Original Research Article

Prospective study for USG guided corticosteroid injection in chronic plantar fasciitis

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Abstract

Background: Plantar fasciitis is a most common condition of the foot that causes heel pain. Long term repetitive overstretching of the plantar fascia has been observed to cause micro-tears in the attachment site near the medial calcaneal tuberosity, which may lead to inflammatory reactions and heel pain. **Method:** A prospective study of 50 patients was undertaken. In the study we gave USG guided corticosteroid injection. All the patients were followed up at 1 week, 3 weeks, 3 months, 6 months and 1 year post injection and results were obtained. **Results:** The Mean VAS score showed significant improvement between baseline and 12-months follow-up No patients suffered any complication (local or systemic) till the end of their follow-up. There was no cross-over allowed in our study, however 4 out of 50 (8%) required a repeat injection. **Conclusion:** Under ultrasonography guidance injection Corticosteroid are safe and effective treatment options for chronic plantar fasciitis and should be used to reduce complications like fat pad atrophy.
Key Word: Chronic plantar fasciitis, USG guided corticosteroid injection

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INTRODUCTION

Plantar fasciitis is a most common condition of the foot that causes heel pain. Long term repetitive overstretching of the plantar fascia has been observed to cause micro-tears in the attachment site near the medial calcaneal tuberosity, which may lead to inflammatory reactions and heel pain. When the plantar fascia is stretched from a prolonged time contracted equinus position, such as sleeping or sitting for a long time, the pain is usually most severe during the first few steps, which causes gait difficulties. There are many conservative treatments available for chronic Plantar Fasciitis such as rest, heat, ice pack, non-steroidal anti-inflammatory drugs (NSAIDS), heel pads, tapping, plantar and Achilles stretching but none of the above gives sufficient results. When above conservative treatment doesn't work Steroid injection, Botulinum Toxin injection, extra-corporeal shock wave therapy, platelet-rich plasma injection, pulsed radiofrequency electromagnetic field therapy and rarely surgery is the preferred options.

METHOD

Ethical clearance was obtained from the institutional ethics review committee and a total of 50 patients were recruited into the study according to the inclusion and exclusion criteria. The pre-injection protocol and follow-up injection protocol was standardized and patients were followed up at 1 week, 3 weeks, 3 months, 6 months and 12 months post injection using pain (Visual Analogue Scale; VAS) and Plantar Fascia Thickness under ultrasonography outcomes. Statistical analysis of the non-parametric data was done according to Mann-Whitney U-test and statistical significance was defined as a p-value less than or equal to 0.05.

Study Protocol: A total 50 patients included in the study were randomly selected. Written, valid and informed consent was taken prior to the injection. The patients were

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not told which injection they were to receive and all injection were administered by myself under the supervision of my guide. Valid, written and informed consent was taken. Complete blood count, erythrocyte sedimentation rate, c-reactive protein, fasting blood sugar and X-ray of calcaneum lateral view were done. All patients received injection treatment under full aspectic precautions. With the help of ultrasonography guidance administered by us. Post injection all the patients received a standard regimen of 5days of anti-inflammatory, analgesics and antacids medications along with education of gentle passive stretching exercises. All the patients were followed up in the outpatient department at 1 week, 3 weeks, 3 months, and 6 months post injection. All the patients had to complete the VAS score and measurement of plantar fascia thickness survey under guidance of ultrasonography. Associated complications were assessed using a few standard clinical questions and examinations

RESULTS

There were 20 males and 30 females (n = 50 patients total). The Mean age at the time of injection of the patients was 43.3 years (range: 33-53). The Mean duration of symptoms was 7.14 ± 0.75 months (range: 6 – 8 months) in Corticosteroid group. The mean duration of unsuccessful conservative treatment was 3.92 ± 0.96 months (range: 2 – 5.5 months). There was no statistically difference between the subgroups with respect to age, gender, duration of symptoms or duration of unsuccessful conservative treatment. All patients completed all the follow-ups, there was no drop-outs from the study and no cross-over. There were 28 patients affected on left feet and 22 patients affected on right feet. A total of 14% patients had hypertension,12% had hyperlipidemia/ hypercholesterolemia, there were 16% alcoholics and 12% smokers. There was no statistically significant difference between the subgroups with respect to any co-morbidities. The Mean VAS score showed significant improvement between baseline and 12-months follow-up (9.12 vs4.72) with Corticosteroids showing significantly better improvement in the short term (1st week). The Mean Plantar Fascia Thickness showed significant improvement between baseline and 12 months follow up (6.06 vs4.01). We foundno serious complications, either local or systemic, in our study. Repeat injections were required in 8 patients. No surgical intervention required post injection in our study. No patients suffered any complication (local or systemic) till the end of their follow-up. There was no cross-over allowed in our study, however 4 out of 50 (8%) required a repeat injection.

DISCUSSION

Although there is no clear consensus on the primary medical treatment of plantar fasciitis, it generally accepted that traditional treatment is successful in the majority of cases. In general, plantar fasciitis is a recurring disease. There are many conservative treatments available for chronic Plantar Fasciitis such as rest, heat, ice pack, non-steroidal anti- inflammatory drugs (NSAIDS), heel pads, tapping, plantar and Achilles stretching but none of the above gives sufficient results. When above conservative treatment doesn't work, Steroid injection, Botulinum Toxin injection, extra-corporeal shock wave therapy, platelet-rich plasma injection, pulsed radiofrequency electromagnetic field therapy and rarely Surgery is the preferred options. Steroid injection is the most preferred option but there is no gold standard dose for use in plantar fasciitis. Corticosteroid injection has been shown to significantly reduce plantar fascia thickness by its Anti-Inflammatory action. With reduction in plantar fascia thickness symptoms also reduces. Results of the Cochrane review show that corticosteroid injection therapy has short-term benefit compared to control, and the effectiveness of treatment is not maintained beyond six months. Complications associated with steroid injection are plantar fascia rupture (2.4%-10%), fat pad atrophy, lateral plantar nerve injury, and calcaneal osteomyelitis. Steroid injection can be performed with precise determination of the location with the help of ultra-sound and had lesser complication as compare to palpation method. The results revealed that the patients in ultrasound- guided injection showed, higher TT, thinner PFT and lower incidence of hypoechogenicity. No obvious improvement occurred with respect to VAS score, HTI, HPT and response rate, though with an inclined favor for ultrasound-guided injection. Palpation- guided injection has been confirmed as an effective and safe method. Genc H et al treated 30 plantar fasciitis patients with palpation-guided injection. After the treatment, VAS score, PFT and the incidence of hypoechogenicity decreased significantly. However, complications including fascia rupture and heel pad atrophy, though uncommon, does exist. Two potential complications, fat pad atrophy and rupture of plantar fascia, occasionally occurred in plantar fasciitis patients treated with corticosteroids injection. In all included studies, no atrophy was reported and significant difference was not detected with respect to heel pad thickness. The results were in accordance with Tsai, who reported that heel pad thickness did not change after corticosteroid injection. It indicated that no heel pad atrophy occurred. The rupture rate of plantar fasciitis after corticosteroid injection ranges from 2.5%[19] to 6.7%[20]. However, no rupture was reported in all included studies. Thus, ultrasound-guided injection corticosteroid injection was an

effective and relative safe method for patients with plantar fasciitis. Autologous platelet rich plasma (PRP) is substantially growing enthusiasm for the use of treatment of Chronic Plantar Fasciitis. PRP is a bioactive component of whole blood with platelet concentration that containing high levels of various growth factors, which can stimulate the reparative process. Current studies have revealed that local injection of PRP provides significant relief of pain and improvement of function in short term studies and the results seems to be comparable, and sometimes superior to local steroid injection. However, available data are limited by quality and size of the study, as well as length of follow-up, and are currently insufficient to recommend this modality for routine clinical use. Extra-corporeal shock wave therapy has become an increasingly available and popular treatment option for refractory plantar fasciitis. Recent clinical studies have shown promising short-term effects but the mechanism of effect remains elusive and long term results have not surpassed other conservative method such as plantar specific exercises. The procedure is painful, requires local anaesthesia and can be complicated by post-treatment bleeding and osseous pain. Surgery is done rarely for chronic severe plantar fasciitis, including plantar fasciotomy with and without neurolysis of calcaneal branches of the tibial nerve, has demonstrated conflicting late clinical results with pain and disability persisting in many patients. Potential surgical complications include infection, skin slough, nerve injury, and vascular damage. These complications have led to the adoption of less invasive surgical release techniques such as the endoscopic fasciotomy and bipolar radiofrequency microtenotomy. These procedures have yet to be fully evaluated in extended clinical trials. The search for an uniformly successful treatment for plantar fasciitis remains an enigma. Although the majority of cases are recurring, a consensus has yet to be reached on a reliable universal comprehensive treatment strategy. As a result, most surgeons use various regimens without a solid base of evidence. Despite the myriad of available treatments, there persists a 10% failure rate. Botulinum Toxin A is used for many medical conditions like Cervical Dystonia, Blephrospasm, Strabismus, Tremors because it causes reversible muscular weakness. The proposal mechanism of action of Botulinum Toxin A is that it reversibly inhibits the presynaptic release of neurotransmitters at the neuromuscular junction (NMJ) for prolonged periods and causes muscular weakness. Secondary neurotransmitters that are affected include substance P, where it decreases at the NMJ may provide analgesia. In addition to its effect on neurotransmitters, some studies have shown that Botulinum toxin also has anti-inflammatory properties on the soft tissue where it is injected .58 With a combination of eccentric exercise and cyclic plantar fascia stretching along with Botulinum toxin A injection, enhanced and accelerated healing with excellent longterm results can be achieved in refractory cases. In our study, total 50 patients were included. There were 20 (40%) males and 30 (60%) females in our study. In our study of 50 patients, mean age was found to be 43.3±6.84 years (range: 33 – 53 years) in corticosteroid group. The mean duration of symptoms was 7.14 ± 0.75 months (range: 6 – 8 months). The mean duration of unsuccessful conservative treatment was 3.92 ± 0.96 months (range: 2 – 5.5 months). Out of total 50 patients, 28 (56%) patients were affected on left side and 22 (44%) were affected on right side. There were 14% patients hypertensive, 16% alcoholic, 12% smoker and 12% had hyperlipidemia / hypercholesterolemia. In our study, all the patients were assessed pre procedure for Visual Analogue Score, Plantar Fascia thickness under USG guidance. Pre- Procedure mean Visual Analogue Score of patients was 9.12 ± 0.78 and Pre-Procedure Mean Plantar Fascia thickness of patients was 6.06 ± 0.66 mm. All the patients were followed-up in the Outpatient Department at 1 week, 3 weeks, 3 months, 6 months and 1 year post injection. All the patients were assessed for VAS score, Plantar Fascia thickness and complications at each follow-up. With respect to pain, we found that corticosteroid significantly improved the VAS score. VAS score was assessed by using clinical question & examination. Mean VAS score of patients at 1 week, 3 weeks, 3 months, 6 months and 1 year post injection was 7.10 ± 0.85, 5.00 ± 0.70, 3.52 ± 0.51, 2.60 ± 0.64 and 4.72 ± 1.02 respectively. Additionally, corticosteroid has better pain relief in the short term (within the 1st week). We also found that the much touted “Drop-off” effect of corticosteroid after the first month of treatment33 is not seen as it consistently offers better pain relief till 6 months. With respect to plantar fascia thickness corticosteroids significantly improved and decreased in thickness. Plantar Fascia thickness of all patients was measured under USG guidance. Mean Plantar Fascia thickness of patients at 1 week, 3 weeks, 3 months, 6 months and 1 year post injection was 5.81 ± 0.72 mm, 4.93 ± 0.39 mm, 4.38 ± 0.23 mm, 4.13 ± 0.25 mm and 4.01 ± 0.24 mm respectively. Additionally, no significant changes were seen short term (1 week post injection) (P value- 0.343). Plantar fascia thickness started decreasing by 3rd week post injection. There were constant and significant changes seen till 6 months, However after 6 months no significant changes seen (P value-0.001). With respect to complications, we found no serious complications, either local or systemic, in our study. Repeat injection were required in 8 patients. No surgical intervention required post injection in our study. We also found that injection under ultrasonography guidance is very safe, accurate and less complication.

CONCLUSION

We conducted a prospective comparative study of 50 patients of chronic plantar fasciitis treated with ultrasound guided corticosteroid injection. Our results showed that Corticosteroid are effective, Corticosteroid found to have significant pain improvement in short term (post injection 1 week). Additionally, we found that no significant 'Drop-off' effect of corticosteroid in the long term. Further, we found that complication rate was negligible. We also found that injection under ultrasonography guidance is very safe, accurate and less complication. In summary, under ultrasonography guidance injection Corticosteroid are safe and effective treatment options for chronic plantar fasciitis and should be used to reduce complications like fat pad atrophy.

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