequently observed, improvement of the joint contracture was not seen. None of the patients in this study had a joint contracture of a proximal interphalangeal joint or more than a 15° contracture of a metacarpophalangeal joint at the outset of treatment with triamcinolone injections.

The 63 patients who underwent the triamcinolone acetonide injection were an average age of 55 years. The gender distribution was 38 men and 25 women. The typical patient with Dupuytren's disease has had the disease for 10 years, beginning with a nodule and/or cord.[3] Most of the patients in this study were in the early stages of the disease and characterization as typical or atypical category was impossible.

Dosage

Triamcinolone acetonide was injected directly into a nodule in doses ranging from 60 to 120 mg/injection (Fig. 1). If patients with Dupuytren's disease presented with a joint contracture greater than 15° an injection of the nodule was not recommended; such patients were offered a limited fasciectomy or dermofasciectomy and a full-thickness graft.

The men generally received 100 to 120 mg/injection and the women received up to 80 mg/injection. The dosage was determined by previous studies of the intralesional injection of triamcinolone acetonide into hypertrophic scars and keloids.[1] The area of injection was tender for up to 24 hours but the patients resumed their normal activities the next day. If multiple nodules existed in one hand the nodules were injected in divided doses that did not exceed the maximum totals allowed to avoid adrenal gland suppression. The injections were repeated at 6-week intervals with an average of 3.2 total injections per site (Fig. 2). When more than 3 injections per nodule was required in a series, patients were given a respite of 6 months, after which the intralesional injections were resumed in a series of up to 3 injections 6 weeks apart followed by a respite of 6 months.

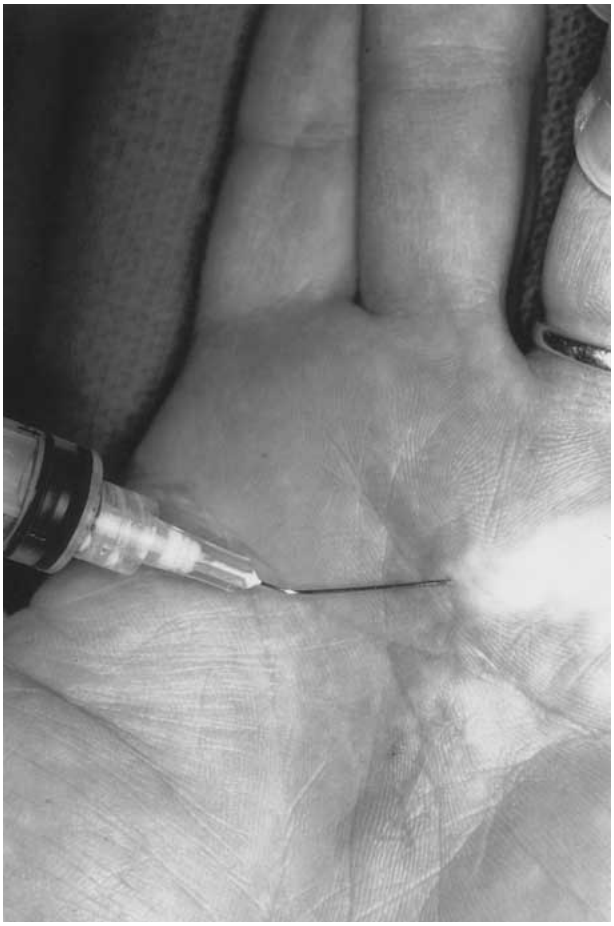

Figure 1. Intralesional injection of triamcinolone acetonide into a palmar nodule of Dupuytren's disease in a 45-year-old man. The needle is bent occasionally to optimize the angle of penetration. The triamcinolone injection is preceded by an injection of lidocaine proximal to the nodule. The lidocaine is not mixed with the triamcinolone because the lidocaine will precipitate it.

The follow-up periods ranged from 30 months to 27 years (average, 65 months) from the time of the first injection. The lengthy follow-up periods occurred because many patients who had a nodule(s) injected in one hand during the 4-year period of the study had an injection(s) in the other hand previously. Several patients in this series had received periodic injections over a 10-year period, initially in one hand and later in the other; this gave us the

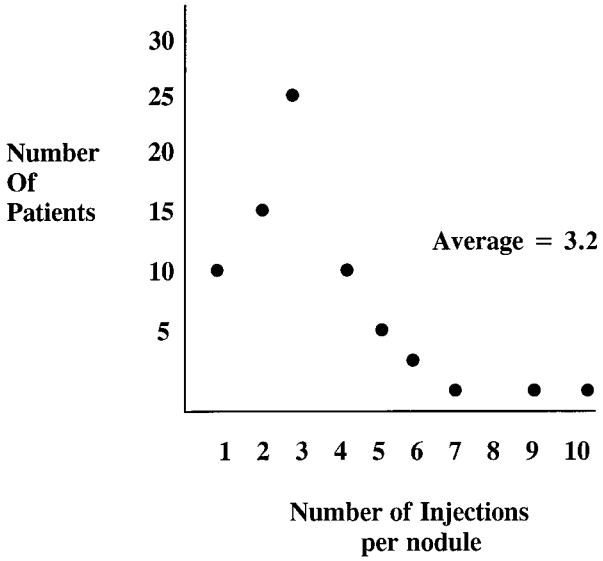

Figure 2. Distribution of triamcinolone acetonide injections into nodules of Dupuytren's disease.

opportunity to monitor the first hand. One patient was monitored for 27 years.

Less than 10% of the patients in the study were diabetic. These patients were advised that each injection would elevate their blood sugar level transiently.

Measurements

A quantitative measurement of nodule reduction was difficult to obtain because measurement of the height of the nodule was arduous. The determination of resolution was based on the ease of penetration of the nodules during subsequent injections, indicating a softening and decreasing density of the nodules. The initial intralesional injection usually required considerable force on the syringe to achieve penetration of the nodules, which are dense and ligneous. In addition, the serial photographs show the reduction of the mass (Fig. 3). This is a qualitative assessment, but a reasonable percentage of resolution can be determined.

Results

In 75 hands (63 patients) undergoing triamcinolone injections into Dupuytren's nodules, all but 2 hands in 1 patient achieved regression of disease (ie, notable softening and flattening of the focus of disease). Little benefit was generally noticed after the first injection in terms of the height of the nodule; almost without exception, the nodules were found to be hard and difficult to infiltrate at the time of the initial injection. The initial injection was considered to be a priming dose. After the second or third injection the results were often impressive. It was considerably easier to infiltrate the nodule compared with the first injection and the height of the nodule was reduced (Fig. 3). This progressive ease of penetration of the nodule by a bolus of triamcinolone indicated softening and decreasing density of the nodules. Photographs obtained before and after a series of injections provided qualitative evidence of mass reduction. Although only half of the patients experienced dysesthesias in the nodules at presentation, the dysesthesias resolved by the second or third injections; dysesthesias were not related to the injections. After an average of 3.2 injections per area of disease in all but 2 hands, 97% of the hands demonstrated 60% to 80% regression of the nodules with softening and flattening of the nodules. Some patients required more triamcinolone after their original series of 3 injections; these additional injections resumed after a 6-month hiatus. Although some patients had complete resolution of the nodules, most experienced definite but incomplete resolution. Although some patients did not experience a recurrence or reactivation of the disease in the injected nodules or development of new nodules, 50% of patients did experience a reactivation of disease in the nodules 1 to 3 years after the last injection, necessitating one or more injections.

Only 1 patient required surgery: a 58-year-old alcoholic woman with bilateral Dupuytren's disease. This patient underwent dermofasciectomy and a full-thickness skin graft for a 40° proximal interphalangeal contracture in the left hand. The right hand received 10 injections over 3 years before she elected to have a dermofasciectomy and full-thickness skin graft to the fourth and fifth digits; however, she continued to have injections in the small nodules that arose in multiple digits, with softening occurring in many of the nodules. Some patients with nodules of Dupuytren's disease did have a minor metacarpophalangeal joint contracture of less than 15°; however, as previously noted, no improvement in joint contracture was noted after injection of the nodule.

Complications

Approximately 50% of patients reported a transient depigmentation or temporary subcutaneous atrophy at the injection site (Fig. 4). No patient found

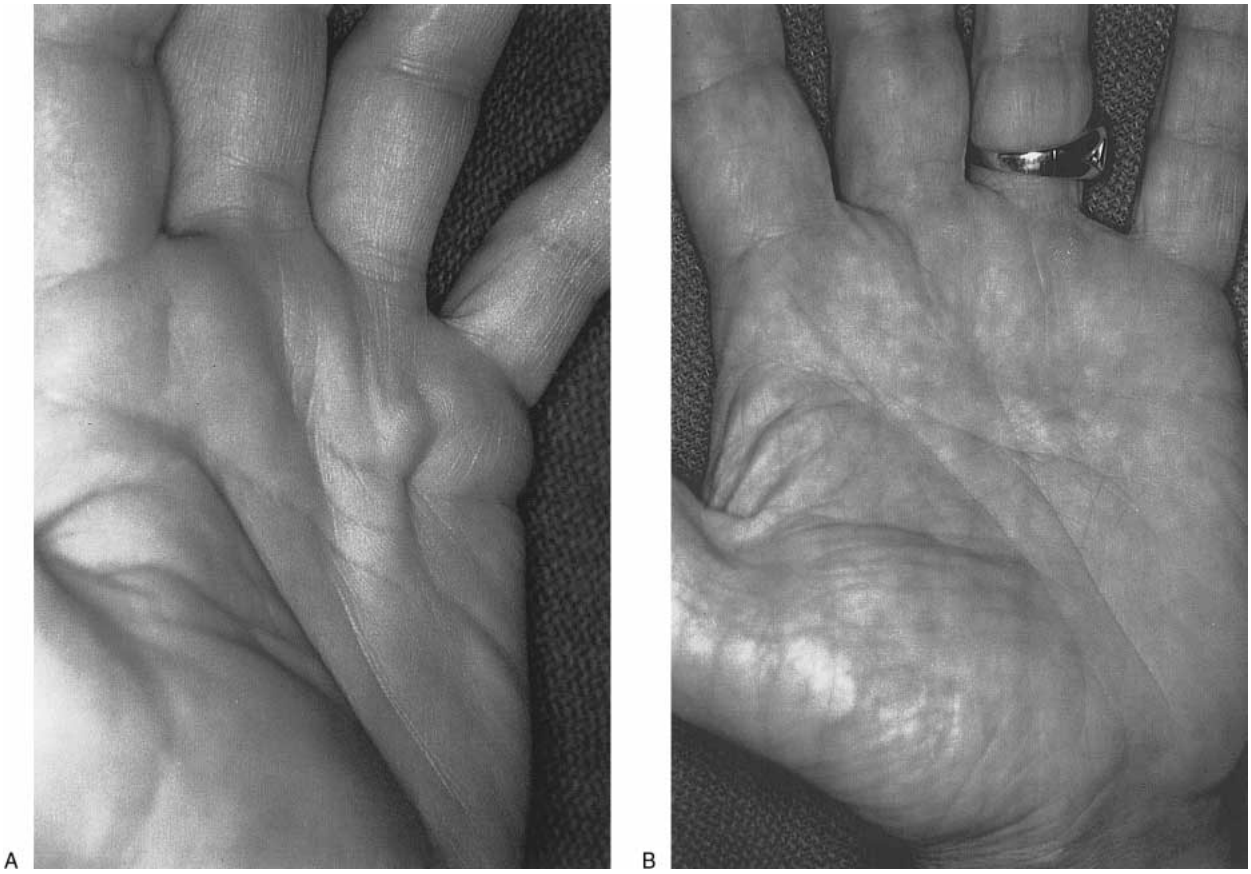

Figure 3. (A) A large nodule of the distal palm in a 55-year-old man that underwent marked resolution after 3 intralesional injections of triamcinolone. (B) One year after injection.

these to be major problems and nearly all saw complete resolution of the atrophy or depigmentation by 6 months after the last injection.

Over the 30 years that one of the authors has been doing these injections, but not in the window of this 4-year study, 2 female patients sustained spontaneous rupture of a flexor tendon. Both were playing golf when the rupture occurred. One had a repair of the flexor tendon and resumed injections for the Dupuytren's disease periodically for the last 5 years. The second patient was lost to follow-up. In both cases the protocol was not followed by a 6-month respite after a series of 3 injections 6 weeks apart. It is strongly recommended that the sequence be followed closely and that the triamcinolone acetonide be injected intralesionally and not beneath the nodule.

No patient in the study expressed dissatisfaction with the process of intralesional injections. Many openly expressed that their disease was being modified in a positive way.

Discussion

The concept of injecting keloids and ultimately nodules of Dupuytren's disease began to form in the 1960s. A dermatologist informed the one of us (L.D.K.) that he was using a new form of cortisone, triamcinolone, which was introduced in 1960, to treat lichens planus, a plaque-like thickening of the dermis, by intralesional injection. The author transferred the concept to injection of hypertrophic scars, an analogous thickening of the skin. He had his colleague inject half of a pruritic hypertrophic scar of the upper arm. In 3 days the pruritis subsided and in 3 weeks the treated half of the scar flattened. During the next 6 years over 200 scars were injected; the great majority experienced a minimum of 50% res-

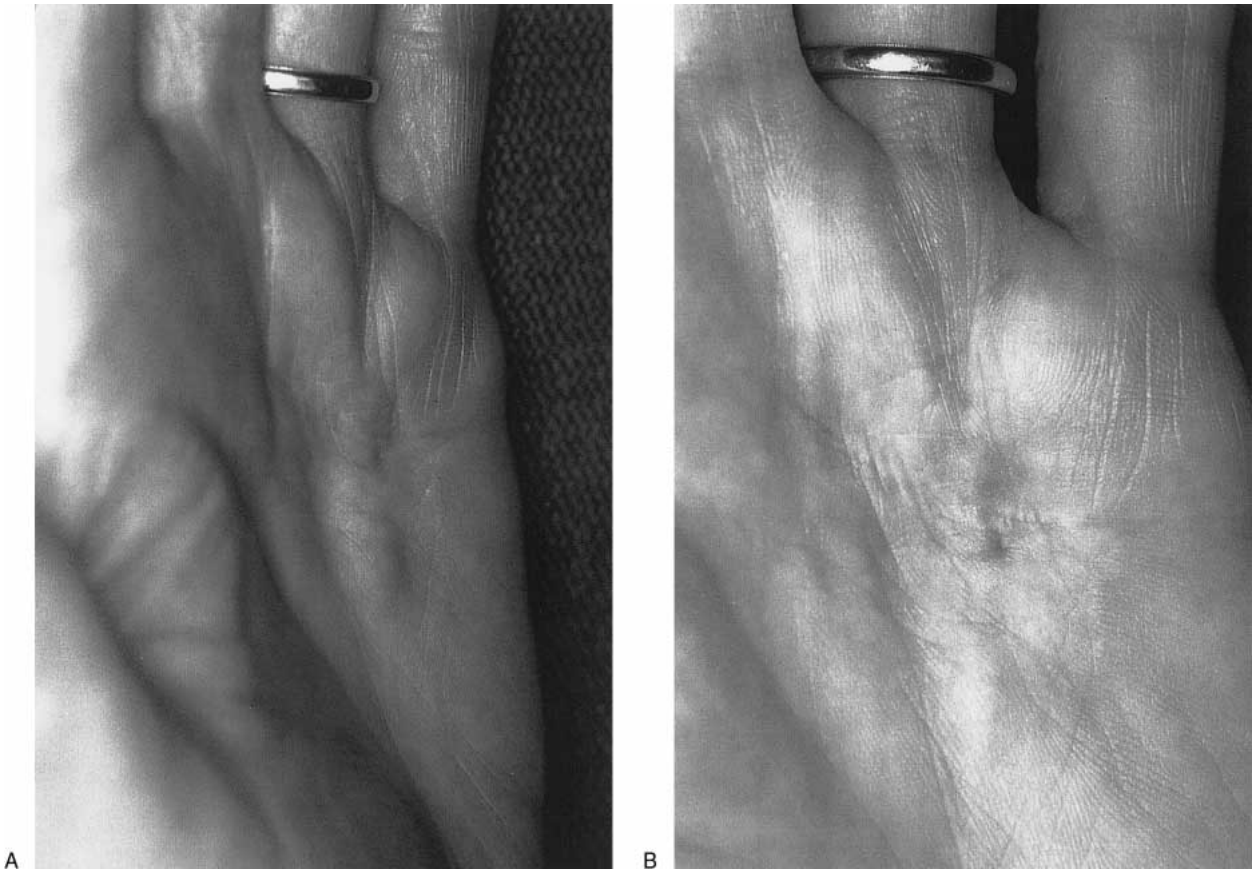

Figure 4. (A) Several nodules of Dupuytren's contracture in the left mid and distal palm of this 53-year-old man responded to 2 series of 3 injections each, 6 months apart. (B) There was noteworthy softening and flattening of the nodules. Depigmentation around the injection site is evident.

olution of the scar after 1 or more intralesional injections.[1] During that period it was demonstrated that whereas hydrocortisone converts insoluble collagen to acid-soluble collagen, which is not absorbed by the body, triamcinolone degrades insoluble collagen to salt-soluble collagen, which is absorbed and excreted by the body.[2]

Because of the high concentration of collagen in nodules of Dupuytren's disease and the increased ratio of type III to type I collagen, which is an abnormal finding similar to that found in hypertrophic scars and granulation tissue,[4] it was felt that intralesional injections of triamcinolone acetonide may have a beneficial effect by softening and flattening them. The first intralesional injection of a nodule of Dupuytren's disease was done in 1970. Since then we have injected more than 400 patients with one or more nodules of Dupuytren's disease in 1 or both hands with 1 or more series of injections.

An additional effect of triamcinolone is that of diminishing fibroplasia in a healing wound. Houck and Patel[5–6] noted that when injected within 24 hours in the healing wound, triamcinolone retards the fibroblast response. This may explain why, in addition to the nodules becoming softer and flatter, further activity is diminished or abated for months or years in many patients (Fig. 5).

The injection of nodules is felt to be another conservative adjunct in the treatment of Dupuytren's disease that can be used before the development of cords and/or joint contracture or in conjunction with collagenase enzymatic injection of cords in the later stage of the disease.[7] Most of the patients in this series were in the earliest stages of Dupuytren's disease. Some had aggressive disease with multiple nodules. As noted, 1 patient went on to develop a contracture despite injections. If a patient presented with florid disease with multiple nodules and mul-

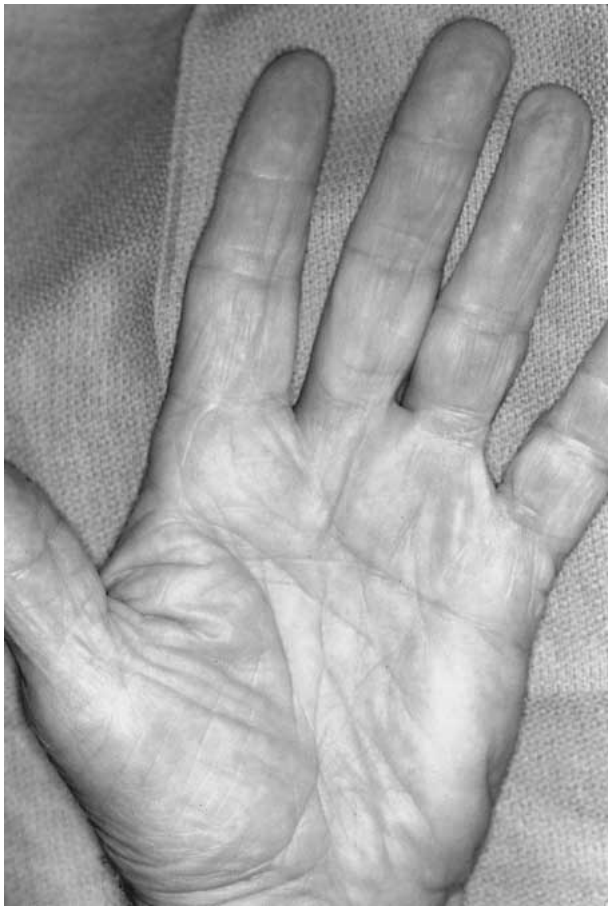

Figure 5. A nodule of Dupuytren's disease in this 80-year-old man's distal palmar crease in line with the ring finger was injected 27 years previously. It flattened and has not reactivated. He had a dermofasciectomy in his other hand in 1970 for joint contracture when he developed a nodule in his left hand. He elected to have an intralesional triamcinolone injection in an effort to diminish the nodule and possibly modify the course of the disease in that hand.

tiple contractures, it is our practice to proceed directly to dermofasciectomy and resurfacing with full-thickness skin grafts taken at a distance from the hand.[8]

An accepted concept of Dupuytren's disease is that if no major contracture accompanies a nodule treatment is delayed until a contracture develops.[9] It is our opinion that treatment need not be delayed and that if the early nodular form of the disease is treated with intralesional injections of triamcinolone acetonide, the nodules can become smaller and softer, as they did in 73 of the 75 hands in this study.

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