

CASE REPORT: DEXAMETHASONE AS A STEROID INJECTION THERAPY IN PLANTAR FASCIITIS WITH DIABETES MELLITUS COMORBIDITY IN REMOTE AREAS USING A HOLISTIC APPROACH

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ABSTRACT

Plantar fasciitis is a condition that leads to chronic pain. This report case is descriptive and utilizes a prospective approach, where the patient was monitored for over a year, with a single steroid injection given during the initial visit. The case involves a 55-year-old woman who visited the primary care with several complaints of heel pain and difficulty of sleeping. The patient had been self-medicating with unbranded over-the-counter drugs and had taken steroids or NSAIDs from pharmacies or other healthcare providers multiple times. She had sought treatment at primary healthcare center for two months prior the study, but the prescribed treatment and exercise were ineffective. Upon examination, the patient was in moderate pain and obesity. Physical examination revealed tenderness in both soles. Laboratory tests showed fasting blood glucose level of 274 mg/dl. The patient was administered an injection of 0.5 ml dexamethasone + 0.5 ml lidocaine in each heel. She was prescribed sodium diclofenac 2x1, to be taken 1 hour after meals (p.c.), glibenclamide 1x1 in the morning before meals (a.c.), and metformin 2x1 at lunch and dinner p.c./with meals. The patient was also advised to avoid heavy activities for 3-7 days and received education on dietary management for diabetes mellitus. After one week, the patient returned for follow-up, reporting a visual analog scale (VAS) score of 0 and a fasting blood glucose level of 110 mg/dl. Follow-up after 1 month, 3 months, 6 months, and 1 year post-injection consistently showed a VAS score of 0. Dexamethasone injection may be considered as a steroid injection option for plantar fasciitis in primary care settings to maintain patient productivity and to reduce the risk of irrational use of steroids or NSAIDs.

Keywords: *plantar fasciitis, steroid injection, diabetes mellitus, holistic, remote area*

1. INTRODUCTION

Plantar fasciitis is a common cause of heel pain in adults, resulting from chronic inflammation of the plantar fascia. The plantar fascia is a structure located on the sole of the foot that connects the heel to the toes. This inflammation is triggered by repetitive stress due to excessive activity. The condition commonly affects runners, walkers, or military personnel, and can also result from significant pressure in patients with obesity, a sedentary lifestyle, or prolonged standing (1,2).

A thorough anamnesis and physical examination are essential for diagnosing plantar fasciitis accurately. Management options include non-pharmacological, pharmacological, and surgical approaches. Nearly 90% of cases resolve spontaneously within 3 to 4 months with non-invasive treatments. Non-invasive treatments

include stretching exercises for the gastrocnemius muscle and plantar fascia, the use of orthotic devices (heel pads or heel cups), or nonsteroidal anti-inflammatory drugs (NSAIDs) (1,3).

If therapeutic goals and evaluations are not properly addressed, plantar fasciitis can become a chronic condition that impacts the patient's quality of life. Persistent pain can lead to decreased productivity, sleep disturbances, or misuse of medications. This presents a particular challenge for healthcare providers in regions with limited access to medical services, such as remote areas (4).

This case report aims to present a patient with plantar fasciitis in a primary care setting in a remote area, where the condition did not improve with standard treatments and was assessed holistically.

2. METHOD

This case report is a descriptive, prospective study conducted on a patient with plantar fasciitis who received a dexamethasone injection in the plantar fascia and had a comorbid condition of diabetes mellitus. The case was identified in the outpatient services of Puskesmas Rantau Pulut II and was observed from August 8, 2022, to August 8, 2023. The injection in the plantar fascia was administered once during the patient's initial visit. Follow-up assessments were conducted on the patient's pain levels using the Visual Analog Scale (VAS) method at 1 week, 1 month, 3 months, 6 months, and 1 year after the injection.

3. RESULT

3.1 Case

A 55-year-old woman presented to the outpatient clinic with complaints of heel pain. She had been experiencing heel pain for the past three months, described as persistent and aggravated by pressure. The patient had previously sought treatment for the same complaint and was advised to take pain-relieving medications and perform exercises. However, according to the patient, there was no improvement.

The patient also complained of not being able to sleep well due to frequent urination, occurring 3-4 times each night. Currently, she is taking over-the-counter medications without a brand name. The patient reported that she had consulted multiple healthcare providers but had not experienced any relief. She has no personal history of any diseases. However, her family history includes diabetes mellitus and hypertension.

On general examination, vital signs, and nutritional status, the patient appeared to be in severe pain (VAS: 8). She was classified as obese with a height of 155 cm, a weight of 65 kg (BMI > 25-27 kg/m²), and central obesity with a waist circumference of 96 cm (waist circumference > 80 cm). On physical examination, there was tenderness in the heel, but the Silverskiold test, Tinel

test, and Squeeze test were all negative. Her fasting blood glucose was 274 mg/dl.

From a holistic/family medicine diagnostic perspective, the personal aspect included a patient presenting with severe pain that had been ongoing for three months and was highly disruptive. The clinical aspect included conditions such as plantar fasciitis and suspected diabetes mellitus, potentially due to steroid misuse. Internal risk factors included being overweight, obesity, sedentary behavior, and frequent use of footwear with hard surfaces. External risk factors involved her occupation as a baker, which required prolonged standing, a relatively high kitchen, limited access to secondary healthcare services, a lack of variety in available healthcare services, and easy access to non-prescription drugs. The patient's functional degree was classified as grade 3.

The management of the patient was approached holistically, incorporating health promotion, specific protection, prompt treatment, disability limitation, and rehabilitation. In the health promotion approach, education was provided, explaining plantar fasciitis and diabetes mellitus, including their risks and causes. The specific protection approach involved informing the patient about the possibility of other family members developing similar conditions, thus necessitating ergonomic modifications to the workplace, avoiding prolonged standing, using soft-soled footwear, reducing weight in cases of overweight or obesity, engaging in at least 150 minutes of physical activity per week, consuming a balanced diet, limiting the intake of fast food or high-sugar foods, and avoiding irrational use of medications such as steroids.

Prompt treatment in this case included the administration of medications such as sodium diclofenac 2x1, taken one hour after meals, glibenclamide 1x1 in the morning before meals, and metformin 2x1 in the afternoon and evening with meals. Due to severe pain, the patient was administered an injection of dexamethasone 2.5 mg (0.5 ml)

and lidocaine HCL 2% 0.5 ml, mixed in a 1 cc syringe with a 23-gauge needle. The injection was performed at the medial calcaneal tuberosity, identified by drawing

an imaginary line from the posterior medial malleolus to the heel, with the injection point located 1 cm from the heel surface (see Figure 1).

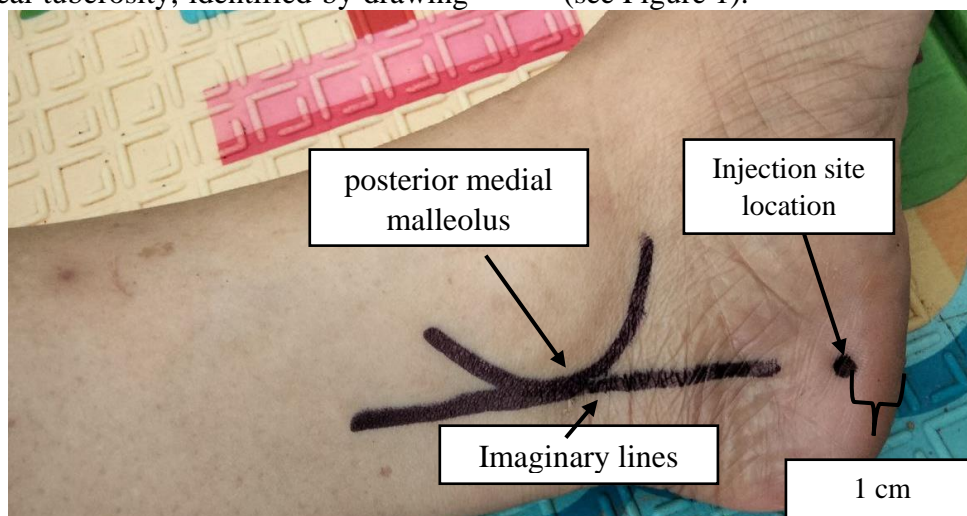


Figure 1. Imaginary lines and injection site for plantar fasciitis treatment.

The management of disability limitation aims to prevent the worsening of the condition or the development of disabilities. Since the patient received a steroid injection in the plantar fascia, they were advised to limit heavy activities for the next 3–7 days. The patient was also instructed to stop using hard footwear and instead opt for soft shoes or orthotics. Additionally, the patient was advised not to stand for prolonged periods, reduce body weight, decrease waist circumference, follow a diet recommended for diabetic patients, and engage in regular physical exercise.

Recommended exercises for the patient after improvement include cycling, swimming, or aerobics. The patient was asked to attend follow-up appointments weekly until blood glucose levels stabilized, after which monthly follow-ups were recommended. Rehabilitation was not required for this patient.

To achieve an ideal body weight, the patient was advised to eat according to their caloric needs. The target weight was set at 49.5 kg, with a daily caloric intake of 1,238 kcal. The caloric distribution was set at 743 kcal/day (60%) from carbohydrates, 186 kcal/day (15%) from protein, and 309

kcal/day (25%) from fat. The diet plan included three main meals and two snacks per day.

The recommended carbohydrate portion for each main meal consisted of $\frac{3}{4}$ cup of rice, one medium slice of cassava (100 grams), two medium potatoes (200 grams), $\frac{3}{4}$ cup of corn rice, or one medium slice of sweet potato (150 grams). The protein portion included one medium piece of beef (50 grams), one medium piece of chicken (25 grams), one egg (60 grams), one medium piece of fish (50 grams), one large piece of tofu (100 grams), or two medium pieces of tempeh (50 grams). Fat requirements could be met by consuming one glass of low-fat cow's milk and additional fats from protein sources or food preparation methods, such as sautéing vegetables with $\frac{1}{2}$ tablespoon of fish oil.

Vegetable and fruit requirements were categorized into two groups. Group A vegetables, such as fresh mushrooms, bamboo shoots, bean sprouts, eggplant, and tomatoes, could be consumed freely without portion control. Group B vegetables, such as spinach, green beans, carrots, and long beans, were recommended in portions of $\frac{1}{2}$ cup to 1 cup per meal after cooking and draining. Suggested fruit

portions included two apples, two pears, one avocado, or five dates per day.

Patient follow-up on August 15, 2022, showed a Visual Analog Scale (VAS) score of 0, fasting blood glucose (FBG) of 110 mg/dl, and body weight of 65 kg. On September 15, 2022, the VAS remained at 0, FBG was 110 mg/dl, and body weight was 63 kg. On November 15, 2022, the VAS was still 0, but FBG increased to 200 mg/dl, and body weight was 60 kg, prompting an evaluation of the patient's diet and physical activity. By February 15, 2023, the VAS remained at 0, FBG was 120 mg/dl, and body weight was 57 kg. Finally, on August 15, 2023, the VAS was 0, FBG was 103 mg/dl, and body weight was 55 kg.

4. DISCUSSION

The patient is a 55-year-old woman diagnosed with plantar fasciitis and diabetes mellitus. The diabetes mellitus condition might be caused by steroid misuse. The risk factors contributing to the patient's plantar fasciitis include excess body weight, central obesity, a sedentary lifestyle, the use of hard footwear, and inadequate workplace ergonomics. The risk of developing diabetes mellitus is caused by the use of non-branded medication containing steroid and a family history of diabetes mellitus.

Theoretically, the risk factors for plantar fasciitis include trauma, abnormal foot conditions, prolonged standing, extensive jumping, carrying heavy loads, obesity, heel pad atrophy, aging, and occupations that require prolonged standing and load-bearing. The risk factors for diabetes mellitus are categorized based on its classification. In type 2 diabetes, risks include a sedentary lifestyle, obesity or central obesity, age over 45 years, a family history of diabetes, hypertension, dyslipidemia, a history of women delivering babies weighing more than 4 kg, and the use of certain medications such as glucocorticoids or steroids in specific conditions (5,6).

Physical examination and supporting tests revealed tenderness in the heel, a fasting blood glucose level of 274 mg/dL. Anamnesis and physical examination are sufficient to diagnose plantar fasciitis. Pain associated with plantar fasciitis is throbbing and localized to the plantar fascia of the calcaneus bone, worsening when changing position from rest to activity or from sitting to standing. Diagnosing plantar fasciitis also requires ruling out other potential diagnoses using the Silfverskiöld test (gastrocnemius muscle abnormalities), the Tinel test (tarsal tunnel syndrome), and a negative squeeze test (calcaneal fracture) (1,7).

The diagnosis of diabetes mellitus can be established using several criteria, such as a fasting blood glucose level > 125 mg/dL, a blood glucose level ≥ 200 mg/dL following an oral glucose tolerance test, classic symptoms with a random blood glucose level ≥ 200 mg/dL, and an HbA1c $\geq 6.5\%$. Classic symptoms of diabetes mellitus include polyuria, polydipsia, polyphagia, and unexplained weight loss. Other symptoms of diabetes mellitus may include fatigue, tingling, itching, blurred vision, erectile dysfunction in men, and pruritus vulvae in women (6)

In managing plantar fasciitis, there are several therapeutic options available. These options include extracorporeal shockwave therapy (ESWT), foot exercises, steroid injections, non-steroidal anti-inflammatory injections, pain-relief medications, orthotics, taping, dry needling, and surgery. The choice of therapy is recommended to be gradual, starting from exercises and stretching to more invasive procedures, with careful consideration of the patient's evaluation and needs. In this case, the patient had previously received education on their condition, instructions on foot stretching exercises, and pain-relief medication, but these were ineffective.(8)

Steroid injections are a common intervention for reducing pain and inflammation. Although plantar fasciitis is more accurately characterized as a

degenerative condition rather than an inflammatory one, steroid injections can provide short-term relief. However, these injections carry risks, including potential complications such as fascial rupture and fat pad atrophy.(9)

Given the chronic nature of the pain and the ineffectiveness of exercises and pain-relief medications, combined with limited access to healthcare services, a dexamethasone injection (2.5 mg in 0.5 ml) mixed with lidocaine HCL 2% (0.5 ml) was administered using a 1cc syringe with a 23-gauge needle. Dexamethasone is a type of steroid that is both affordable and easily accessible in primary care settings, such as community health centers. Steroid injections are a primary therapy to consider when non-invasive treatments do not yield satisfactory results. Commonly used steroids include methylprednisolone (40-80 mg in 1-2 ml) and lidocaine 0.25% (1 ml), as well as triamcinolone acetonide (5-20 mg in 0.5 ml) with lidocaine (0.5 ml), while the use of dexamethasone is relatively uncommon.(10,11,12)

In addition to the use of steroids, steroid injections can also employ hyaluronic acid. Hyaluronic acid has been frequently utilized in the management of musculoskeletal disorders such as osteoarthritis, persistent shoulder pain, lateral epicondylitis, and patellar tendinopathy. Hyaluronic acid is available in several forms, including high molecular weight and low molecular weight variants. Generally, high molecular weight hyaluronic acid is considered more effective than other types. (13,14)

Steroid injections for plantar fascia can be performed in two ways: blind injection or ultrasound-guided injection. Blind injections can be administered by palpating the medial calcaneal tuberosity. The injection site can also be marked by drawing a straight line from the posterior aspect of the medial malleolus to the sole of the foot, marking the injection site one finger-width above the sole, and directing

the injection towards the area of pain.(15,16)

The use of blind injection for plantar fasciitis has both advantages and disadvantages. The advantages include being cost-effective, having comparable efficacy to ultrasound-guided injections, minimal costs, and the flexibility to be performed in various settings. However, there are studies that have found that palpation-guided plantar fasciitis injections do not reduce pain at all. This outcome depends on the skill or technique employed by physician. .(17,18)

Upon discharge, the patient was advised to avoid heavy physical activity, adjust their diet, modify their lifestyle, and pay attention to workplace ergonomics. The pharmacological treatment prescribed at discharge included sodium diclofenac 2x1, to be taken 1 hour after meals; glibenclamide 1x1 in the morning before meals; and metformin 2x1, to be taken with meals in the afternoon and evening. The patient will be followed up to monitor pain, blood glucose levels, and weight loss. In managing plantar fasciitis, it is essential not only to provide medical treatment but also to educate the patient and address any accompanying conditions effectively.(8)

After a steroid injection for plantar fasciitis, the patient should initially rest. Resumption of heavy activities involving the feet, including exercise, may only be considered once one of the following criteria is met: two weeks have passed since the injection, the Visual Analog Scale (VAS) score is below 2, the lesion appears isoechoic or hyperechoic on ultrasonography, and the patient is able to use orthoses. The patient is expected to return for follow-up visits at two weeks, four weeks, three months, and four months post-injection. During these follow-up appointments, the patient will be assessed based on their VAS score, functional score, and activity level.(19,20)

The accompanying conditions in this patient include an unhealthy lifestyle, obesity, diabetes mellitus, and a non-

ergonomic work environment. Therefore, the patient was provided with thorough education on the importance of exercise, an appropriate diet for individuals with diabetes, weight loss with a target aligned to the ideal body weight, and improvements in the ergonomics of their workplace. The goals for controlled diabetes management may include a BMI of 18.5-22.9 kg/m², blood pressure <140/90 mmHg, HbA1c <7%, fasting capillary blood glucose (FCBG) 80-130 mg/dl, 2-hour postprandial capillary blood glucose <180 mg/dl, LDL <100 mg/dl or <70 mg/dl for those at risk of a heart attack, triglycerides <150 mg/dl, and HDL >40 mg/dl for men or >50 mg/dl for women.(6)

Follow-up with this patient has demonstrated positive outcomes, with pain relief observed from 7 days post-injection lasting up to 1 year after the injection. Blood glucose and weight management were also well-controlled. To prevent recurrence, the patient was advised to manage comorbidities, perform foot stretching exercises, especially before and after physical activity, choose appropriate footwear, gradually increase physical activity, avoid prolonged standing, and manage their weight. All of these holistic approaches are employed in pain management, particularly in cases where the patient is experiencing chronic pain. (5)

Chronic pain conditions can significantly impair a patient's quality of life. However, the quality of life is not solely affected by chronic pain but also by accompanying conditions. These comorbid conditions may include other diseases or mental health disorders. Common mental health issues experienced by individuals with chronic pain include depression, anxiety, and sleep disturbances. Therefore, a holistic assessment is essential. (21,22)

In rural areas, pain management services face specific challenges. These challenges may include limited access to specialist clinics, a lack of education about therapy options, insufficient knowledge among general practitioners, and

inadequate complementary therapy services. Physicians in rural areas must be equipped with comprehensive knowledge and skills in pain management. The goal is to minimize conditions that may arise from unresolved chronic pain. Physicians in primary care, especially in rural areas, must be equipped with strong competencies in pain management.(23,24,25)

5. CONCLUSION

Direct dexamethasone injection into the plantar fascia can be considered as a minimally invasive treatment option for plantar fasciitis cases that are unresponsive to standard treatment, particularly in remote areas. Pain associated with plantar fasciitis can be highly disruptive, raising the risk of medication misuse, including pain relievers and steroids, which are difficult to monitor in remote regions. Physicians in remote areas must adopt a holistic approach to prevent patients from engaging in behaviors that could exacerbate patient's condition.

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