Clinical Observations

Clinical Treatment of the Stenosing Tenovaginitis of Flexor Digitorum by Micro-wound Technique Using Hooked Needle-shaped Surgical Knife

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Objective: To observe the therapeutic effect and safety of using the hooked needle-shaped knife to treat the stenosing tenovaginitis of flexor digitorum.

Methods: Sixty outpatients were divided into a treatment group of 30 cases treated by using the hooked needle-shaped knife, and a control group of 30 cases treated by block therapy. 6 months later, the alleviation of pain in the affected finger during movement, under pressure, traction and finger-bending anti-resistance was compared before and after treatment.

Results: The alleviation of pain during movement, under pressure, traction and finger-bending anti-resistance was much better in the treatment group than that of the control group ($P<0.01$), with an effective rate of 93.3% in the treatment group and 80.0% in the control group ($P<0.01$).

Conclusion: The micro-wound technique using the hooked needle-shaped knife has definite effect and safety for stenosing tenovaginitis of flexor digitorum.

Keywords: needle-shaped surgical knife; block therapy; stenosing tenovaginitis; micro-wound technique

In the authors’ hospital, the stenosing tenovaginitis of flexor digitorum is mainly treated by block therapy or by micro-wound technique using the needle-shaped surgical knife. In recent years, the authors have achieved therapeutic results by using the hooked needle-shaped surgical knife to treat stenosing tenovaginitis.

METHODS

General Data

Sixty outpatients, 44 females and 16 males, aged 34–69 years (56 on the average), treated at Wangjing Hospital from 2007–2009. The study was carried out with the approval from the Ethics Committee of Wangjing Hospital. Informed consent was obtained from all the study subjects. The patients were divided into a treatment group and a control group by the registering number, 30 cases in each group. Among them, 16 cases had stenosing tenovaginitis in the left thumb, 28 cases in the right thumb, 3 cases in the left index finger, 1 case in the right index finger, 8 cases in the right middle finger, 1 case in the left ring finger and 1 case in the right ring finger. Their illness course lasted from 1 month to 1 year, 3 months on the average. All the patients had pain, snap and / or strangulation in their affected fingers with limited flexion and extension. There was no obvious difference in the basic condition before treatment between the two groups ($P>0.05$).

Standard of Diagnosis and Division of Stages

The affected finger can not move flexibly with local aching pain. The symptoms are more obvious after getting up in the morning or after hard manual labour. Tenderness is found in the palmar side of finger joint with a node touched. It is difficult for the affected finger to flex or extend with snap or strangulation. Stage I means that local pain and tenderness can be found the palmar side of finger joint but with no snap, and with normal flexion and extension. Stage II means that snap can be heard when the affected finger is bending and stretching, but the snap can be eliminated or alleviated after movement, and flexion and extension can be actively done. Stage III means that snap or strangulation frequently appears when the affected finger is bending and stretching with limited flexion and extension.

Inclusive Standard

The patients aged 20–70 with stenosing tenovaginitis at stage II and III, with other therapies stopped for over 1 month, given no treatment before by needle-shaped surgical knife, block therapy or surgical operation.

Exclusive Standard

The patients not conforming to the above standard of diagnosis and division of stages, and those having diabetes or severe diseases of the liver and kidney.

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Therapeutic Methods
1. Micro-wound technique using the hooked needle-shaped surgical knife:
   1) A piece of holed cloth is put on the routinely sterilized palm of the affected hand. 2) The surgeon wearing a pair of aseptic gloves injects 2 mL of 1% lidocaine into the skin around the hard node at the joint of the affected finger for local anesthesia. 3) A hooked needle-shaped surgical knife is inserted into the skin from the anesthetizing point to push away the fat connective tissue toward the proximal side, reaching the place between the thickened tendon sheath and node. Then, the knife is vertically thrust into the tendon sheath wall, with an angle of 45° made between the knife handle and the skin, to slowly cut the tendon sheath towards the distal end for relaxing the thickened tendon sheath wall and cyclic ligament. The cutting is done 3–5 times until the sensation of resistance disappears. A successful operation is marked by free flexion and extension of the affected finger with disappearance of snap and/or strangulation. 4) The wound is covered with aseptic absorbent cotton, which is fixed with adhesive tape and bandaged for 5 days.

2. Block therapy:
   1) With the palm facing upward, the routine sterilization is given with the root of affected finger as the center. 2) A 10 mL syringe is used to draw 20 mg Quannaide (produced by Kunming Jida Pharmaceutical Company), 2% lidocaine 1 mL and normal saline 1.5 mL. 1.5 mL of the solution is first injected into the hard node and the surrounding painful points. Then, the needle is lifted to the subcutaneous layer, and obliquely thrust about 2 mm along the tendon sheath in the direction of finger tip, with the needle tip entering the sheath towards the distal end, and 0.5–1 mL of the solution injected. 3) After the needle has been withdrawn, the injecting point is covered with aseptic absorbent cotton, which is fixed with adhesive tape for two days.

The Indexes Observed
The pain in the affected finger during movement, under pressure, traction and finger-bending anti-resistance was recorded, and compared between the two groups 6 months later. The extent of pain was quantified with the 11-point numerical rating scale (NRS), and the extent and improvement of pain were recorded.

The snap of the strangulation finger were observed in the two groups.

Criteria for the Therapeutic Effect
Cured: The local pain and tenderness disappeared, with normal movement of the finger and without snap or strangulation. Markedly effective: The local pain disappeared, tenderness was alleviated, with normal movement of the finger and without snap or strangulation. Improved: Local pain and tenderness were alleviated, movement was slightly limited but with no snap or strangulation. Failed: Local pain and tenderness remained, with limited movement, and snap or strangulation.

Statistical Processing
Statistical processing was made with SPSS13.0 software, which are expressed with \( \bar{x} \pm s \). \( t \) test was used for the alleviation of pain in the affected finger in the two groups. Rank sum test was used for the effective rate. Obvious bound is determined as 0.05

RESULTS
Evaluations were made 6 months later. No adverse reactions were found in the two groups.

Comparison of Improvement of Pain in the Affected Finger after Treatment (Table 1)
The pain in the affected finger during movement, under pressure, traction and finger-bending anti-resistance was alleviated after treatment in both the two groups with better results achieved in the treatment group than that of the control group (\( P<0.01 \)).

Comparison of Therapeutic Effects between the Two Groups (Table 2)
According to the criteria for evaluating therapeutic effects, the effective rate was higher in the treatment group than that of the control group (\( P<0.01 \)), indicating that the therapeutic effect in the treatment group was better than the control group.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Cases</th>
<th>Pain during movement</th>
<th>Local tenderness</th>
<th>Pain under traction</th>
<th>Pain under finger-bending anti-resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment group</td>
<td>30</td>
<td>5.520±0.122</td>
<td>5.480±0.138</td>
<td>5.350±0.143</td>
<td>6.520±0.122</td>
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<tr>
<td>Control group</td>
<td>30</td>
<td>2.930±0.142</td>
<td>2.810±0.171</td>
<td>4.120±0.993</td>
<td>4.050±0.218</td>
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<tr>
<td>( t ) value</td>
<td></td>
<td>13.218</td>
<td>11.522</td>
<td>5.701</td>
<td>8.982</td>
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<tr>
<td>( P ) value</td>
<td></td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
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</table>

<table>
<thead>
<tr>
<th>Groups</th>
<th>Cases</th>
<th>Cured</th>
<th>Obvious effect</th>
<th>Effectiveness</th>
<th>Ineffectiveness</th>
<th>Total effective rate</th>
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<tr>
<td>Treatment group</td>
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<td>26</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>93.33%</td>
</tr>
<tr>
<td>Control group</td>
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<td>11</td>
<td>8</td>
<td>5</td>
<td>6</td>
<td>80.00%</td>
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</table>
DISCUSSION

Stenosing tenovaginitis of flexor digitorum is caused by injury of the muscle tendon due to frequent hard manual labour and by obstruction of channels due to invasion by wind, cold and dampness. Modern medicine attributes the disease to aseptic inflammation of the tendon and sheath. The repeated attacks of the disease with pain, snap and strangulation are caused by the thickened sheath wall and narrowed sheath pipe due to edema of the tendon sheath and by swelling of the muscle tendon due to inflammation.

Chronic injury of the soft tissues is caused by imbalance of “the dynamic equilibrium”, pathologically manifested by adhesion, scar, contracture and obstruction. In daily life, the friction between the tendon and sheath of flexor digitorum become far greater when the finger is bending during holding, grasping and pinching, thus causing imbalance of “the dynamic equilibrium”. The imbalance and excessive hard work may easily cause chronic inflammation of the tendon sheath to form adhesion, scar, contracture and obstruction, making the finger unable to carry out the normal physiological activities.

In treatment of the stenosing tenovaginitis of flexor digitorum, the hooked needle-shaped surgical knife can easily remove the adhesion and cut open the narrowed tendon sheath pipe, and thoroughly relieve the oppression, reduce the local pressure, improve micro-circulation and promote resorption of the inflammatory substances, with satisfactory short-term and long-term therapeutic effects of relieving pain, and eliminating snap and strangulation. The block therapy, with inhibition of inflammation to relieve the swelling and pain, can not radically solve the problem of narrowed tendon sheath, hence poorer in the long-term therapeutic effect.

The micro-wound technique using the hooked needle-shaped surgical knife is developed in recent years, which has been well accepted by the patients for the satisfactory effects achieved with the minimum anatomical injury and physiological interference, less bleeding, shorter course of treatment, and by the safety with no infections and complications.

REFERENCES


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