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by Ariani Rahayu S

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Effectiveness of Triamcinolone and Lidocaine in Patient with Piriformis Syndrome – A Case Series

Ariani Rahayu Setianti¹, Hanik Badriyah Hidayati^{2*}

¹Master of Clinical Pharmacy Programme Faculty of Pharmacy, Airlangga University, Surabaya, Indonesia

²Neurology Department, Dr. Soetomo General Hospital-Faculty of Medicine, Airlangga University, Surabaya, Indonesia

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ABSTRACT

Piriformis syndrome (PS) has been documented as a contributory cause for sciatica, buttock, and low back pain [1]. The worldwide incidence of PS would be about 2,4 million per year. The management of piriformis syndrome includes injection of the piriformis muscle with local anesthetic and steroid; however, the study for the effectiveness of the combination is lacking especially in Indonesian population. Ultrasound results and physical findings described in these cases represent general clinical signs in PS patients. Triamcinolone in combination with Lidocaine is effective to reduce pain in patients suffered from PS, however, the pain reduction did not occur immediately after injection. Pain measurement done by determine Visual Analogue Scale (VAS).

1. Introduction

18 Piriformis syndrome (PS) first introduced in 1788 known as *wallet sciatica* or *fat wallet syndrome*.^{1,2} PS is a peripheral neuritis of the sciatic nerve caused by an abnormal condition of the piriformis muscle.³ PS has been recorded as a devoted cause for sciatica, buttock, and low back pain. Pain and localized tenderness around the gluteal region at the area of the piriformis muscle are the clinical manifestation of this syndrome and usually characterized as a deep, aching type of pain with or without signs and symptoms of sciatica.⁴ PS may contribute to 0,3% to 6% of all cases of low back pain and/or sciatica with an estimated amount of new cases of low back pain at 40 million annually, the incidence of PS would be roughly at 2,4 million per year.⁵ PS has been accused as the potential pain generator and affect individuals in both heavy activities population, such as athletes, and general population of all occupations with many kinds of activity levels.^{3,6}

PS remains a controversial and nebulous diagnosis for back and buttock pain.⁷ Delay in diagnosing PS may lead to pathologic condition of the sciatic nerve, chronic somatic dysfunction, and compensatory changes resulting in pain, paresthesia, hyperesthesia, and muscle weakness.³ Currently, gold standard therapy in PS has not been found yet.⁸

7 The first-line treatment for PS based on conservative pharmacotherapy with nonsteroidal anti-inflammatory drugs (NSAID), muscle relaxant, and neuropathic pain agents such as tricyclic antidepressants (TCAs) or anticonvulsants.^{9,10} Local injection of lidocaine, steroids, or the newest agent, botulinum toxin can be used if the first line failed to reduce the pain.¹¹ Triamcinolone is one of corticosteroid used to treat piriformis syndrome in clinical settings, however, the research about effectiveness of lidocaine and triamcinolone is lacking especially in Indonesian populations.¹²

The purpose of this case report is to determine the effectiveness of triamcinolone and lidocaine combination as one of the therapy choices in PS. This case series will illustrate some patients experience after injected by both agents.

Case Presentation

Case 1

Patient ND, 57 years old female and weighed 71 kg. Patient referred from B Hospital diagnosed with low back pain suspect piriformis syndrome. Patient suffered from pain in both buttocks and hamstring since 5 years ago, radiating to both legs. Patient felt pain especially when sitting and walking, and also thick and tingling in both soles. There was no history of trauma, diabetes mellitus denied, and there was a history of high cholesterol.

FAIR position negative, Beatty test positive, and Freiberg test negative. Peripheral Extremities USG showed that the thickening of piriformis muscle was unclear. Patient received paracetamol 500mg/24 hours and vitamin B12 50 mcg/12 hours, and vitamin B6 10 mg/12 hours. The pain persisted so the doctor decided to give Trilac®

(Triamcinolone 10 mg/mL) 2 mL and lidocaine 2% 1 mL. The initial pain scale was 7 (severe) and after treatment the pain decreased into 2 (mild).

Case 2

Patient MB, 35 years old male, 159 cm and weighed 60 kg. Patient referred from PHC Hospital with PS. Patient suffered from buttock pain radiating to the right leg since one year ago, throbbing pain and increased if patient was standing, walking, or bowing. Patient felt his right sole thick and tingling. He could not stand for more than 5 minutes and walk for 100 meters because of the pain. Pain decreased if the patient sits or lie down. There was a history of trauma due to fell in sitting position. There was no tumour, fever, half-body weakness, or stroke. The patient got oral analgesic as the therapy but the pain remained.

USG performed in the right extremities and there was a thickening of right sciatic nerve \pm 0,53 cm with a tenderness and probe positive. Then he got injection with Trilac® (Triamcinolone 10 mg/mL) 2 mL and lidocaine 2% 2 mL. Patient felt a bit dizzy for about 5 minutes after injection. Patient's pain measured with Visual Analogue Scale (VAS), which the initial VAS was 8 (severe) and decreased into 6 (moderate). Pain reduction was obtained two days after injection.

Case 3

Patient NS, 64 years old female, 157 cm and weighed 62 kg. Patient referred from UA Hospital with PS. Patient had a history of heart disease and hypertension. Patient suffered from pain in left buttock since 2 months ago. Pain radiated to left hamstring, weakness in limbs denied. There was no tingling feeling. FAIR position tested positive.

Peripheral Extremities USG showed that the right piriformis muscle was thicker compared with left piriformis muscle. Patient got oral analgesics combination in capsules to relieve the pain. However, pain decreased but did not disappear. Patient then injected with Trilac® (Triamcinolone 10 mg/mL) and lidocaine 2% injection, 2 mL and 1 mL, respectively. Patient could not stand for about 10 minutes right after injection and needed to rest for about 15 minutes. The initial pain scale before injection was 4 (moderate) and after injection was 2 (mild). Pain decreased two days after injection.

Discussion

Piriformis syndrome has been recorded as one of responsible factor of sciatica, buttock, and low back pain occurrence with relatively rare prevalence, about 0,3% to 26% of all cases of low back pain and sciatica.^{4,5} This syndrome should be considered in the differential diagnosis of all patients with persistent pain in the gluteal area predominantly when there are no findings from the lumbar spine or the hip joints.⁷

There are some etiologies of piriformis syndrome, including gluteal trauma in the sacroiliac or gluteal areas (possibly several years previously), predisposing anatomic variants, myofascial trigger points, hypertrophy and spasm of the piriformis muscle. PS divided into two types of cause, primary and secondary. Primary cause happens

when sciatic nerve entrapment occurs due to intrinsic abnormality within the muscle itself whereas the second one occurs as a result of direct or blunt trauma to the piriformis muscle.¹¹ Other researchers classify PS cause into trauma, muscle hypertrophy, sitting for prolonged periods, and anatomic anomalies.^{3,5}

The piriformis muscle is flat, oblique, and pyramidal-shaped. It originates anterior to the vertebrae (S2 to S4), the superior margin of the greater sciatic foramen, and the sacrotuberous ligament. This muscle receives innervation from nerve branches coming off L5, S1 and S2. Irritation of the neighboring sciatic nerve which is very close to the center of the muscle, could appear when piriformis muscle is overworked, irritated, or injured.⁵ Some symptoms of PS occurs as the consequence of local inflammation and congestion due to muscular compression of small nerves and vessels, including the pudendal nerve and blood vessels, which exited at the medial inferior border of the piriformis muscle.³

The components added to the clinical presentation are somatic and neuropathic. Somatic component underlying PS is a myofascial pain syndrome whereas neuropathic component refers to compression and irritation of the sciatic nerve as it courses through the infrapiriform foramen.¹²

The symptoms suggesting PS are clinical, bringing together the patient's painful functional impairments and the signs reproduced by physical maneuvers soliciting the piriformis muscle and the environing anatomical structures.¹³ Physical findings thought to be more specific for PS. Three onyomous tests are the Freiberg test (forceful internal rotation of the hip with the patient supine), the Pace test (reproduction of buttock pain with resisted hip abduction), and Beatty test (reproduction of buttock pain with the abduction of the thigh against gravity with patient in lateral decubitus position). The other suggestive test is FAIR (Flexed, Adducted, Internally Rotated) position.¹¹ The patients presented in this study have been tested by those criteria to diagnose the PS. Beatty test was positive in patient 1 and FAIR position test was positive in patient 3.

Diagnostic imaging is invaluable in figuring out other probable causes of sciatic nerve irritation such as lumbar disk disease and radiculopathy.¹⁴ CT and MRI are reportedly valuable for diagnosing PS by revealing enlargement of the piriformis muscle, however, adequate sensitivity remains questionable.¹⁵ Zhang *et al* demonstrated ultrasound as one of the techniques used to determine the diagnosis of PS. In PS patients, the piriformis muscle was enlarged and the echo intensity of this muscle was enhanced. Moreover, the thickness was significantly increased in the symptomatic side compared with that on the asymptomatic side.¹⁶ In three patients presented, the result of USG musculoskeletal showed thickening of piriformis muscle in two patients while the other one is clear.¹⁸

Piriformis muscle injection is usually suggested to the patient as part of multimodal therapy.¹² Nonsteroidal anti-inflammatory drugs, analgesics, muscle relaxant, and neuropathic pain agents (gabapentin, nortriptyline, and

carbamazepine) may relieve pain and spasm in this condition.^{7,9} In addition, the management of piriformis syndrome includes injection of the piriformis muscle with local anesthetic and steroid or with botulinum toxin. Some investigators also inject dilute local anesthetic and steroid in the area of the sciatic nerve. The recommendation for local injection therapy may be both diagnostic and therapeutic.^{11,17} Corticosteroid with local anesthetic injection aims are to reduce the irritation by decreasing inflammation in the area and temporarily stopping piriformis muscle spasm.¹⁸

Triamcinolone is one of corticosteroids injection approved by Food and Drugs Administration (FDA). Corticosteroids have both anti-inflammatory and immunosuppressive effect but the exact mechanisms are complex. Corticosteroids act directly on nuclear steroid receptor and interrupt the inflammatory and immune cascade at several levels. They decrease vascular permeability and inhibit the accumulation of inflammatory cells and prevent the synthesis and secretion of several inflammatory mediators.¹³ Triamcinolone is used empirically for intra articular injection because of low solubility and longer duration of action whereas betamethasone for soft tissue injection due to high solubility, shorter duration of action, and fewer cutaneous adverse effect. Triamcinolone common concentration used is 10-40 mg with approximate duration of action 14 days.¹⁹

Lidocaine is an amide-type local anesthetic that exerts its pharmacological action through the block of sodium channels in neural tissues, thereby interrupting neuronal transmission.²⁰ The analgesic effect of lidocaine can be due to blockage of the neuronal transmission at the site of injury, attenuating the neurogenic response, and by the intrinsic systemic anti-inflammatory properties. Moreover, lidocaine can reduce cytokine-induced cellular damage through a mechanism that involves mitochondrial adenosine triphosphate (ATP)-gated potassium channels.²¹ The speed of onset of lidocaine is 1 to 5 minutes after local infiltration and 5 to 15 minutes after peripheral nerve blockade. Lidocaine has been shown to cross the placenta and blood-brain barrier by simple passive diffusion.²²

Previous study conducted by Fishman *et al* reported that patient who got 1,5 mL 2% lidocaine combined with 20 mg triamcinolone generally feel immediate relieved after injection. Patient who conferred with two of three clinical signs, 468 out of 537 patients after 10 months follow up, 79% attained at least 50% improvement in symptoms. Patients with less than two clinical criteria, 75,2% improved 50% or more.^{23, 24, 25}

A study performed by Ciurylo and Gray in patients with PS who got steroid injection showed that from 26 samples, 84,6% resulted in diagnostic response and the average pain reduction was 65,6%. In this research, triamcinolone dose used was 20 mg mixed with 2 mL 1% lidocaine and 2 mL of 0,25% bupivacaine. In a randomized trial conducted in 2015, addition of corticosteroid to lidocaine therapy did not give any beneficial compared with lidocaine alone in patient with piriformis syndrome. Fifty-seven patients between the ages 18 and 70 were enrolled in this research

12 but seven patients not meeting the inclusion criteria excluded after the clinical and radiological assessment. Fifty patients were randomized and divided into two groups, first group was given lidocaine 2% 5 mL only and second group was given lidocaine 4% + 1 mL betamethasone. Compared with 24 baseline, there was a significant improvement in NRS ($P < 0,05$), however, there was no significant difference in pain reduction between each group ($P > 0,05$). There was no adverse effect or complication found in this study.²⁶

All of the patient presented in this paper received triamcinolone 20 mg and lidocaine 2% 1-2 mL injection to treat PS. The patients experienced a reduction in pain severity; however, the pain reduction was varied among the patients. The first patient experienced five scales reduction, while the second and the third patient were two scales reduction. There was a delayed onset of pain reduction. Patient 2 and 3's pain reduced two days after 17 injection. Review done by Brinks *et al* found that increased or persistent pain after injection or pain at the site of injection was described in 19 studies.²⁷ This phenomenon was likely the most possible cause of the delayed effect.

Conclusion

Triamcinolone and Lidocaine could be used as a therapy choice in patients with piriformis syndrome. Those agents could reduce pain scale from 2 up to 5 scales two days after injection, but longer observation is needed to achieve maximum pain reduction. However, a larger study is needed to determine the effectiveness in a bigger population.

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