Partial Calcanectomy in the Renally Impaired Vasculopath– A Case Series

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Statement of Purpose

Partial calcanectomy is an effective procedure for cases of severe ulceration and/or calcaneal osteomyelitis in the correct patient population. This case series reviews 65 cases of partial calcanectomy in a population with severe vascular and renal insufficiency.

Introduction

Partial Calcanectomy is a limb salvage option in the setting of infection and significant heel ulcerations especially in a frail population where below knee amputation (BKA) would significantly limit life expectancy[1]. Partial Calcanectomy requires less rehabilitation and can achieve improved levels of functional independence compared to BKA. There is a decreased metabolic cost of walking, which has a major impact on patients with multiple advanced comorbidities[2]. Ambulation rates following BKA have been on a decline ~38% of patients being able to ambulate at 1 year due to patients living longer with more significant comorbidities[1]. In comparison, partial calcanectomy has shown an ambulatory status that can be maintained in upwards of 75% of patients[3,4]. One of the major concerns with partial calcanectomy is healing with over 50% requiring some form of revision[5]. In this specific patient population, a partial calcanectomy is an effective procedure for gangrene or infection. We aimed to determine success of the procedure as defined by the ability to maintain ambulatory status and prevent a BKA in a population with several vascular and renal insufficiency.

Table 1: Demographics and Comorbidities

Age (years)	31-95
Sex	M=41, F=24
Follow up (months)	1-72
Diabetes Mellitus	58
Chronic Kidney Disease (on hemodialysis)	35 (22)
Peripheral Vascular Disease	50
Infection	46
History of Below Knee Amputation	9

Methodology

Two surgeons' cases were retrospectively reviewed between 2000-2019. A total of 65 partial calcenectomies were performed due to infection, necrosis, or extensive soft tissue deficits. Antibiotics were given based on culture results and Infectious disease recommendations. Vascular intervention was provided when deemed appropriate. Surgical approach was dependent on heel wound location. A majority of the partial calcanectomies were performed in a staged manner, with the initial procedure being performed for eradication of infection and later closed when no infection remained. Post-operatively all patients were made non-weightbearing and placed in a total contact cast by a prosthetist. At the time of suture removal, patients were allowed to begin ambulation with a brace fashioned by the prosthetist.

Results

65 partial calcanectomies were retrospectively reviewed. Average age was 68 years old with a range of 31 to 95. The average follow up was 12 months with a range of 1 to 72 months. 42 patients survived and did not require a more proximal amputation during their initial hospital stay. Of those 42 patients, 62% were able to avoid BKA at 6 months. Of the 52 ambulatory patients, 75% were able to maintain some form of ambulation post-operatively. Renal impairment was found to have the most substantial impact on the success of limb salvage, with only 54% going on to heal. In patients on dialysis only 45% went on to heal their amputation.

Figure 1: Preoperative Radiograph

Figure 2: Post operative Partial Calcanectomy

Discussion

Patients with large heel ulcerations with or without underlying osteomyelitis have few salvage options and often further complicated by their multiple comorbidities. Prior literature has shown that partial calcanectomy can be a successful option with prevention of BKA between 4% - 20% and upwards of 75% of patients are able to maintain their preoperative ambulatory status postoperatively[3,6]. With this literature in mind, partial calcanectomy has been shown to be a useful procedure in the setting of a limb threatening condition. As comorbidities increase these **rates** begin to decline and complications rise. Diabetic patients have been shown to experience higher rates of minor and major complications and a five times greater risk of major amputation[3]. Crandall and Wagner reported a failure rate of 65% in their diabetic population. Vascular disease has been shown in several studies to not play a significant role in success of partial calcanectomy, but it is often not stated the severity of the disease[3,5,6]. Preservation of limb function is crucial to survivability in this very sick population. Columbo et.al has shown declined ability to rehab BKA and at one year conversion to AKA/Death was 60%, and 39% if TcPO2<40. Our data demonstrates that these procedures can successfully preserve limb and life in this study population.

The population undergoing partial calcanectomy is a very sick one. In our study there was a large number of vasculopaths (77%). These patients are often sicker with higher rates of DM, renal disease, and generally more frail. It has been shown that frail patients have limited success with rehabilitation of BKA, leading to high morbidity. Thus it is crucial that more aggressive attempts at limb salvage be attempted in this population. In this case study we have shown that in population of Vasculopaths with renal impairment that partial calcanectomy remains a viable option for limb salvage.

References

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