

CASE STUDY

A RARE COMPLICATION OF CALCANEAL FRACTURE – CALCANEAL NON-UNION. CASE REPORT

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Andrii A. Sherehii, Vasil V. Stoika, Vasil V. Lytvak
SHEI "UZHGOROD NATIONAL UNIVERSITY", UZHGOROD, UKRAINE

ABSTRACT

The aim was to study published reports of postoperative intra-articular calcaneus fractures non-union complications after ORIF, determinate the main reasons for such complications and study the ways to improve the treatment results/ We retrospectively studied anamnestic data, medical history from 2018, and the treatment process of our patient in 2019-2020 with calcaneus ORIF post-operative non-union. The patient was managed by secondary ORIF with autogenous bone marrow grafting after removal of broken retainers. At 6 months, the result was evaluated as good according to the AOFAS scale, (89–80 points for AOFAS). Non-union after calcaneus fracture ORIF management is an extremely rare complication. Controlled randomized trials with a larger sample size and longer follow-up are required for plausible evidence and systematization of treatment principles.

KEY WORDS: clinical case, calcaneus fracture, non-union

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INTRODUCTION

The most vulnerable to calcaneal fractures are physically active, able-bodied male. In the observation of Savgachev, 2016, which was based on 372 patients aged 22 to 58 years with a peak of 42 ± 3 years, for the period 2010 - 2016, gender distribution was more favorable for male patients (81.6%) than for female patients – 69 (18.4%) [1].

According to the statistics given by Essex-Lopresti P, calcaneus fractures in 75% -92% of cases have a fracture line that runs through the articular surface and are characterized as intraarticular with an impression-shifting nature. It can be a prerequisite for post-traumatic deforming osteoarthritis of the joints of the posterior foot, with the consequences in the form of constant pain, swelling syndromes, functional restriction of the foot [2].

Relatively infrequent, but at the same time severe in consequence, is trauma of the posterior part of the foot, including fracture of the calcaneus, which makes from 2,0% to 5,7% in the structure of all fractures of the human skeleton, and taking up nearly 65% of the total foot bones fractures [3].

The high rate of unsatisfactory treatment results in the range of 13.0% -27.3% is maintained nowadays, and in some types of fractures their proportion reaches up to 80.5% [4]. The need for re-surgical treatment arises in 40% of such patients in 2–3 years after the trauma and the proportion of entry to primary disability as a whole range from 25.0% to 34.1% of all victims [5]. However, calcaneal non-union after surgical treatment is a rare complication, which was described only in severe case reports available for our review.

The basis of modern principles of treatment is the restoration requirement of joint congruence, restoration of axial ratios under the condition of careful attitude to soft tissues.

Our research intended to study published reports of post-operative intra-articular calcaneus fractures non-union complications after ORIF, determinate the main reasons for such complications and study the ways to improve the treatment results and identify the best clinical treatment strategies for their management.

We retrospectively studied anamnestic data, medical history from 2018, and the treatment process of our patient in 2019-2020 with calcaneus ORIF post-operative non-union at Trauma department of Uzhhorod district clinical hospital of Uzhhorod district council of Zakarpattia region.

Assessments of the clinical efficiency of surgical treatment complexes were studied in terms of 3 months, and 6 months using X-ray and clinical-functional methods.

Literature retrieval composed by the searched publication through databases PubMed, Medline, Elsevier, Google scholar and E-library using the search terms "calcaneal fracture complications", "Heel-bone malunion", "calcaneus non-union". The search was restricted to English-language and Russian-language journals.

CASE REPORT

A 56 years old male patient was referred to the Uzhhorod district clinical hospital by family GP doctor with persistent pain and swelling of his heel during physical activity, walking distance over 400 meters.

ANAMNESIS MORBI

The patient received injury, as a result of falling from a height in 2018. He accepted emergency care in the amount of plaster



Fig. 1. Radiographs 5 months after the accident.



Fig. 2. CT- print 5 months after the accident.

immobilization, analgesics. Patient's general condition was burdened by the presence of edema, epidermal phlyctens, subcutaneous hematomas of the foot and ankle joint, over 20 years smoking experience. Next day after the trauma he was admitted to the trauma department of the City Hospital with Diagnosis: Closed calcaneus intraarticular AO 82 C2 (Sanders 3) fracture, with joint depression and fragment displacement. The conservative treatment for twelve days by anti-edema therapy, applying plaster cast immobilization, physical therapy by isometric muscle exercises of the thigh and shin from both lower extremities led soft tissues to the readiness for surgery. Applied ORIF with restoration of the posterior talar articular surface of the calcaneus and LCP fixation, followed by protected weight bearing for 9 weeks. Postoperative period without complications during observation period.

THE MEDICAL HISTORY (ANAMNESIS VITAE)

The working age patient was in good physical condition, had any significant comorbidities before the trauma accident. For the last 3 years suffered from a periodic hypertension with values of systolic blood pressure up to 150 mm. Hg., cured by occasional intake of oral medications, composed of Amlodipini besilas. Smoker's experience is occurring more than last 10 years. The osteochondrosis of the lumbosacral region of the spine have been troubling for 5-6 years.

The patient denies the presence of viral hepatitis, tuberculosis, HIV, venereal diseases in the medical history; allergic history is not burdened

PHYSICAL EXAMINATION (STATUS PRAESENS OBJECTIVUS)

Clinical examination and radiological evaluation, including CT scan of the foot, revealed evidence of calcaneal non-union with subtalar arthritis and broken plate in February 2020 (Fig. 1., Fig. 2.). During pre-operative assessment any serious comorbidity wasn't detected. \

TREATMENT

The patient was managed by secondary ORIF with autogenous bone marrow grafting after removal of broken retainers. Ultimate stabilization was achieved with a heel plate with angular stability and locking screws. In the early postoperative period superficial surgical site infection combined with marginal superficial 2 cm necrosis of the proximal skin flap was developed, that has been successfully treated with regular wound dressings and antibiotics. Delayed wound healing allowed to remove the stitches in 15 days and did not significantly affect the final result of treatment.

At 6 months, the result was evaluated as good according to the AOFAS scale, (89–80 points for AOFAS). On standard radiographs, depression of the Böhler angle was noted within 8°–10° degrees.

We have received only a few case reports from accessible sources on English and only single review on Russian language. The first reported case of NON-UNION after calcaneal fracture was published by Thomas in 1993 as recent [6]. There is no significant gender difference in incidence between male or female even in the small number of cases reported. Due to the small number of cases it was not possible to identify similarities that could indicate as a risk factor for non-union. According to the data published by Zwipp et al. there is a tendency to Non-Union preferably after conservative treatment in their experience with high rank of 10% [7]. Smoking and Diabetes mellitus has been detected as a probable risk factor. In Karakurt et al. Report all patients were smokers [8]. This assumption is confirmed by our case with long term smoking experience in patient.

Wajdi's study substantiates the possibility of using Bone Marrow Concentrates (BMC) or Platelet Rich Plasma (PRP) methods, with satisfactory results without harming the subtalar joint [9]. Calcaneal Non-Union refers to a rare but serious complication after calcaneal fractures. The weakness of Zhangs and other studies is that case data are limited, and no more reliable conclusions can be drawn. Considerable high-quality, evidence-based studies are required to explore the etiology of the disease and appropriate treatment options in the future [10].

CONCLUSIONS

Non-union after calcaneus fracture ORIF management is an extremely rare complication.

Controlled randomized trials with a larger sample size and longer follow-up are required for plausible evidence and systematization of treatment principles.

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ORCID and contributionship:

Andrii A. Sherehii: 0000-0002-0088-5473 ^{A,B,C}

Vasil V. Stoika: 0000-0003-2219-2544 ^{D,E}

Vasil V. Litvak: 0000-0002-3378-9648 ^{C,F}

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The Authors declare no conflict of interest

CORRESPONDING AUTHOR

Andrii A. Sherehii

SHEI "Uzhhorod National University"

3 Narodna sq. 88000, Uzhgorod, Ukraine

tel: +38 (050) 610 09 76

e-mail: a.a.s_07@mail.ru

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