Comparative Study of Functional Outcome of Open Versus Percutaneous Release of A1 Pulley for Trigger Finger

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ABSTRACT

INTRODUCTION: Trigger finger is caused by entrapment of flexor tendon by thickening at entrance to its sheath especially at A1 pulley; on forced extension it passes the constriction with a snap(‘triggering’)conservative management of trigger finger consists of NSAIDs, splinting and steroid injection into the tendon sheath. Failure of conservative management is indication of surgical release. Surgical release can be done by open or percutaneous methods. The functional outcome of open versus percutaneous release has not been studied in our set up. So the purpose of this prospective study is to compare the functional outcome of open versus percutaneous release of A1 pulley of trigger finger.

METHOD: This was a prospective observational study done in Bir Hospital, NAMS in total 60 patients. Open release was done in 30 patients and percutaneous release in 30 patients. Pre operative, 1 week post operative and 12 week postoperative pain by Visual analogue Scale (VAS) score, range of motion and post operative complications were compared in both groups.

RESULT: There was no significant difference in functional outcome in both the groups.

CONCLUSION: We concluded that functional outcome is equally good in both the groups, however due to lesser expenses, less morbidity, less risks of wound complications percutaneous release may be better choice of procedure.

KEY WORDS: Trigger finger, open release, percutaneous release

INTRODUCTION

Trigger finger is a condition that occurs when the gliding movement of the tendon is blocked by the osteofibrous canal of the A1 pulley, preventing the tendon from naturally extending and returning to its initial position.1 Although synovial proliferation and fibrosis of flexor sheath are identified as triggering factors, true cause and its etiology remains unknown.2

Trigger finger was first described by Notta in 1850.3 Any digit may be affected but but thumb, ring and middle fingers are most commonly affected. Sometimes several fingers are affected. The patient notices a click as the finger is flexed. When the hand is unclenched the affected finger initially remains bent at proximal interphalangeal joint but with further effort it suddenly straightens with a snap. Patient may notices a lump or knot in the palm. The lump may be the thickened area in the first annular part of the flexor sheath.

Treatment of the trigger finger depends upon stage of the disease. Grade I can be treated by conservative method like NSAIDs, splint immobilization and steroid injection into the tendon sheath. Grade II to IV can be treated by open or percutaneous release of A1 pulley. Surgical release reliably provides relief from the problems for most patients. Persistence of triggering is more often seen than recurrence and is due to incomplete release at the time of procedure.

The condition has a reported incidence of 28 cases per 100000 populations per year, or a lifetime risk of 2.6% in the general population.4 This rises to 10% in patients with diabetes. Incidence occurs in two peaks, the first under the age of 8 and the second(more common) in the fifth and sixth decades of life.5
METHOD

This is a prospective observational study done in outpatient department of Bir Hospital from September 2013 to August 2014. Patients with trigger finger not responsive to conservative method like NSAIDs, local steroid injection, patient with grade II, III, and IV of all age and sex group were included. Patients with grade I, patient with diabetes mellitus patient unwilling to give written consent were excluded from the study. The study was done after the approval given from the Institutional Review Board of National Academy of Medical Sciences. All selected patients were randomized to one of two groups by alternative selection. Group one was allocated for open release and group two for percutaneous release. Both procedures were performed in outpatient department with the use of local anaesthesia of 1% lignocaine.

OPEN TECHNIQUE

The transverse incision was given in a skin crease at the level of the metacarpal head. The A1 pulley was released. Any residual triggering was tested by active flexion of the affected digit. The skin was closed with 3-0 prolene suture. A compressive bandage was applied.

PERCUTANEOUS TECHNIQUE

The affected digit was placed in extension. At the level of A1 pulley an 18 gauge needle was inserted and the bevel was oriented so that it was longitudinally aligned parallel to the flexor tendon. The needle was moved proximally and distally in the A1 pulley till the grating sensation was felt. When the grating sensation eliminated the needle was removed and checked for triggering of the digit. Small adhesive bandage was kept.

The patient was evaluated for preoperative, 1 week post operative, and 12 week post operative pain, range of motion of interphalangeal/proximal interphalangeal joint of finger, and post operative complications. The functional outcome was assessed in these three domain. Data was processed and analyzed statistically in Microsoft Office Excel 2007 and SPSS ver.20 programme by using Pearson chi-square test for qualitative analyses and ‘T’ test for quantitative analyses. P value less than 0.05 was taken as statistically significant.

RESULT

A total number of 66 patients with 66 trigger finger were included in the study but 6 patients with 6 trigger finger were lost in follow up and couldn’t be traced. So the remaining 60 patients with 60 trigger finger were included in this study.

Table 1. Demographic distribution and Hand dominance

<table>
<thead>
<tr>
<th>Variables</th>
<th>Open group</th>
<th>Percutaneous group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Age</td>
<td>45.10±13.01</td>
<td>46.20±12.46</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>13</td>
<td>15</td>
</tr>
<tr>
<td>Female</td>
<td>17</td>
<td>15</td>
</tr>
<tr>
<td>Hand Dominance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right</td>
<td>18</td>
<td>20</td>
</tr>
<tr>
<td>Left</td>
<td>12</td>
<td>10</td>
</tr>
</tbody>
</table>

Table 2. VAS score of both groups

<table>
<thead>
<tr>
<th>VAS score</th>
<th>Open Group</th>
<th>Percutaneous Group</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-op VAS score(VAsp)</td>
<td>6.93±0.971</td>
<td>6.88±0.830</td>
<td>0.789</td>
</tr>
<tr>
<td>1 week post-op VAS score(Vas1)</td>
<td>3.30±0.794</td>
<td>3.53±0.671</td>
<td>0.210</td>
</tr>
<tr>
<td>12 week post-op VAS score(Vas12)</td>
<td>0.16±0.406</td>
<td>0.10±0.442</td>
<td>0.542</td>
</tr>
</tbody>
</table>

Table 3. Active PIP/IP joint ROM of both groups.

<table>
<thead>
<tr>
<th>Active PIP/IP joint ROM</th>
<th>Open Group</th>
<th>Percutaneous Group</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-op ROM (ROMp)</td>
<td>87.73±9.878</td>
<td>88.11±9.442</td>
<td>0.936</td>
</tr>
<tr>
<td>ROM 1 week post-op (ROM1)</td>
<td>84.86±10.153</td>
<td>84.77±10.089</td>
<td>0.416</td>
</tr>
<tr>
<td>ROM 12 week post-op (ROM12)</td>
<td>87.26±9.742</td>
<td>87.53±9.899</td>
<td>0.974</td>
</tr>
</tbody>
</table>
In our study age and sex distribution was almost similar in both the groups. Right hand was more dominant in both the groups (Table 1). Preoperative, 1 week postoperative, 12 weeks post operative Visual analogue scale score (VAS Score) is also similar in both the groups (Table 2). Preoperative, 1 week postoperative, and 12 weeks postoperative range of motion (ROM) of both the groups is similar (Table 3). Similarly postoperative complications in both the groups are comparable (Table 4).

Among 60 cases, excellent outcome was in 47 (78.3%) cases and satisfactory in 13 (21.7%). No single case was unsatisfactory. Among open group excellent outcome was in 24 (80%) cases and satisfactory in 6 (20%). In percutaneous group excellent outcome was in 23 cases (76.7%) and satisfactory in 7 (23.3%). The functional outcome was similar in both the groups.

**DISCUSSION**

Trigger finger is one of the most common hand problems we encounter in the orthopedic outpatient department of our hospital. This common problem has shown different responses to different treatment modalities. When we went through various literatures and work done by various authors, it showed lack of consensus on the optimum and ideal treatment of this common condition. Treatment options of trigger digits have been discussed in various literature which include splintage of affected finger, non-steroidal anti-inflammatory drugs (NSAIDs), local steroid injections percutaneous release of A1 pulley and open surgical release of the A1 pulley. Lorthioir first described percutaneous trigger finger release in 1958. He reported good result in 52 digits with no complications with the use of fine tenotome. This encouraging result paved way for newer techniques and modified instruments to reduce the possible complications associated with percutaneous release. It has been reported by several authors to be safe and efficacious.

In a similar study done by Ulf Dierks et al in 36 patients, overall 100% success in terms of grip strength, post operative range of motion of proximal interphalangeal joint, and residual pain was obtained. However because of lower cost and quicker procedure they recommended percutaneous release. Similarly in the study done by Sato et al they concluded that the effectiveness of open and percutaneous release of trigger finger is similar. E.C.A.M. Gilbert et al in a similar study concluded that percutaneous release is quicker procedure, is less painful, and shows significantly better results in rehabilitation than open surgery. In our study functional outcome of both the groups are similar.

**CONCLUSION**

We concluded that the functional outcome of both open surgical release and percutaneous release of A1 pulley for trigger digits are similar in terms of Pain relief after procedure, Range of motion, and post operative complications. However due to fewer expenses, less morbidity, less risks of wound complications percutaneous release may be better choice of procedure in our country.

**REFERENCES**

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