Case Report

Polymermethacrylate Cement Augmentation of the Coccyx (Coccygeoplasty) for Fracture: A Case Report

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Background: Coccydynia is a painful disease of the sacrococcygeal region, which causes discomfort, especially as symptoms are aggravated by sitting. It is frequently related to trauma and idiopathic causes, and the pain is mostly chronic in character. Percutaneous vertebroplasty and sacroplasty are the methods widely used in treating compression fractures and deficiency of vertebral body and sacrum. However, the efficiency of polymethylmethacrylate injection in the treatment of osteoporotic coccyx fractures and coccydynia is still unknown.

Case Report: A 68-year-old man admitted to our clinic with complaints of pain in the sacrococcygeal and perianal regions. In the imaging studies, a fracture line in 5th sacral and 1st coccygeal segments, as well as oedema in the bone structure was observed. Since the patient’s pain did not improve with conservative methods, we treated our patient with coccygeoplasty.

Conclusion: In this report, we have presented a case with osteoporotic coccyx fracture treated through coccygeoplasty. We recommend coccygeoplasty in the treatment of acute or subacute osteoporotic coccygeal fractures and coccydynia with oedema.

Keywords: Fracture, coccydynia, coccygeoplasty, osteoporosis

Several factors cause the pain associated with the tail bone, and yet it is mostly seen due to idiopathic reasons. The most frequently observed causes are trauma, repetitive micro-traumas, obesity, and rapid weight loss (1). Coccydynia related to coccyx pathologies is observed five times more frequently in women than in men. This is probably due to the higher of body mass index in women (2). Coccydynia is either related to coccyx fractures or posterior sacrococcygeal subluxations caused by recurrent or prolonged vertical loading and chronic traumas related to sitting (3). Percutaneous vertebroplasty is a well-known method used in treating vertebral body compression fractures for a long time and is also effective in immediate pain control. Besides this, sacroplasty is a technique defined in pain control and deficiency of sacrum fractures (4). Treatment of osteoporotic coccyx fractures by polymethylmethacrylate (PMMA) injection has been reported in the literature only once and termed as coccygeoplasty (5). Coccydynia is not a rare condition, and lots of patients may benefit from PMMA augmentation (i.e., coccygeoplasty). To the best of our knowledge, this is the second report about coccygeoplasty, which aims to contribute to the knowledge about the indications, technique, and outcomes of this procedure.

Case Report

A 68-year-old man reported to our clinic with complaints of chronic pain in the sacrococcygeal and perianal regions. His pain was aggravated when he was sitting or during defecation. Besides, when he changed from a sitting to a standing position or when he was lying, the pain would stop. Although there was no history of major trauma, the patient reported occasional slipping and falling. He was hypertensive and suffered from type 2 diabetes mellitus. He had L3-4-5 decompression and stabilization due to lumbar spinal stenosis, and imaging revealed that the bone structure was osteopenic. Upon physical examination, the sacrococcygeal region particularly was sensitive to direct touch. His neurological examination was normal. In the imaging studies (lumbosacral MRI and X-ray), a fracture in the 5th sacral and 1st coccygeal segments was observed as evidenced.
by bony edema and coccyx angulation (Figure 1). The patient was first treated with non-steroidal anti-inflammatory agents, and doughnut pillows were recommended. During the follow-up period, two weeks after, pericoccygeal local anaesthetics and steroid injections were administered to the patient, but did not relieve the pain was. The pain was severe enough to affect daily life adversely. It has been decided that conservative treatment did not maintain sufficient pain control, and the patient was evaluated for invasive procedures. After informing the patient about the benefits and possible risks, the decision was taken to perform coccygeoplasty using PMMA cement. The patient was placed on the operation table in the prone position, administered spinal anaesthesia, and sedated. His pelvis and abdomen were supported with rolls and pads. By placing C-arm fluoroscopy over the operation table, the entry point was determined at the midline using anteroposterior and lateral planes (which corresponded to the painful area of the sacrococcygeal junction) targeting to fill the first and second segments of the coccyx with an angle of about 45 degrees using an 18-Gauge Chiba needle. Entrance cannulas were placed through the entrance points by checking on the lateral and anteroposterior projections. They were checked by fluoroscopy, and approximately 2.5-3 ml of PMMA cement injection was administered (Figure 2). After carrying out the final fluoroscopy controls in the lateral and anteroposterior projections, the operation was completed. No complication was encountered (Figure 3). Postoperatively, he was mobilized on the same day. On the first day after the operation, he was discharged from the hospital with complete pain control. During the controls on the third month, the patient confirmed that he had no pain and did not need analgesics.

**Discussion**

Coccydynia is defined as pain in the coccygeal region, and patients describe this pain as a pain that is closer to the anal region and between the buttocks, and it is called 'tailbone pain'. Although its real incidence is unknown, it accounts for less than 1% of all lumbosacral region pains (6). Obesity, female gender, rapid weight loss and internal (childbirth, etc.) and external (falling backward etc.) traumas, minor traumas (such as sitting on a hard and inconvenient surface, etc.), non-traumatic causes (anomalies in the mobility of the coccygeal joint, degenerative phenomena, infectious causes, etc.) can be the related factors (6).

The pain was aggravated by sitting, standing for a long time, and defecation. Tenderness was observed at the coccyx during physical examination. During imaging studies (X-ray, CT and MRI), fracture lines and/or the sacrococcygeal joint’s hyper/hypo-mobility, angulation, in oedema the bone (especially in STIR sequence on MRI) and surrounding soft tissue can be observed (7). The cause of our case’s coccydynia was probably micro-traumas due to falling, and bone oedema in STIR MRI suggested subacute fracture. In coccydynia, X-ray is recommended on sitting and standing positions to evaluate the instability of the sacrococcygeal joint. However, it is evaluated via X-ray in the standing position in several centers, as such the diagnosis and cause of coccydynia can be missed (8). We recommend X-ray in both sitting and standing positions for patients with pain in the coccygeal region.

Whatever the cause of coccydynia, it can be placed under control by conservative methods such as physical therapy, manipulation of coccyx, and anaesthetic treatments (NSAIDs, acetaminophen, opioids, etc.), U wedge or doughnut-shaped coccygeal cushions (7,8). However, in some groups of coccydynia cases, which are less frequently observed like our present osteoporotic coccygeal fracture case, conservative methods are not sufficient (about 10% of the cases) (5,6). Interventional methods can be applied in patients whose pain does not regress with conservative methods. These methods are caudal epidural steroid injections, recurrent pericoccygeal local anesthetics and/or steroid injections, ganglionic parasympathetic nerve blocks, selective radiofrequency ablation of the coccygeal nerve procedures (8,9). It was noted that pain control was achieved in 59% of the cases only by using injections; the success rate was stated to be 85% when injection and manipulation were combined. However, about 28% of the pain was observed to relapse (10). Surgical procedures must be considered in cases when a response is not received by all other treatment methods. Surgical treatment of coccydynia is known as coccygectomy and which is the amputation of coccyx from sacrococcygeal junction below S5 (6,8).

In a limited number of cases, it can be applied if other treatments fail. This surgical procedure has risks such as postoperative septic infection, osteomyelitis, persistent pain, and pelvic floor prolapse(4,6,8). In acute or subacute osteoporotic fractures, or edematous coccyx that appear in MRI, this is considered as an alternative for coccygeoplasty. Dean et al. defines coccygeoplasty as the treatment of applying cement via percutan in a case with persistent pain due to osteoporotic coccygeal fracture. Dean et al. considered that conservative methods remained insufficient in treating coccydynia mainly due to osteoporotic fractures and recommended coccygeoplasty method to control pain in such cases (5). This method is a technique similar to vertebroplasty and sacroplasty and ensures pain control as well as mechanical stabilization of fracture by applying PMMA cement. This technique can be rapidly and safely applied to a patient with osteoporotic coccygeal fracture who has refractory pain (5,11). The neurological complication risk of this procedure is very low since there is no spinal canal at the coccygeal level. This procedure can cause painful defecation complications if cement leaks to the pericoccygeal region. In order to prevent this, an operation is recommended to be carried out by using fluoroscopy imaging at a lateral and anteroposterior plan (5,7,8). Therefore, we applied coccygeoplasty with spinal anaesthesia and sedation to our patient with osteoporotic coccygeal fracture whose pain was not relieved.
by conservative methods. In the method described by Dean et al., coccygeoplasty was carried out with two separate cannulas set at the two coccyx segments from the right and left. In our case, we have carried out the same procedure from a single midline entrance. Obtaining the same result from a single entrance made the procedure less invasive for the patient. Although there are many alternatives in the treatment of coccydynia, coccygeoplasty is recommended for treatment of osteoporotic coccygeal fractures and coccidinia patients with oedema seen in STIR MRI. The advantage of the coccygeoplasty method is the fact that it is a successful and rapid method in pain control, early mobilization can be achieved, the morbidity of the patient is lesser, and the length of hospital stay is shorter. When general anaesthesia is not administered, the risks due to anaesthesia can be excluded. Our patient was observed to be pain-free too in a three-month follow-up, and the long-term result of coccygeoplasty was found to be successful.

There is still not a method that can be considered as the standard in treating coccydynia. It usually controlled by conservative measures such as physical therapy, manipulation of the coccyx, analgesic treatments, and coccygeal cushions. However, these methods may be insufficient in osteoporotic coccygeal fractures. For the treatment of retractable pain in the treatment of acute or subacute osteoporotic coccygeal fractures and coccydynia with oedema, coccygeoplasty is recommended as a good and easy method.

Conflict of Interest: The authors declare no conflicts of interest.

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References

FIG. 1. Preoperative images (sagital TI and contrast enhanced MRI) show that coccygeal fracture and bone edema
FIG. 2. Perioperative floroscopy images.

FIG. 3. CT images after the coccygeoplasty procedure.