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Prolotherapy in Chronic Coccydynia

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ABSTRACT

Introduction: Coccydynia, or coccygodynia, is pain in the tailbone or coccyx area. Despite identifying chronic coccyx pain happened hundreds of years ago, its treatment can be difficult and sometimes controversial due to the multifactorial nature of coccyx pain. Many physiological and psychological factors contribute to its etiology. Most cases of coccydynia resolve within weeks to months with or without conservative treatment, but for some patients, the pain could be chronic and bothersome.

Cases: This report describes a patient who experienced a traumatic fall from a height, causing chronic coccyx pain. Coccyx pain is local and does not radiate, usually gets worse when changing from sitting to standing or vice versa. This makes it difficult for patients to carry out their usual activities. After taking pain medications regularly for years, the pain does not improve.

Conclusion: Prolotherapy is an effective pain management technique as pain relief in patients with coccyx pain. This technique is quite safe and because the injection site is far from risky large blood vessels and nerves, it can be performed by anaesthesiologists who are not familiar with this technique, especially when assisted with ultrasound guidance. Prolotherapy injections are carried out with two approaches from the cranial and caudal directions. Prolotherapy should be repeated in several sessions so that the level of effectiveness and patient satisfaction can be increased.

Keywords

Coccyx fracture, Coccydynia, Prolotherapy.

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INTRODUCTION

Coccydynia, or coccyx pain, is characterized by significant pain in and around the tailbone that does not radiate, and is made worse by sitting or standing from a seated position. The classic presentation of coccydynia is localized pain over the coccyx. The patient came with the complaint of "tailbone pain". The pain will usually be worse with prolonged sitting, leaning back when sitting, standing for a long time, and getting up from a sitting position. Pain can also occur with intercourse or bowel movements. This can interfere with the patient's ability to perform activities of daily living such as sitting, standing, walking, and defecating.

It is important to review a history of recent trauma with acute onset of pain, or the onset of pain may be insidious without a clear precipitating factor. Coccydynia is most often caused by direct trauma to the coccyx such as a fall. Trauma causes inflammation and edema with possible subluxation or abnormal hypermobility of the coccyx. Physical examination will reveal tenderness over the coccyx. Rectal examination allows the coccyx to be grasped between the index finger and thumb. Manipulation will be painful and may reveal hypermobility or hypomobility of the sacrococcygeal joint. Normal range of motion should be around 13 degrees.[1,2]

The differential diagnosis of coccyx pain includes other conditions such as adventitia bursitis at the end of the coccyx, traumatic arthritis of the sacrococcygeal joint, non-union fracture, irregular tumor or cyst of

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coccyx, lesion of adjacent area, arachnoiditis, or precoccygeal. calcifying tendinitis. Careful examination is necessary to rule out these underlying conditions prior to pain treatment. Other causes of coccyx pain, such as infectious etiologies (eg, pilonidal cyst), masses, and pelvic floor muscle spasms, must be ruled out. Radiographic images can more closely evaluate the presence of fractures, degenerative changes, or masses. Imaging studies, including dynamic x-rays and magnetic resonance imaging, can help diagnose hypermobility or hypomobility of the sacrococcygeal joint. Various abnormal radiographic findings associated with coccydynia have been described that can be detected within three months of pain onset, such as retroversion of the coccyx with spicules, scoliotic deformity, or anteversion of the coccyx, anterior or posterior subluxation, hypermobility.

However, up to 30% of cases may have no identifiable radiographic abnormalities. It is important to review a history of recent trauma with acute onset of pain, or the onset of pain may be insidious without a clear precipitating factor. Coccydynia is most often caused by direct trauma to the coccyx such as a fall. Trauma causes inflammation and edema with possible subluxation or abnormal hypermobility of the coccyx. Physical examination will reveal tenderness over the coccyx. Rectal examination allows the coccyx to be grasped between the index finger and thumb. Manipulation will be painful and may reveal hypermobility or hypomobility of the sacrococcygeal joint. Normal range of motion should be around 13 degrees.[1,2]

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Although the identification of chronic coccyx pain happened back hundreds of years, its treatment can be difficult and sometimes controversial due to the multifactorial nature of coccyx pain. Many physiological and psychological factors contribute to its etiology. Most cases of coccydynia resolve within weeks to months with or without conservative treatment, but for some patients, the pain could be chronic and very bothersome.[2]

Even when the etiology of coccydynia can be determined, current treatments for the condition tend to be ineffective or provide incomplete relief. Conservative therapies for coccydynia such as heat, ice, topical anesthetics, and manual intrarectal manipulation have been shown to have limited efficacy. Physiotherapy has been shown to have a 16% cure rate. Maingne and Chattelier reported a six-month success rate for initial treatment with levator ani massage (29.2%), levator ani stretching (32%), and sacrococcygeal joint mobilization (16%) for an overall success rate of 25.7%. Local injection of corticosteroids alone or by manipulation has been shown to have success rates for 60% and 85%, respectively, but nearly one-third of patients experience relapse of symptoms within one year. While coccygectomy is an effective treatment for refractory cases, its invasive nature and the potential for postoperative complications such as infection and rectal drainage keep clinicians looking for an effective alternative to conservative treatment.[1,2]

Recently, prolotherapy has emerged as a promising treatment for recalcitrant coccydynia. Prolotherapy is an injection therapy for chronic musculoskeletal injuries, including coccydinia. Prolotherapy injections aim to tighten and strengthen weak or loose tendons, ligaments, or joint capsules through the multiplication and activation of fibroblasts. The main principle is the injection of small volumes of irritant solution into the painful ligament and tendon insertions as well as in the adjacent joint space during multiple treatment sessions.

Khan and colleagues demonstrated a significant reduction in self-reported coccyx pain via visual analogue score (VAS) in patients treated with prolotherapy. Although encouraging, this study examined palpation-only guided injections performed without direct imaging. The injections are targeted to the superficial areas experiencing the most pain. Yin Ting Chen et al., investigated the ultrasound prolotherapy approach in patients with coccyx pain and showed very satisfactory results. From three case reports they gave, pain level was reduced by more than 50%, the initial pain even disappeared for a long period of time.

Case

This case report describes a patient who is a member of the Indonesian Army who was traumatized by falling from a height while carrying out rope climbing for training. The patient fell from a height of more than 5 meters. This causes the patient to experience chronic coccyx pain. Tailbone pain gets worse when the patient sits for a long time, stands for a long time, even during intense sports activities. Pain often occurs when there is a change in position, such as from sitting to standing and vice versa. After regularly taking pain medications for years, the pain has not diminished.

When initially admitted, the patient showed a degree of pain NRS 8. This was seen when the patient got up from a sitting position. The pain management team planned repeated prolotherapy procedures with the first procedure taking place in October. This technique is proven to be able to reduce patient pain by around 50-60% of initial pain after the first session of prolotherapy. The second session of prolotherapy was carried out in November and once again showed a significant reduction in the degree of pain to NRS 1. At this time, a third session of prolotherapy is still scheduled, but if the patient's complaints of pain are no longer significant, then the third session of prolotherapy is no longer needed.

Male, 22 years old, a patient who is a member of the Indonesian army had an accident during the routine training schedule in February 2021. The patient fell from a height of about 10 meters in an obstacle course training session. The patient fell into a seated position. After the incident, the patient often complains of pain in the tailbone area to the waist with throbbing pain and sometimes stabbing. When the pain appears, the patient admits that he cannot do his usual activities, such as difficulty in walking and pain in switching positions. Pain can strike while at rest, but more often recurs during strenuous activity.

Figure 1. sagittal ultrasound probe in the coccyx bone

The patient had kept silent about this because he thought it was only temporary pain until there was a visit to Berastagi Hospital, an X-ray was taken for the patient, and the results came out to be a dislocation with a fracture of the coccyx. Pain is found when changing positions from sitting to standing and vice versa. Tenderness in the coccygeus area positive, with local characteristic and no radiating pain.

Prolotherapy I (20 October 2022): The patient is in prone position, prolotherapy Solution 10cc (D15% + Lidocaine 40 mg), injection was made with a sagittal ultrasound probe in the coccyx bone, 2-3cc to the cranial direction, 4cc to the caudal direction, injection with a 10 cc syringe using a needle syringe 23.

Prolotherapy II (20 November 2022): The patient is in prone position, prolotherapy Solution 10cc (D20% + Lidocaine 40 mg), injection was made with a sagittal ultrasound probe in the coccyx bone, 2-3cc to the cranial direction, 4cc to the caudal direction, injection with a 10 cc syringe using a needle syringe 23. After the first prolotherapy was performed, the patient stated that he was satisfied with the results because he felt that he could move more freely than before and was able to do his activities as usual. The initial NRS of 8 is reduced by about 50% to NRS 4. After the second prolotherapy was carried out, pain during activity was reduced by around 50% to NRS 1-2.

DISCUSSION

The coccyx is the terminal segment of the spine. The word coccyx comes from the Greek word for cuckoo's beak because of its similar appearance when viewed from the side. The coccyx is a triangular bone consisting of 3 to 5 fused vertebrae, the largest of which articulates with the lowest sacral segment. In addition, the first coccygeal segment contains a rudimentary articular process called the cornu of the coccyx which articulates with the sacral horn. The lower portion of the phylum terminale, also called the coccygeal ligament, inserts into this first segment. The coccyx is bounded anteriorly by the levator ani muscle and the sacrococcygeal ligament. Moving from anterior to posterior, its lateral edge serves as the insertion site for the coccygeal muscle, sacrospinous ligaments, sacrotuberous ligaments, and fibers of the gluteus maximus muscle. Inferiorly, the tendon of the iliococcygeus muscle inserts into the end of the coccyx. These ligaments and muscles help support the pelvic floor and also contribute to voluntary bowel control. In a study of the gross anatomy of the intercoccygeal joints, Maingne, Guedj, and Straus described the wide variability in joint structure: from intact discs resembling lumbar intervertebral discs to intermediate disc structures with cystic or fibrotic changes in the synovial joints. In some cases, the joints are fused. Certain types of coccyx morphology can also predispose to coccyx [6].

Despite their small size, the coccyx has several important functions. As well as being the insertion site for several muscles, ligaments, and tendons, it also serves as a tripod for one leg—along with the ischial tuberosity—which provides weight-bearing support for a person in a seated position. Leaning back while in a sitting position causes increased pressure on the coccyx. The coccyx also provides positional support to the anus [6].

In the classic lecture by Simpson, injury to the coccyx or coccyx joint with inflammation in the surrounding tissue and contraction of the muscles attached to the coccyx causes characteristic coccyx pain. Although Simpson's statement is still true, the factors that trigger the pain appear to vary. Traycoff, Crayton and Dodson classified coccyx pain as pain arising from the coccyx itself, pain radiating to the coccyx, or pain of neurogenic origin, arising from nerve roots, plexuses or peripheral nerves radiating to or through the coccyx. However, the classification is limited. A more detailed classification should not only be based on the location of the pain, but must also include the pathoanatomic of the origin of the pain [6,7].

The most common cause of coccydynia is a single direct axial trauma such as a direct fall onto the coccyx or, as during the post-natal period, due to a subtle form of cumulative trauma resulting from awkward sitting. Schapiro, in 1950, described the disorder as 'television sickness', since poor postural adaptation is thought to be an important predisposing factor to coccydynia. Mainne et al reported that 36 of 51 patients had a history of direct trauma, and Pennekamp et al reported a 50% incident direct trauma. Depending on the severity of the trauma, the patient has a strain on the pelvic floor muscles, mild distortion without damage to the bone or ligaments above the cleft in the coccyx segment, or a severe fracture dislocation of the sacrococcygeal complex. Maingne, Doursounian and Chatellier reported a body mass index of greater than 27.4 in women and 29.4 in men as a risk factor for the development of idiopathic and post-traumatic coccydynia. When an obese person tries to sit up, the coccyx tends to protrude backwards as a result of insufficient sagittal rotation of the pelvis. This results in increased exposure to intrapelvic pressure that develops during the act of sitting or during falls, resulting in subluxation of the coccyx.

In this patient, trauma cases were the triggering factors for coccyx pain. Incidents of falls were experienced when the patient took part in a rope climbing training then fell to seated position with a fall height of 5 meters from the ground.

In the first prolotherapy, the solution injected was a mixture of 15% D plus 40 mg of lidocaine. The injection is given when the patient is in the prone position and is given twice. The first approach is given caudal then cranial. The amount of solution in the caudal approach is around 2-3 cc while the amount in the cranial approach is 4 cc. After the first prolotherapy, the pain condition improved and decreased from NRS 8 to NRS 3-4. The patient is scheduled for a second prolotherapy procedure in 2-4 weeks.

In the second prolotherapy, the solution concentration was increased to D20% plus 40 mg lidocaine. The injection is the same as during the first prolotherapy, where the patient is positioned prone and given two doses. 2 cc in the caudal direction and 4 cc in the cranial approach. After the second prolotherapy, the pain condition reduced again. Where the initial NRS of 4 is reduced to NRS 0-1. Patients are scheduled for follow-up prolotherapy in 2-4 weeks.

In this case the patient was able to carry out normal activities as usual after the first prolotherapy and was able to reduce the use of pain medications that he usually consumes. This reduction in pain level persists as long as the patient is not in the hospital for about 4 weeks. After the second prolotherapy, with an even lower level of pain, it is hoped that the patient can stop all use of pain medications and can do activities like the patient before the coccyx injury. Previously the patient had been scheduled for a third prolotherapy, but if the patient's pain complaints were no longer significant, the third prolotherapy was no longer needed.

This is in accordance with the results obtained by Chen et al. Where they did case reports of 3 patients with chronic coccygian and performed prolotherapy therapy in all three patients. All of the patients show satisfactory results with permanent loss of chronic pain.

CONCLUSION

Prolotherapy is an effective pain management technique as pain relief in patients with coccyx pain. This technique is quite safe and because the injection site is far from risky large blood vessels and nerves, it can be performed by anaesthesiologists who are not familiar with this technique, especially when assisted with ultrasound guidance. Prolotherapy injections are carried out with two approaches from the cranial and caudal directions. Prolotherapy should be repeated in several sessions so that the level of effectiveness and patient satisfaction can be increased.

DECLARATIONS

Ethics approval and consent to participate. Permission for this study was obtained from the Ethics Committee of Universitas Hasanuddin Makassar, Indonesia.

CONSENT FOR PUBLICATION

The Authors agree to publication in Journal of Society Medicine.

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None.

AUTHORS' CONTRIBUTIONS

All authors significantly contribute to the work reported, whether in the conception, study design, execution, acquisition of data, analysis, and interpretation, or in all these areas. Contribute to drafting, revising, or

critically reviewing the article. Approved the final version to be published, agreed on the journal to be submitted, and agreed to be accountable for all aspects of the work.

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