Section: Plastic Surgery

Original Research Article

NEEDLE APONEUROTOMY IN THE MANAGEMENT OF DUPUYTREN'S CONTRACTURE IN INDIAN POPULATION: AN OLD METHOD REVISITED

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ABSTRACT

Background: To see the efficiency of needle aponeurotomy in cases of Dupuytren's contracture in terms of immediate correction & patient satisfaction. **Materials and Methods:** 36 males & 04 females were enrolled in this study. All these patients reported with difficulty in straightening of affected fingers and were unable to use the affected hand efficiently. All were treated with needle aponeurotomy in OPD setting. **Result:** A total of 48 fingers (8 middle fingers, 15 ring fingers, 25 little fingers) were treated. The mean time taken for the procedure was 10 minutes (minimum 08 minutes, maximum 12 minutes). All the patients showed improved range of motion in immediate postoperative period. There was statistically significant improvement in extension lag of all the affected fingers (paired t test, value 0.001). Skin tear was the most common complication. None reported for redo procedure in 12 months follow up. **Conclusion:** Needle aponeurotomy is safe, effective, and minimally invasive solution for Dupuytren's contracture. It can be done as OPD procedure with faster recovery. Multiple joints & fingers can be treated in single session.

INTRODUCTION

Dupuytren's contracture is a fibroproliferative disease which affects the range of motion of fingers. Thus, it compromises the hand function in daily activities.[1] Several treatment options ranging from percutaneous needle fasciotomy to open surgery have been described for this disability. However, till date, there is no universal consensus on the best treatment method for Dupuytren's contracture.[2] In recent years, there has been a shift towards minimally invasive treatment with faster recovery. Needle aponeurotomy offers these advantages in treatment of Dupuytren' contracture.[3] However, chances of iatrogenic nerve & tendon injury have been mentioned as specific concerns for use of needle aponeurotomy.[4] In this article, we are reporting our initial experience of needle aponeurotomy in primary Dupuytren's contracture in Indian population.

MATERIALS AND METHODS

This is a single centre study conducted at our hospital after obtaining the permission from institutional ethics committee. The duration of study was from 01 Jan 2021 to 31 Dec 2022. All the patients were assessed for status of finger contractures [Figure 1]. Table top test was done in all patients [Figure 2]. All the details of finger involved, joint affected, passive extension deficit & range of motion of finger were documented. Patients with history of previous surgical intervention, on anticoagulation therapy, allergy to lignocaine and neurological involvement were not included in this study. Forty patients of Dupuytren's contracture were enrolled in this study. The procedure was performed in OPD room after obtaining informed consent.

Figure 1: Dupuytren's contracture affecting MCP joint of ring finger.

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Figure 2: Table top test

Technique: The needle aponeurotomy was done under local anaesthesia without using the tourniquet. The patient was placed in supine position with affected hand abducted on side table. Standard cleaning draping was done with betadine. The Dupuytren's cords were palpated [Figure 3]. The site for cord perforation was identified in palm & proximal phalanx by gentle passive extension of the affected finger. A small amount of 1% lignocaine was injected intradermally at the planned site. 25G needle was used to puncture the cord. The needle was inserted vertically into the cord through the lignocaine injection site [Figure 4]. The cord was held in tension & multiple strokes up to a depth 3-4 mm were given by the needle. Subsequently, the needle was rotated & angulated sideways. Again, multiple strokes were given. Throughout this procedure, the cord was kept in tension with passive extension of the finger. The breakage of the cord fibres can be felt with a sense of 'give way'. The application of further force will lead to extension of the finger [Figure 5]. The patient was asked to do active flexion-extension of the fingers. A small dressing was applied on the puncture site. The finger was splinted in extension. The first dressing was changed after one week [Figure 6]. Most of the wounds healed by the time of first dressing. The patient was advised to continue use finger splint for 02 weeks. The patient was followed up at 01 month and 06 months.

Figure 3: Dupuytren's cord palapation

Figure 4: Needle Aponeurotomy

All the results were analysed using statistical methods. Paired sample t test was used to compare pre & post procedure findings. A p value of <0.005 was taken as significant.

Figure 5: Immediate post procedure Finger in extension

Figure 6: One-week post procedure

RESULTS

The study was conducted on 40 patients (36 males & 04 females). The minimum age was 38 years while the oldest patient was of age 64 years. A total of 48 fingers were released (08 middle fingers, 15 ring fingers & 25 little fingers). The little finger was most involved in our study (52%).

In 32 patients, only MCP joint was involved while in 08 patients, both MCP joint as well as PIP joint was also involved. None of the patient had DIP joint involved. The average time taken for the procedure was 10 minutes (minimum 08 minutes, maximum 12 minutes). The range of motion at MCP joint showed statistically significant improvement after the procedure.

The pre procedure mean extension deficit at MCP joint was 43.67+ 11.65 degrees. Post procedure, the mean extension deficit remained 6.19+5.16 degrees. On applying paired t test, the p value came 0.001, which is statistically significant. The pre procedure mean total active range of motion was 222.60 degrees. Post procedure, it increased to 270 degrees in 35 patients (87.5%).

The most common complication noticed was skin tear (60%) [Figure 5]. All wounds healed with dressings in one week time. None of the patients had flexion tendon injury or digital nerve injury in our study. There was no case of infection or haematoma formation.

More than 90% patients expressed satisfaction at the end of procedure. All the patients were satisfied after 1st dressing at end of one week. All the patients returned to their work within 01 week of the procedure.

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DISCUSSION

There is no dearth of literature about the Dupuytren's contracture. However, there is still no clear consensus about the best treatment for this disease. Our data and results compare favourably with the existing knowledge of Dupuytren's contracture.

This disease is more predominant in male population5. The reason for this male predominance has been attributed to the presence of androgen receptors in palmar fascia.[6] In our study also there were 90% males & 10% females.

Various treatment modalities have been tried for this disease which include open surgery (derma fasciectomy, limited fasciectomy), collagenase clostridium histolyticum injections, corticosteroid injection & percutaneous needle aponeurotomy.[7] Various studies have been done using needle aponeurotomy with encouraging results.

One of the major advantages of this procedure is short duration. In our study, the meantime duration was 10 minutes. In the study by Cheng et al, the time duration was from 5 minutes to 45 minutes.[8] In both, our study as well as Cheng et al study, all the patients were sent home same day.

In our study, there was immediate improvement in the range of motion of affected fingers. Post procedure, 87.5 % patients regained full range of motion while the rest have deficiency of 10 degrees. In the study by Herrera et al, they were also able to achieve excellent immediate post-operative results.[9] The mean percent correction of MCP joint in their study was 99%.

In our study, we report the complication of skin tear in 60% cases. Herrera et al also reported 68% skin tear rate in their study.[9] All the skin tears were treated by local wound care & healed in one week. We did not encounter any other documented complications like nerve injury, tendon rupture etc in our study. In a series of 211 patients treated with needle aponeurotomy by Foucher et al, they reported a single case of nerve injury & no other complications.[10] Of 90 patients, followed by Badois et al, they reported excellent results in 81% cases, skin breakage in 16%, wound infection in 3% & nerve injury in 3% cases.[11]

One of the most feared complications of Dupuytren's contracture release is nerve damage. Percutaneous needle aponeurotomy does not have higher chances of nerve injury in comparison to open surgery. A study by van Rijssen et al in which both methods, open surgery, and percutaneous needle fasciotomy, were compared. The results showed 5% incidence of nerve injury in open surgery while none of the patients treated with percutaneous needle fasciotomy had nerve injury.[12]

In our study, all the patients were able to return to their pre procedure work within one week. This is significantly less than the time taken to return to work after open surgery. Au-Yong et al, reported time off work between 10-14 days following open surgery.[13] Although, the risk of recurrence is high in Dupuytren's contracture.[14] We followed up our patients for 12 months & none of them desired a further intervention. This may be because of short term follow-up.

CONCLUSION

Needle aponeurotomy is a very effective & minimally invasive treatment option for Dupuytren' s contracture. It is highly cost effective as it is done as OPD procedure. Multiple affected fingers & joints can be released in single sitting. The patient satisfaction rate is also very high for this procedure as it requires minimal hospital visits & quick recovery.

It has a significantly lower rate of complications as compared to other methods of release of Dupuytren's contracture. Thorough knowledge of patho-anatomy of Dupuytren's contracture & encouraging the patient participation during the procedure are vital to reduce the complications. The recurrence rates are also very low for 1 year follow up. If the disease recurs, patient can be offered another sitting of needle aponeurotomy without any additional risks.[15]

There are published guidelines & evidence based recommendations on the use of needle aponeurotomy in Dupuytren's contracture.[16]

To the best of our knowledge, this is one of the early studies done in Indian population to see the result of needle aponeurotomy in terms of immediate correction of contracture & patient satisfaction. Our study emphasizes that needle aponeurotomy should be the first line of treatment for Dupuytren's contracture specially in cases with a palpable cord & MCP joint involvement. We acknowledge few limitations of our study in terms of small sample size & short term follow up.

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