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TREATMENT OF BILATERAL CHRONIC CALCANEAL WOUNDS ASSOCIATED WITH OSTEOMYELITIS AND INFECTION OF THE LEFT CALCANEAL TENDON USING THE FIGUEIREDO TECHNIQUE IN A DIABETIC PATIENT: A CASE REPORT

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Abstract
Among the most important complications of Diabetes Mellitus is the diabetic foot. Currently, wound treatment is based on surgical debridement and serial dressings.
However, controlling the evolution of ulcerations is difficult due to the patient's systemic conditions, recurrent infections in the lesions and the association with osteomyelitis and deep soft tissue infection, often requiring hospitalization for surgery and intravenous antibiotic therapy.
The aim of this study is to report a case of surgical treatment with the Figueiredo Technique (FT) of bilateral chronic wounds on the calcaneus, associated with osteomyelitis and infection of the left calcaneal tendon, in a diabetic patient.

Keywords Diabetes Mellitus, surgical debridement and serial dressings.

INTRODUCTION

A 52-year-old male patient with decompensated diabetes and severe heart failure. He developed bilateral chronic wounds on the heels (diabetic foot) with bone exposure associated with osteomyelitis and infection of the left calcaneal tendon, which had been progressing for 4 months (FIGURE 1).

He was hospitalized due to the decompensation of his comorbidities as a result of the infectious condition of his wounds and had severe functional limitations in both lower limbs.

A wide surgical debridement of the wounds, exploration of the calcaneal tendon and coverage with the Figueiredo Technique were proposed (FIGURE 2). The patient was kept in hospital for empirical broad-spectrum antibiotic therapy until the results of the intraoperative cultures were obtained.

The result was the growth of a multidrug-resistant bacterium, Morganela Morganii, and the decision was made to maintain intravenous antibiotic therapy with Linezolid for 4 weeks, given the severe infectious condition and the high risk of decompensation of his comorbidities.

The dressing was changed every 7 days and, after 1 month of treatment, despite the good progress of the wound healing process, there was purulent secretion coming out of the surgical wound over the left calcaneal tendon and local phlogosis (FIGURE 3). As the first approach attempted to preserve part of the calcaneal tendon, it was suspected that the infectious focus was in the residual tendon, so a new approach was required for a more extensive resection.

On the second look, signs of loosening of the sutures on the right calcaneal prosthesis were observed and it was decided to replace the prosthesis. In addition, resection of the left calcaneal tendon up to the myotendinous transition was performed due to tissue non-viability and the presence of purulent secretion (FIGURE 4). The polypropylene prosthesis in the left calcaneal wound was firmly in place, with no loosening of the sutures and good progress in the healing process, and it was decided to keep it, with no need for replacement during this surgical period.

It was decided to keep the patient in hospital for another week, until the first external dressing change to observe the surgical wound, which was dry, with no dehiscence, no phlogistic signs and no outflow of purulent secretion (FIGURE 5). The patient's comorbidities were completely under control and, at this point, both wounds already had an advanced granulation process, the bony exposure of the calcaneus was completely covered and there were no signs of periprosthetic phlogiston. The patient was then discharged from hospital for outpatient follow-up and weekly

external dressing changes. Oral antibiotic therapy was maintained for 15 days, with no need to use antibiotics after that until the end of treatment.

Outpatient follow-up was carried out with the first return 1 week after hospital discharge, the second at 2 weeks and from then on the patient was followed up once a month, maintaining wound care and external dressings carried out painlessly at home.

During the follow-up, a progressive maturation of the granulation was observed, with epithelialization of the wound occurring centripetally, starting at the edges towards the center (deeper area), gradually reducing the size of the lesion. The operative wound on the calcaneal tendon was completely healed 3 weeks after surgery, in good condition, with no sign of the infectious process reactivating (FIGURES 6,7,8,9 and 10).

After 5 months of treatment with the Figueiredo Technique, the wounds were completely healed and the soft tissue infection and osteomyelitis resolved (FIGURES 11 and 12), as evidenced by the progressive decline and normalization of the inflammatory tests and imaging exams.

In addition, the Figueiredo Technique made it possible to compensate for the patient's comorbidities, which had not been possible since the appearance of the wounds, reducing his morbidity and improving his quality of life. As a functional sequel, there was a slight loss of strength in plantar flexion of the left foot, due to the lack of the calcaneal tendon, which did not lead to deficits in the patient's gait, who walks normally despite the absence of the tendon, without the need for reconstruction procedures given the patient's low demand.

DISCUSSION

Diabetic foot is a common cause of disability and the biggest cause of lower limb amputations. Today, local wound care, serial dressings and high-cost therapies such as vacuum dressings and hyperbaric oxygen therapy help to control the progression of these wounds, but are rarely able to lead to complete healing of the lesions.4

Another point is the concomitant bacterial infection, which is very common and can affect deep soft tissues, often even the bone, leading to osteomyelitis. In these cases, hospitalizations for intravenous antibiotic therapy, serial surgical debridements and often amputations are necessary to preserve the patient's life.1

FT consists of covering the entire lesion with a polypropylene prosthesis sutured to its healthy edges, after extensive debridement to remove all necrotic and infected tissue. The technique is based on the principle of healing by second intention in a protected manner, promoting protection from external aggressions and optimizing the inflammatory phase of healing, so that the healing process is possible even in an organically weakened organism.3

In the case presented in this study, the patient's lesions had been progressing for approximately 4 months, during which time his quality of life and functional limitations had worsened substantially. Without adequate wound coverage, aggression from the external environment, exposure to infection-causing agents, the presence of an inflammatory infiltrate and vascular deficiency do not allow the organism, weakened by the underlying disease, to carry out the wound healing process properly, even after surgical debridement and antibiotic therapy.

In the case reported, the infection of the soft tissues, ascending through the left calcaneal tendon and bilateral osteomyelitis in the calcaneus with bone exposure, made it impossible to control

the patient's multiple comorbidities, in addition to the high risk of sepsis due to the rapid progression of the infectious process, which put the patient's life at risk and led to the hypothesis of the need for limb amputation.

Soon after applying the Figueiredo Technique, combined with targeted intravenous antibiotic therapy, it was possible to observe a response in terms of infectious control and the patient's comorbidities, removing the risk of sepsis and even death as a result of their wounds.

It is important to note, however, that in cases of severe calcaneal tendon infections, where tissue viability is macroscopically compromised, tenotomy should be performed at the myotendinous transition and the entire tendon removed so that there are no remnants of infected tissue preventing the injury from healing, or generating a sub-acute infection that could worsen later, restarting the cycle of infection - wounds - decompensation of comorbidities - organic weakness. In this case, a more aggressive debridement in the first approach could have avoided the need for the second look.

The need to change the polypropylene prosthesis is variable depending on each case. During follow-up, it is important to observe the positioning of the prosthesis on the wound, its fixation with the sutures, periprosthetic phlogistic signs, the appearance of the exudate formed, the progression of the healing process and the accumulation of debris under the prosthesis and polypropylene. All these aspects are important in determining whether or not there is a need to revise the Figueiredo technique.

The benefits of applying the Figueiredo Technique, in addition to healing chronic wounds and curing the infectious process, include the possibility of outpatient follow-up after the systemic signs of infection have been controlled with weekly changes of the external dressing in a painless way, making it easier for the family to care for the patient and a general improvement in the quality of life lost as a result of the injury. These benefits facilitate patient follow-up and increase acceptance of the treatment which, despite being lengthy in cases of chronic wounds, is moving towards definitive healing and this can be seen with each change of the external dressing.

It is important to note that laboratory monitoring of inflammatory tests and image control, whether by X-ray or MRI, depending on each case, are necessary to confirm the cure of osteomyelitis and deep tissue infection.

CONCLUSION

In view of the case presented, it is possible to conclude that the Figueiredo Technique has proved to be a solution for the treatment of chronic wounds and diabetic feet, even when associated with osteomyelitis and soft tissue infections. In addition, it becomes a great ally in the treatment of calcaneal tendon infections, following the same principles reported in this case.

Another important point is the improvement in the control of comorbidities during treatment with the Figueiredo Technique, increasing the life expectancy and quality of life of these patients.

Pictures:

(2 weeks after removal of polypropylene prostheses)

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