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The primary aim of *World Journal of Clinical Cases* (*WJCC*, *World J Clin Cases*) is to provide scholars and readers from various fields of clinical medicine with a platform to publish high-quality clinical research articles and communicate their research findings online.

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Heel pain caused by os subcalcis: A case report

Saijilafu, Suo-Yuan Li, Xiao Yu, Zhi-Qiang Li, Guang Yang, Jing-Huan Lv, Guang-Xiang Chen, Ren-Jie Xu

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Abstract

BACKGROUND

The accessory bones are common bone variations around the feet and ankles, which usually originate from nonunion of the secondary ossification center adjacent to the main bone mass, and most of them remain asymptomatic. Os subcalcis is an accessory bone at the plantar aspect of the calcaneus, which is located just posterior to the insertion of the plantar fascia. Focal bone formation at the calcaneal plantar pole with heel pain has rarely been reported.

CASE SUMMARY

A 55-year-old man presented to our clinic with left plantar heel pain and a progressive swelling for 8 years. X-ray, computer tomography and magnetic resonance imaging showed a large os subcalcis on the plantar side of the calcaneus, located at the insertion of the plantar fascia. He underwent surgical excision of the lesion. Microscopically the bony trabeculae were intermingled with fat and covered with cartilage.

CONCLUSION

This is a rare case with accessory os subcalcis leading to heel pain. It highlights the awareness of os subcalcis and helps avoid future misdiagnosis of heel pain.

Key Words: Heel pain; Accessory ossicle; Calcaneus; Os subcalcis; Case report

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Core Tip: We present a case of a 55-year-old male patient who suffered from heel pain. Imaging examination revealed a large accessory bone located on the plantar surface of the calcaneus, slightly behind the insertion point of the plantar fascia. The heel pain was alleviated by the removal of os subcalcis.

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INTRODUCTION

The accessory bones usually originate from nonunion of the secondary ossification center adjacent to the main bone mass[1,2]. They are common bone variations around the feet and ankles and remain mostly asymptomatic[3]. Os subcalcis is an accessory bone at the plantar aspect of the calcaneus, which is located just posterior to the insertion of the plantar fascia[4]. Focal bone formation at the calcaneal plantar pole has rarely been reported. We here report a case of bone formation of the plantar calcaneus in a man.

CASE PRESENTATION

Chief complaints

A 55-year-old man presented to our clinic with left plantar heel pain and a progressive swelling for 8 years.

History of present illness

Eight years previously, he felt pain in his left heel, especially when standing and walking, and a progressive swelling of the heel. Three years ago, he received a local blockage in the left heel, which temporarily relieved his pain. In recent two months, the pain was aggravated and affected his walking. He denied any previous trauma to the left heel.

History of past illness

After the patient was hospitalized, the preoperative examination identified diabetes which the patient was unaware of. Following drug treatment, the patient's blood sugar has been well controlled.

Personal and family history

The patient had unremarkable personal and familial medical history, including psycho-social history.

Physical examination

Physical examination showed that the callosity was approximately 3 cm in diameter, and could be seen at the bottom of the left heel (Figure 1).

Laboratory examinations

His red blood cell count, hemoglobin, white blood cell, white blood cell differential count, platelet, C-reactive protein, erythrocyte sedimentation rate, rheumatoid factor and uric acid test results were within normal limits.

Imaging examinations

X-ray, computer tomography and magnetic resonance imaging (MRI) showed a large os subcalcis on the plantar side of the calcaneus, located at the insertion of the plantar fascia (Figure 2). The accessory bone was in the shape of an inverted pyramid, about 35 mm × 35 mm × 25 mm in size.

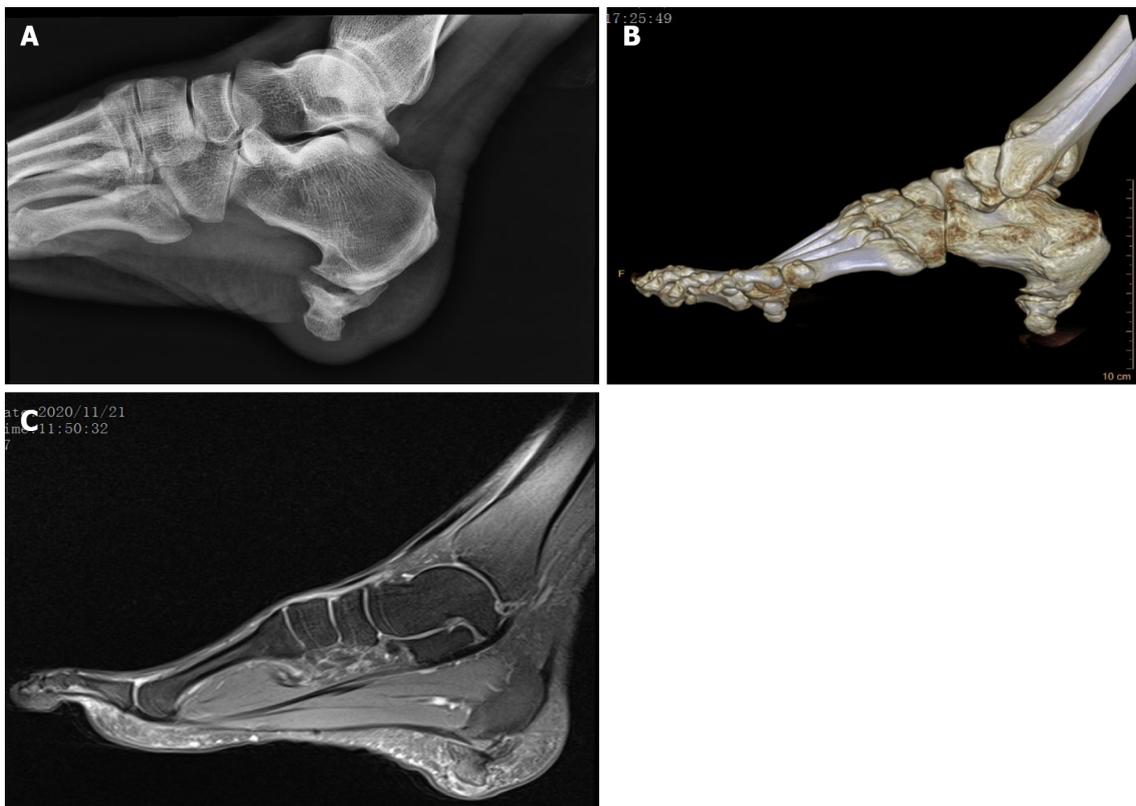
FINAL DIAGNOSIS

The final diagnosis was large os subcalcis on the plantar side of left calcaneus.



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Figure 1 Callosities at the plantar aspect of the heel of the right foot. A: Lateral position; B: Direct vision; C: Prone position.



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Figure 2 Imaging examinations of the left ankle/calcaneus demonstrated a bony structure on the plantar side of the calcaneus. A: Radiograph; B: Computer tomography scan; C: Magnetic resonance imaging.

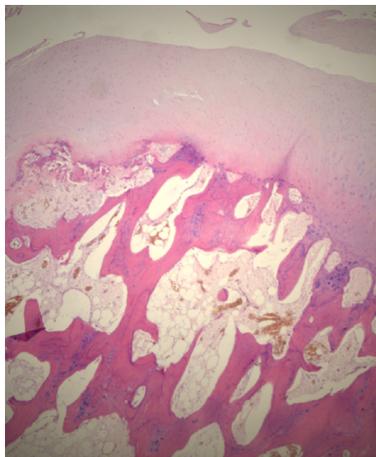
TREATMENT

The large os subcalcis was excised under spinal anesthesia in the prone position. The left leg and foot were prepared using Anerdian. The skin and subcutaneous tissue were cut layer by layer through a longitudinal spindle incision on the heel bone surface. At the plantar surface of the os subcalcis, a bursa was present. The surrounding fibrous soft tissue was released and the os subcalcis was exposed. Along the surfaces of the neo-arthritis between the os calcis and os subcalcis, fibrous tissue and cartilage-like tissues were observed. The os subcalcis and the bursa were completely resected (Figure 3). Following hemostasis, the skin incision was sutured intermittently. The resected os subcalcis was sent for histological examination. Macroscopically, the resected bone was pyramid shaped and measured 35 mm × 35 mm × 25 mm. Microscopically, the bony trabeculae were intermingled with fat and covered with cartilage (Figure 4). Celecoxib was orally administered at 200 mg twice daily after surgery for analgesia.



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Figure 3 Macroscopic view of the resected os subcalcis. A: Distal surface; B: Proximal bone surface.



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Figure 4 Microscopy showed that the bony trabeculae were intermingled with fat and covered with cartilage.

OUTCOME AND FOLLOW-UP

The radiography at the first postoperative day demonstrated that the os subcalcis was completely resected (Figure 5). No weight-bearing on the heel was allowed until the incision healed. At 3 wk after surgery, the heel pain was relieved, and the patient was able to walk freely.

DISCUSSION

Plantar heel pain is the most common foot problem, which can be caused by bone, soft tissue, nerve or systemic diseases. Although accurate diagnosis and proper management are important, it is difficult to distinguish the various causes of highly similar symptoms. The bone disorders include calcaneal stress fracture, calcaneal apophysitis, osteomyelitis and inflammatory arthritis. Soft tissue pathology includes fat pad atrophy or contusion, plantar fascia rupture and plantar fasciitis. Neurological factors include the first branch of the lateral plantar nerve, the medial calcaneal branch of the posterior tibial nerve, and S1 radiculopathy, tarsal tunnel syndrome and peripheral neuropathy[5]. There are few reports on plantar heel pain caused by os subcalcis in the literature.

The accessory bones usually originate from nonunion of the secondary ossification center adjacent to the main bone mass. They are common bone variations around the feet and ankles. The percentage of adult feet with accessory bones ranges from 18% to 30%.

Kruse *et al*[6] investigated more than 1200 foot X-ray films from the DuPont Institute in Wilmington, DE, United States, in order to estimate the incidence of accessory bones around the foot and ankle. Cilli *et al*[7] performed anteroposterior and lateral plantar X-rays on 464 male patients in Kayseri, Turkey, to



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Figure 5 Radiograph at the first postoperative day demonstrated that the os subcalcis was completely resected.

analyze the presence, incidence and distribution of accessory bones. Coskun *et al*[8] investigated 984 foot X-rays from the medical schools of Akdeniz University and Hacettepe University in Turkey to estimate the incidence of accessory bones around the ankle. Longo *et al*[9] investigated the prevalence of accessory ossicles and sesamoid bones in a population of Italian women with hallux valgus. A total of 505 women aged 26 to 80 years at the time of hallux valgus correction were examined. Udoaka *et al*[10] conducted a study of 520 radiographs in Nigeria to ascertain the prevalence of sesamoid bones. Koo *et al* [11] retrospectively reviewed foot images of 213 patients taken at a tertiary hospital in Seoul, Korea. Neither these investigations nor some reviews mentioned os subcalcis[3,12-14].

We found a very few case reports of os subcalcis in the literature. Milliken[4] was the first to describe os subcalcis in the literature. In 1937, a 65-year-old farmer with a small bony structure on the plantar side of the calcaneus was described. The ossicle was removed, and the histological examination demonstrated a spongy bone covered with cartilage, with well-oriented trabecula. Varounis *et al*[15] reported an 11-year-old female who presented with a bony mass separate from the posterior portion of the calcaneus. Clinically, the os subcalcaneum displayed a syndesmotic attachment to the calcaneus. Husebye *et al*[16] presented the case of a 72-year-old female with a volume-expanding os subcalcis. Histological examination demonstrated that cartilage covered the surface of os subcalcis with endochondral ossification between the cancellous bone and the cartilage. Combined with the above reports[4,15,16], we believe that the surgical indications of os subcalcis are: (1) progressive enlargement of the heel mass; (2) significant heel pain or walking instability caused by the heel mass; and (3) broken heel skin caused by the heel mass.

Imaging plays a crucial role in the diagnosis of plantar subcalcis. Among imaging tests, MRI can clearly reveal the cartilage covered surface of os subcalcis, trabecular bone structure and the well demarcated and formed cortical findings[17]. MRI helps us in differential diagnosis with heterotopic ossification, ectopic calcification, osteochondroma[18], periosteal osteosarcoma[19]. In addition, ultrasonography performed with high-resolution broadband linear-array probes due to low cost, fast, readily available, and free of ionizing radiation. It is becoming increasingly important in the evaluation of the ligaments around the ankle joint. Ultrasound has an additional role in the first level differential diagnosis of ankle and heel pain as well as in detection of accessory bones[20,21]. The use of a gel stand-off pad can detect otherwise-missed peri- or intra-lesional flow signals on Doppler imaging, increasing the diagnostic role of this technique in differential diagnosis of heel pain[22].

CONCLUSION

We report a rare case of a patient with accessory os subcalcis leading to heel pain. The accessory os subcalcis was completely excised, and the heel pain disappeared after surgery. This case report may improve the orthopedic awareness of os subcalcis and help avoid future misdiagnosis of heel pain.

FOOTNOTES

Author contributions: Saijilafu and Li SY contributed equally to this work. Saijilafu and Li SY conducted all integrated data, edited the figures and wrote the manuscript; Yu X and Li ZQ critically reviewed the manuscript; Yang G and Lv JH performed the pathological examination; Chen GX and Xu RJ supervised the study and provided advice; Chen

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