Prospective study of the conservative treatment of trigger finger: evaluation of 131 fingers

Estudo prospectivo do tratamento conservador do dedo em gatilho: avaliação de 131 dedos

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ABSTRACT

Objective: To demonstrate the progression of individual trigger fingers treated conservatively by corticosteroid injection.

Method: Data on 131 fingers subjected to corticosteroid injection was gathered from March 2006 to September 2007. Affected fingers were classified according to Green’s classification. Results were assessed after 30, 60 and 180 days and no more than three injections were done per digit.

Results: Results were described and evaluated according to the involvement grade and the affected digit. The dominant hand was the most affected; the thumb was the most affected individual digit. Most digits were grade II. At the end of treatment 115 fingers were symptom-free; only 16 digits required surgery.

Conclusion: Corticosteroid injection is an effective, safe and low-cost method. Insulin-dependent diabetes mellitus patients and grade III B patients submitted to corticosteroid injection with no success may require surgery.

Keywords: Trigger finger disorder/drug therapy; Stenosing tenosynovitis; Adrenal cortex hormones/therapeutic use; Anti-inflammatory agents/therapeutic use; Prospective studies.

INTRODUCTION

Trigger finger, or stenosing tenosynovitis, may be defined as a condition characterized by snapping or locking of fingers (with or without pain). The first annular finger pulley operates as a tunnel within which the flexor tendon rests. It has been postulated that this tunnel is the cause of focal tendon degeneration, resulting in thickening of the sheath and nodules on tendons. The nodule increases the diameter of the tendon when it enters the flexor sheath, which interferes with the gliding mechanism of the first annular pulley (1-2).

The first descriptions of trigger finger date from 1850 and 1859, in which Nelaton and Notta, in Paris, described tendon sheaths in cadavers, including the portion currently known as the A1 pulley, and other...
pulleys\textsuperscript{(3-4)}. In 1895, Jeannin studied 12 patients and described the pathology and probable etiologies\textsuperscript{(5)}.

The etiology remains unknown\textsuperscript{(6)}, but it may be associated with the use of certain tools, such as gardening shears, crutches, household chores, and heavy work, which cause minor trauma in the palm due to repetitive strain\textsuperscript{(2,7-8)}.

In 1972, Houston and Wilson conducted an anatomical study and showed that the spiral arrangement of the intratendinous fiber architecture could facilitate the development of nodules distal to the A1 pulley\textsuperscript{(9)}.

The condition may be considered as primary or idiopathic if only one digit is affected and if there is no underlying disease, or secondary if multiple digits are involved or if there is an associated condition, such as the carpal tunnel syndrome, the Quervain’s tenosynovitis, \textit{diabetes mellitus}, osteoarthritis, rheumatoid arthritis or hypothyroidism\textsuperscript{(2,6,10-14)}.

Trigger finger affects mainly women aged from 50 to 59 years\textsuperscript{(1,6-7,11-12,15-16)}; it is considered rare in the black race\textsuperscript{(2)}.

The thumb is the digit most often involved, followed by the ring, the middle, the little and the index fingers. The dominant hand is affected about four times more often than the non-dominant hand\textsuperscript{(2,6-7,8,11,16-17)}.

In most cases the diagnosis is clinical. Trigger finger may be classified, depending on the symptoms, into four types, according to Green (1997)\textsuperscript{(18)}:

- grade I (or pre-trigger): patients present only local pain;
- grade II (or active): patients present the trigger, but can actively extend the digit;
- grade III (passive): divided into grade IIIA – extension of digit requires passively moving the finger; and grade IIIB – incapable of flexing the digit;
- grade IV (contracture): patients present fixed flexion (contracture) of the proximal interphalangeal joint of the digit.

Therapy ranges from rest to corticosteroid injections, oral anti-inflammatory drugs, percutaneous release drugs, physical therapy, orthoses and surgery\textsuperscript{(1,7,19-20)}.

Many authors defended corticosteroid injection as the first line treatment for trigger finger; it is considered a simple, easily performed and low-cost method, compared to surgery\textsuperscript{(7,12-13,16)}.

OBJECTIVE

The purpose of this study was to show the progression of individual trigger finger in various grades, following conservative therapy with corticosteroid injections.

METHODS

Patients seen at the Hand Surgery Outpatient Unit at Hospital do Servidor Público Municipal de Sao Paulo (HSPM), were selected if trigger finger was present and included in the study.

Exclusion criteria were patients that had already been treated with corticosteroid injections by other researchers, immunosuppressed patients, those allergic to the medication used in therapy, patients with decompensated underlying disease (arterial hypertension, diabetes, rheumatoid arthritis, etc), patients with pediatric tenosynovitis (congenital trigger digit) or those that for any reason did not wish to participate in the study.

There were 131 treated digits from 121 patients seen at the outpatient unit of HSPM from March 2006 to September 2007, with a history of trigger finger.

Patients were allocated according to the involvement grade of each digit (see classification above).

Relevant information such as sex, age, dominant hand, involved digit, main complaint, duration of disease, and associated diseases were recorded according to a previously defined protocol. The same researcher carried out the consultations and the procedure. The diagnosis was made clinically in all cases; no additional exams were required.

Asepsis was performed with alcohol 70\%, followed by an injection of methylprednisolone acetate 40 mg (Depomedrol\textsuperscript{®}) and lidocaine (1 ml) without vasoconstrictor.

The injection technique consisted of inserting a 13 x 0.45 needle (attached to a 5 ml syringe) into the first annular pulley of the involved digit. The needle was introduced at a 45° angle on the metacarpal longitudinal axis.

A compressive dressing was applied after injection and each patient was instructed to rest (only on the day of the procedure), to apply ice locally, and to take a systemic analgesic (paracetamol) in case of pain.

Patients were assessed 30, 60, and 180 days after corticosteroid injection. In these visits, intercurrent events, complaints (improving, worsening or unstable symptoms), time until symptoms subsided, and skin changes, such as patches and trophic alterations on the injection site. Pain analysis was conducted using the visual pain scale.

Patients were deemed asymptomatic when returning with no complaints about the condition and the absence of complaints was maintained for six months.

No more than three injections were done\textsuperscript{(10-12,21)}.

Patients were scheduled for surgery if symptoms worsened or remained unchanged for 180 days.
RESULTS

Of 131 digits, 119 belonged to female patients and 12 to male patients; the ratio was 9:1.

After a six-month follow-up period, one digit belonging to a male patient and 15 digits of female patients were operated (12.2%).

Most patients were white (57.2%); 42.8% were brown or black. There were no Asian patients.

The thumb was involved most often (57 digits), followed by the middle finger (40 digits), the ring finger (31 digits), the index finger (2 digits), and the little finger (1 digit).

Digits from the dominant limb were involved in 57.3% of cases compared to non-dominant digits (42.7%). Table 1 shows the involvement grade of digits.

The time from onset of symptoms varied significantly; it was three months or less in 64.9% of patients, three to six months in 17.6% of patients, and over six months in 17.6% of cases.

Table 1. Sample distribution according to the variable initial grade

<table>
<thead>
<tr>
<th>Initial grade</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>8</td>
<td>6.1</td>
</tr>
<tr>
<td>II</td>
<td>56</td>
<td>42.7</td>
</tr>
<tr>
<td>IIIA</td>
<td>36</td>
<td>27.5</td>
</tr>
<tr>
<td>IIIB</td>
<td>29</td>
<td>22.1</td>
</tr>
<tr>
<td>IV</td>
<td>2</td>
<td>1.5</td>
</tr>
<tr>
<td>Total</td>
<td>131</td>
<td>100</td>
</tr>
</tbody>
</table>

The main complaint was pain (57.3%), followed by locking (18.3%), and difficulty in flexing the digit (11.5%). Palpable nodules were found in 89 digits; there were no nodules in 42 digits.

The main complaint and the presence or absence of nodules did not statistically alter the results. Only 24.4% of patients had no associated diseases.

Symptoms subsided within a week in over half of the involved digits (69.5%); symptoms did not improve at all after corticosteroid injection in only 24.4% of digits (Table 2).

Sixteen patients underwent surgery; of these, 68.75% were white and 31.25% were brown and black.

Table 2. Sample distribution according to the variable affected finger and with no symptoms after six months

<table>
<thead>
<tr>
<th>Affected finger</th>
<th>No symptoms after six months</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thumb</td>
<td>Yes: 50, No: 7, Total: 57</td>
<td>12.2</td>
</tr>
<tr>
<td>Index</td>
<td>Yes: 1, No: 1, Total: 2</td>
<td>50</td>
</tr>
<tr>
<td>Middle</td>
<td>Yes: 37, No: 3, Total: 40</td>
<td>7.5</td>
</tr>
<tr>
<td>Ring</td>
<td>Yes: 27, No: 4, Total: 31</td>
<td>12.9</td>
</tr>
<tr>
<td>Little</td>
<td>Yes: 0, No: 1, Total: 1</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>115</td>
<td>16</td>
</tr>
</tbody>
</table>

In patients treated initially within six months of onset of symptoms, 30% underwent surgery; in patients treated after six months of onset, 21.7% were operated.

Among associated diseases, insulin-dependent diabetes mellitus stood out relative to symptom improvement. In these patients, 5 of 14 treated digits did not progress favorably (Table 3). Other conditions did not interfere with the final results.

Table 3. Sample distribution according to the variable insulin-dependent DM and result after six months

<table>
<thead>
<tr>
<th>Insulin-dependent DM</th>
<th>No symptoms after six months</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>No</td>
<td>106</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td>115</td>
<td>16</td>
</tr>
</tbody>
</table>

During therapy it was found that 48.8% of treated digits were symptom-free within the first month. In the remaining fingers, 100% of grade I digits also progressed satisfactorily. Surgery was required in 23.8% of grade II digits, in 22.2% of grade IIIA digits, and in 100% grade IIIB digits six months after the first corticosteroid injection (Table 4). It was not noted complications or complaints following corticosteroid therapy.

Table 4. Sample distribution according to the variable initial grade and results after six months

<table>
<thead>
<tr>
<th>Initial grade</th>
<th>No symptoms after six months</th>
<th>% with no symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>8</td>
<td>100</td>
</tr>
<tr>
<td>II</td>
<td>50</td>
<td>89.2</td>
</tr>
<tr>
<td>IIIA</td>
<td>30</td>
<td>83.3</td>
</tr>
<tr>
<td>IIIB</td>
<td>25</td>
<td>86.2</td>
</tr>
<tr>
<td>IV</td>
<td>2</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>115</td>
<td>131</td>
</tr>
</tbody>
</table>

DISCUSSION

Trigger finger is one of the most commonly found conditions in orthopedic and hand surgery outpatient clinics.

Women are more affected than men, in a 3:1 ratio. The mean age of onset is 50 to 59 years. It was found that the ratio above is higher than that in our unit (9:1); the mean age, however, was similar. The dominant limb was affected more often.

This condition affects more white patients, but may also occur in brown and black patients. It is rare in Asians.
The thumb is the most frequent site of tenosynovitis, followed by the middle and ring digits.

Grade II (active) is the most common; most patients present with pain, which is the dominant symptom. The mean duration of symptoms before therapy is three months.

Diseases such as arterial hypertension, diabetes mellitus, carpal tunnel syndrome, thyroid conditions, rheumatoid arthritis, and other, were found in 75.6% of patients.

Abnormal collagen metabolism is an important factor in the pathogenesis of tenosynovitis in diabetic patients. Hyperglycemia increases peritendinous collagen and fibrous tissue proliferation in the tendon sheath, leading to stenosis.

Published papers have shown that insulin-dependent diabetes mellitus patients respond worse to corticosteroid injection than other patients; this was demonstrated in the present study, in which improvement in such patients was up to five times worse after six months.

Use of corticosteroid injections for treating musculoskeletal lesions has always been controversial.

In the middle of the year of 1950, use of corticosteroid injections in the treatment of stenosing tenosynovitis was shown to provide clinical benefit.

As long as patients tolerate the treatment well, it is preferable to inject corticosteroids with lidocaine as the initial treatment of trigger finger.

We found that time did not alter our results, as opposed to various papers reporting that patients with symptoms lasting over six months are more likely to undergo surgical therapy, which altered their final results.

The severity of symptoms is not a contraindication for conservative therapy, as all of our treated grade IV patients had a 100% cure rate.

A corticosteroid injection should be applied in grade I patients with significant pain that do not improve with anti-inflammatory drugs, as an attempt to improve the symptoms.

Only 16 of 131 digits in this sample required surgery. We found that about 49% of digits require no further treatment after the first corticosteroid injection; other authors have also reported this finding.

The middle digit responded best to therapy, followed by the thumb and the ring digit. A worse response was seen in the index and little fingers; however, the sample of affected digits is too small for a comparison with the first three.

Recurrences may occur within six months; a good result in this period is usually attained. Persistent symptoms with no improvement after three corticosteroid injections indicate the need for surgery. The present study confirms the safety of corticosteroid injections in the treatment of trigger finger, since there were no side effects described in the 131 digits.

It is not worth that we found no published paper comparing the grades of trigger finger and the results of conservative therapy with corticosteroid injections.

CONCLUSIONS

Local corticosteroid injection is the first choice therapy for treatment of flexor tenosynovitis, since it is easily performed, has a low complication rate and a low cost.

Insulin-dependent diabetes mellitus patients and grade IIIB patients who were treated with one corticosteroid injection, and had an unfavorable progression, may be referred to surgery.

REFERENCES


