

RESEARCH ARTICLE

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SURGICAL TREATMENT OF A CHRONIC ANKLE WOUND ASSOCIATED WITH OSTEOMYELITIS OF THE FIBULA, WITH THE FIGUEIREDO TECHNIQUE: A CASA REPORT

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Abstract

Peripheral Obstructive Arterial Disease (PAD) is the obstruction of the peripheral arteries caused by atherosclerosis. Intermittent claudication is the main manifestation, in more advanced stages there may be ischemia and chronic wounds. PAD is a relevant public health condition due to its high prevalence and impact on patients' quality of life, as well as the risk of disease progression, which can result in limb amputations due to infections and deep ulcerations, associated with serious systemic complications.

The aim of this study is to report a case of treatment with the Figueiredo Technique (FT) of a chronic left ankle injury due to Peripheral Arterial Occlusive Disease, associated with osteomyelitis of the fibula, in an elderly patient.

Keywords Surgical treatment, Peripheral Obstructive Arterial Disease and Figueiredo technique.

INTRODUCTION

ACM, male, 76 years old, diabetic, hypertensive, history of previous stroke and with PAD, being followed up by vascular surgery due to a traumatic wound in the left lateral malleolus, 6 months ago, with difficulty in healing, pain, fetid odor, hyperemia and exteriorization of purulent secretion, with absent ipsilateral distal pulses.

He was admitted to hospital for antibiotic therapy and wound debridement. The limb's viability was

compromised by the presence of an abscess adjacent to the ankle joint and bone exposure of the lateral malleolus. As a result, transtibial amputation was indicated, in conjunction with the infectology team (Figure 1). As the patient and his family did not accept the procedure, the orthopedic team proposed a new wide surgical debridement and covering the lesion with the Figueiredo Technique (FT).



Figure 1 - Wound on the lateral malleolus of the left ankle.

The patient was then transferred to orthopedics and underwent surgery on the 11th day of hospitalization. He remained in hospital for IV antibiotic therapy for 7 days, with no need to change the external dressing during this period.

On the date scheduled for hospital discharge, the

first change of the external dressing was carried out, where the patient did not complain of pain and a good general aspect of the limb was observed, as well as an improvement in local phlogistic signs and a moderate amount of exudate accumulating under the prosthesis, with no presence of purulent

secretion (Figure 2-A). The patient was then discharged from hospital for outpatient follow-up, weekly changes of the external dressing and oral antibiotic therapy for 15 days.

Two weeks after discharge, in the outpatient

follow-up, the wound observed through the prosthesis showed exuberant granulation in its most proximal portion, with a point of depth at the site where the lateral malleolus osteotomy was performed (Figure 2-B).



Figure 2: appearance of the wound: (A) 7 days and (B) 2 weeks

Complete granulation of the lesion, including an area of exposed bone, was achieved 2 months and 10 days after TF, with an improvement in the overall appearance of the entire limb (Figure 4).

After 5 months and 3 weeks from the start of treatment, the lesion was mostly epithelialized, with the malleolar region still in the granulation phase (Figure 5), with loosening of the stitches and

accumulation of debris under the prosthesis.

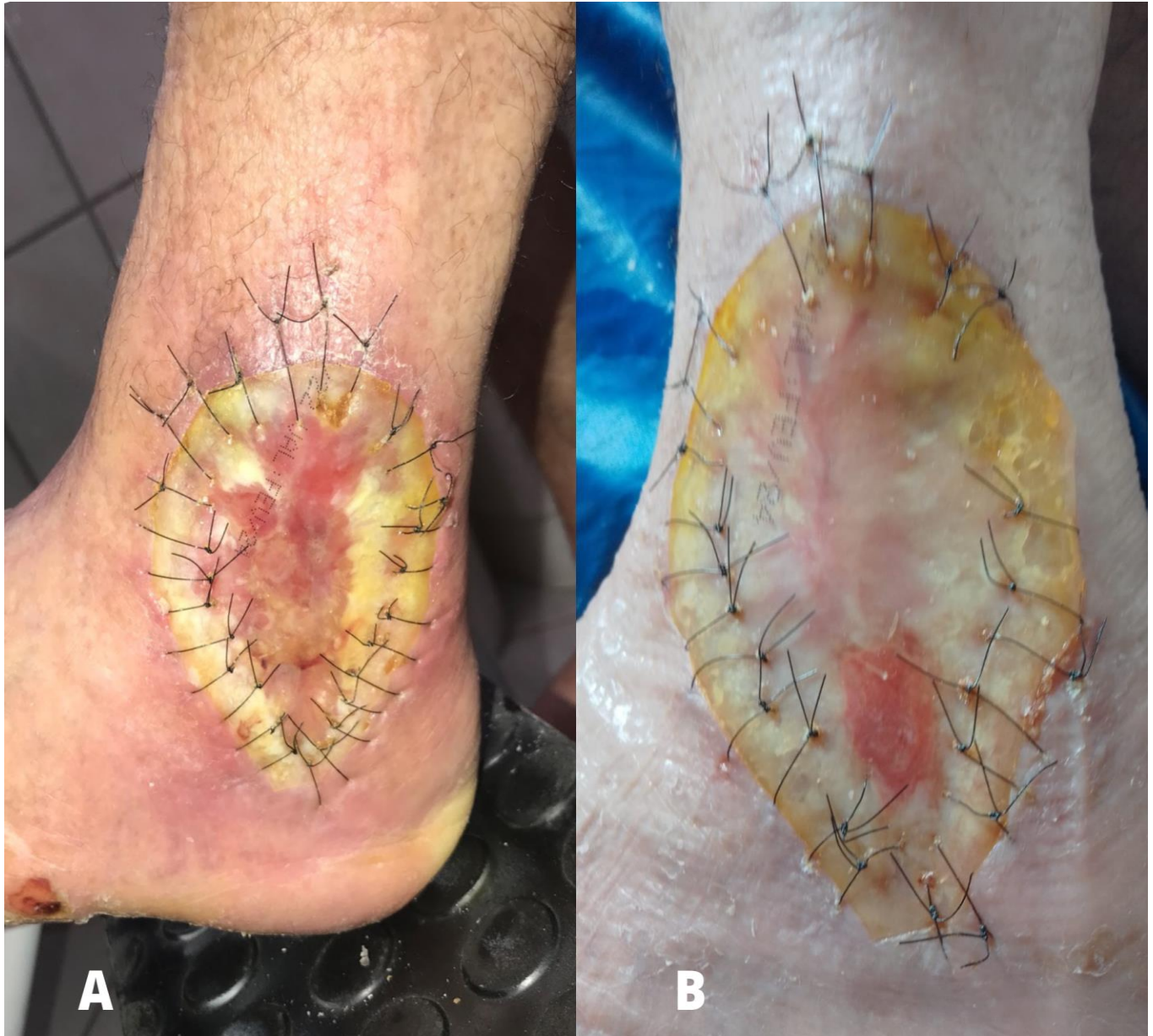


Figure 3: (A) 2 months and (B) 5 months.

Six months after the start of treatment, the patient underwent a revision of the FT. Due to the good epithelialization of the lesion, it was decided to cover only the non-epithelialized area with a new

prosthesis. At the second weekly dressing change, the neoformed skin looked good, with no phlogistic signs, with a prosthesis in the remaining area with good epithelialization progress (Figure 6).



Figure 6 - 6 months and 2 weeks.

Seven months after the start of treatment, the wound was completely epithelialized and the polypropylene prosthesis was removed. At the three-week follow-up after the prosthesis was

removed, the patient had excellent-looking neoformed skin, with color characteristics typical of the area, no phlogistic signs or points of fragility, and his wound was completely healed.



Figure 7 - Scar 3 weeks after the end of treatment.

DISCUSSION

Current treatments for PAD aim to improve the blood supply to the affected segment, preventing progression of the disease and leading to an improvement in symptoms, especially intermittent claudication. Despite all efforts, chronic ulcers on the lower limbs are often inevitable due to local skin fragility, decreased blood supply and

availability of oxygen and defense cells, so small lesions resulting from trauma, calluses and even dry skin can develop into a chronic wound that is difficult to control and which progressively increases.¹

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. Another issue is concomitant bacterial infection, which is very common and can affect deep soft tissues, often even the bone, leading to osteomyelitis.

In these cases, hospital admissions for intravenous antibiotic therapy, serial surgical debridements and often amputations are necessary to preserve the patient's life.^{1, 4}

In the case presented in this study, the patient's lesion had been progressing for approximately 6 months, during which time his quality of life and functional limitations had worsened substantially, and amputation of the limb had been indicated by the other specialties that had followed him prior to the FT.

Without adequate coverage of the wound, aggressions from the external environment, such as small local traumas, including during dressing changes, and exposure to agents that cause infections, do not allow the organism, weakened by the underlying disease, to carry out the wound healing process properly.

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 despite the reduced blood supply in the limb affected by PAD.³

The benefits of using the Figueiredo Technique include early discharge from hospital for outpatient follow-up, painless external dressing changes every 7 days, easier care for the patient by the family 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 long in the case of chronic wounds, is moving towards definitive healing and this can be seen with each change of the external dressing.

The need to replace the polypropylene prosthesis is variable depending on each case, and was carried out 6 months after the FT was applied, as during this period the healing process progressed properly, with progressive epithelialization of the edges, mature granulation covering the entire area of previous bone exposure and no loosening of the stitches. At the time of the change, almost the entire wound was completely epithelialized, with only a small area where there was mature granulation but no skin formed, precisely where the lesion was deepest.

It was then decided to cover this area with a smaller prosthesis than the previous one, because despite the possibility of healing this residual raw area by unprotected second intention, in cases of chronic wounds with infection present, any area of fragility that is not completely epithelialized predisposes the wound to enlarge again. For this reason, in the treatment of chronic wounds with the Figueiredo Technique, the polypropylene prosthesis should be maintained until the entire lesion is completely epithelialized, as shown in the case.

CONCLUSION

From this perspective, it is possible to conclude that the Figueiredo Technique has proved to be a solution for the treatment of chronic wounds, even in the face of active infection and vascular insufficiency. Thus, the technique is established as a simple, easy-to-perform, low-cost option with excellent functional and aesthetic results.

REFERENCES

1. Consenso e Atualização no Tratamento da Doença Arterial Obstrutiva Periférica/ Marcelo

- Calil Burihan ... [et al.]. - 1. ed. - Rio de Janeiro: Guanabara Koogan, 2019.
2. MOTA, T. D. C., SANTOS, J. D. M., DA SILVA, B. D. J. C., DE MESQUITA, N. M. C. B., & OLIVEIRA, D. M. (2017). DOENÇA ARTERIAL OBSTRUTIVA PERIFÉRICA: REVISÃO INTEGRATIVA. *Revista Uningá*, 53(1).
<https://doi.org/10.46311/2318-0579.53.eUJ1402>
3. Figueiredo LA, Ribeiro RS, Melo ALB, Lima AL, Terra BB, Ventim FC. Uso da prótese de polipropileno para o tratamento das lesões em ponta de dedo. Descrição de técnica cirúrgica e resultados. *Rev Bras Ortop*. 2017;52(6):685-92.
4. Aboyans V, Ricco JB, Bartelink MEL, Björck M, Brodmann M, Cohnert T, Collet JP, Czerny M, De Carlo M, Debus S, Espinola-Klein C, Kahan T, Kownator S, Mazzolai L, Naylor AR, Roffi M, Röther J, Sprynger M, Tendera M, Tepe G, Venermo M, Vlachopoulos C, Desormais I; ESC Scientific Document Group. 2017 ESC Guidelines on the Diagnosis and Treatment of Peripheral Arterial Diseases, in collaboration with the European Society for Vascular Surgery (ESVS). *Eur Heart J*. 2018 Mar 1;39(9):763-816. doi: 10.1093/eurheartj/ehx095. PMID: 28886620.

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TERMO DE CONSENTIMENTO LIVRE E ESCLARECIDO (TCLE)

Você está sendo convidado(a) como voluntário(a) a participar da pesquisa intitulada TRATAMENTO CIRÚRGICO DE LESÃO CRÔNICA EM TORNOZELO COM A TÉCNICA DE FIGUEIREDO: UM RELATO DE CASO, sob a responsabilidade de Leandro Azevedo de Figueiredo.

JUSTIFICATIVA: O estudo está sendo feito a fim de comprovar a eficiência da técnica figueiredo no tratamento de lesão crônica.

OBJETIVO(S) DA PESQUISA: Relatar um caso de lesão crônica em tornozelo esquerdo decorrente de Doença Arterial Oclusiva Periférica em paciente idoso com a Técnica de Figueiredo.

PROCEDIMENTOS: A obtenção de dados será feita através de questionários, entrevistas, análise de dados clínicos e observação/registo da evolução diante do tratamento aplicado. Não haverá inclusão em grupos controle/placebo ou experimental. (Itens IV.4.a e IV.4.b da Res. CNS 466/12).

DURAÇÃO E LOCAL DA PESQUISA: Os procedimentos de pesquisa de coleta de dados serão realizados no Hospital Santa Casa da Misericórdia de Vitória durante o período de recuperação do paciente.

RISCOS E DESCONFORTOS: Os riscos relacionados à pesquisa envolvem a quebra de sigilo e confidencialidade e, para tanto, os pesquisadores se comprometem manter em sigilo a sua identidade assim como dados que possibilitem a sua identificação a fim de garantir o anonimato (Resolução CNS 466/12 dispõe em seu item V: "Toda pesquisa com seres humanos envolve risco em tipos e gradações variados").

BENEFÍCIOS: Não haverá benefício direto para o participante desse estudo, porém o relato do caso irá contribuir para a melhoria no atendimento/tratamento de pacientes que irão utilizar, futuramente, a Técnica de Figueiredo.

ACOMPANHAMENTO E ASSISTÊNCIA: O paciente terá direito à acompanhamento durante todo o período de pesquisa, podendo contatar os pesquisadores por meio do número de telefone ou endereço informado em "Esclarecimento de Dúvidas". Também ficam garantidos os benefícios e acompanhamentos posteriores ao encerramento e/ou à interrupção da pesquisa, com assistência imediata e integral gratuita por danos decorrentes da pesquisa.

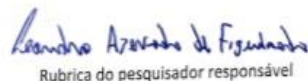
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Você não é obrigado(a) a participar da pesquisa, podendo deixar de participar dela em qualquer momento, sem que seja penalizado ou que tenha prejuízos decorrentes de sua recusa. Caso decida retirar seu consentimento, você não será mais contatado(a) pelos pesquisadores.

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GARANTIA DE RESSARCIMENTO FINANCEIRO: Descrever possíveis ressarcimentos e explicar como serão cobertas as despesas tidas pelos participantes da pesquisa em razão de sua participação.

GARANTIA DE INDENIZAÇÃO: Fica garantido ao participante o direito de indenização diante de eventuais danos decorrentes da pesquisa.


Rubrica do participante/responsável


Rubrica do pesquisador responsável

ESCLARECIMENTO DE DÚVIDAS:

Em caso de dúvidas sobre a pesquisa ou para relatar algum problema, você poderá contatar o(a) pesquisador(a) LEANDRO AZEVEDO DE FIGUEIREDO nos telefones (27)98182-8951 (Leandro), (27)99858-1842 (Pedro), (27)99961-4141 (Bárbara) e (27)99941-9941 (Antônio), ou no endereço Av. Adalberto Simão Nader, número 117. Você também pode contatar o Comitê de Ética em Pesquisa da Escola de Ciências da Saúde- EMESCAM (CEP/EMESCAM) através do telefone (27) 3334-3586, e-mail comite.etica@emescam.br ou correio: Av. N. S. da Penha, 2190, Santa Luiza – Vitória – ES – 29045-402. O CEP/ EMESCAM tem a função de analisar projetos de pesquisa visando à proteção dos participantes dentro de padrões éticos nacionais e internacionais. Seu horário de funcionamento é de segunda a quinta-feira das 13:30h às 17h e sexta-feira, das 13:30h às 16h.

Eu, ANTÔNIO CARLOS MORO, declaro que fui verbalmente informado e esclarecido sobre o presente documento, entendendo todos os termos acima expostos, e que voluntariamente aceito participar deste estudo. Também declaro ter recebido uma via deste Termo de Consentimento Livre e Esclarecido, de igual teor, assinada e rubricada em todas as páginas, por mim e pelo(a) pesquisador(a) principal ou seu representante.

HSCM, 14/junho/2022


Participante da pesquisa/Responsável legal

ANTONIO JOSÉ MORO NETO
CPF: 098.950.297-05
FILHO DE ANTÔNIO CARLOS MORO

Na qualidade de pesquisador responsável pela pesquisa "TRATAMENTO CIRÚRGICO DE LESÃO CRÔNICA EM TORNOZELO COM A TÉCNICA DE FIGUEIREDO: UM RELATO DE CASO", eu, LEANDRO AZEVEDO DE FIGUEIREDO, declaro ter cumprido as exigências do(s) item(s) IV.3 e IV.4 (se pertinente), da Resolução CNS 466/12, a qual estabelece diretrizes e normas regulamentadoras de pesquisas envolvendo seres humanos.

Leandro Azevedo de Figueiredo

Pesquisador

Leandro Azevedo de Figueiredo


Rubrica do participante/responsável

Leandro Azevedo de Figueiredo
Rubrica do pesquisador responsável