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Conservative treatment of non-healing plantar skin ulcer complicated by infection and fistula in congenital clubfoot.
A case report

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Conservative treatment of non-healing plantar skin ulcer complicated by infection and fistula in congenital clubfoot. A case report.

INTRODUCTION: *Congenital changes related to Spina Bifida (SB) include congenital clubfoot (PTC), also known as equinovarus congenital clubfoot. Skin pressure ulcers represent a frequent complication associated with SB and PTC, determined by both sensitivity deficits and skeletal alterations of plantar support. This conditions can lead to the onset of frequent neurotrophic skin ulcers.*
CASE REPORT: *72-year-old female patient suffering from spina bifida with congenital clubfoot condition, complicated by ulcerative lesion in the plantar region with fistula and infection (Proteus Mirabilis). An infectious disease evaluation with monitoring of the inflammatory-infectious hematochemical values and targeted antibiothic-therapy was performed. The patient performed a scintigraphic examination in order to exclude the osteomyelitis process. The dressing protocol set up was: Disinfection with disinfectant based on Poliesanide and Betaine, with the use of Nelaton 6 Fr catheter (and subsequent dressings with 18 G needle cannula), inside the fistulous channel. Subsequent abundant washing with 0.9% saline solution. Application of oily phyto-product Mix of Neem Oil and Hypericum Perforatum (1-Primary Wound Dressing), inoculating it with the catheter inside the medium and checking its leakage from both sides and cover with sterile gauze and bandage with cohesive bandage. After 4 weeks there was a reduction in the size of the fistula and the disappearance of serum-corpuscular secretions. At 7 weeks, complete re-epithelialization of the skin ulcerative lesion was observed.*
DISCUSSION: *This case report refers to the conservative medical treatment of a complex case of non-healing pressure skin ulcer with distant fistulization. The main difficulty in managing this lesion was identifying the right dressing that could reach and spread within the fistulous channel, favoring the reduction of the inflammatory-infectious process. The dressing used, as it was in an oily formulation, therefore had the right characteristics as it was easy to inoculate. The oily mix of Neem and Hypericum Perforatum (1-Primary Wound Dressing) has in fact performed a prolonged antiseptic function while maintaining the right degree of local hydration, essential for the correct carrying out of the reparative processes.*
CONCLUSIONS: *In undermined or fistulous ulcers, the use of oil-based dressings, such as the oily mix of Neem and Hypericum Perforatum (1-Primary Wound Dressing), can represent a valid local therapeutic choice.*

KEY WORDS: Congenital clubfoot, Neurotrophic skin ulcer, Wound Care

Introduction

Spina bifida (SB) is a neural tube defect that occurs when the spine of a developing fetus does not close properly in the uterus. Myelomeningocele is the most severe form of SB, in which the vertebrae and spinal canal do not complete closure before birth.

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According [1] to estimates of a study involving a population of children and adolescents in 10 regions of the United States, SB affects approximately 3.1 in 10,000 individuals [2]. Congenital changes related to SB include congenital clubfoot (PTC), also known as equinovarus congenital clubfoot. This defect has a prevalence of about one in 1,000 live births. Thanks to the evolution of surgical techniques, pediatric treatment of PTC only rarely requires further invasive procedures in adulthood, although deformity and arthritic pain often persist [3].
Skin pressure ulcers represent a frequent complication associated with SB and PTC, determined by both sensitivity deficits and skeletal alterations of plantar support. The annual prevalence rate reported in the literature of skin lesions, such as pressure ulcers, in individuals with myelomeningocele ranges from 15% to 77%. In general, the more severe the degree of paralysis and sensory loss, the greater the frequency and severity of these injuries [4,5]. Furthermore, as suggested by experimental models on rats, UDPs are located in the most deformed anatomical regions of the foot with a proportional correlation ratio [6].
Musculoskeletal deformities and sensory-motor nerve alterations associated with congenital clubfoot (PTC) determine not only the onset of frequent neurotrophic skin ulcers but also structural deformities that lead to the need for minor or trans-metatarsal amputations. Unfortunately, the complications most commonly associated with these surgical procedures are ulcerative skin pressure transfer lesions [7].
It is therefore essential in these patients to reduce mechanical loads through the use of medical devices and support surfaces [8,9].

Case Report

72-year-old female patient suffering from spina bifida with congenital clubfoot condition. The patient is also affected by non-haemodynamically significant carotid atheromasia, systemic arterial hypertension, osteoporosis and diffuse osteoarthritis. Since childhood, the patient has undergone repeated operations on her right foot. In january 1992 she therefore underwent an arthrodesis operation for a supinated right metatarsus resulting from a fracture and subsequently a double tarsal osteotomy. Finally, in october 1993 she had trans-metatarsal amputation for non-healing neurotrophic ulcers in paretic flexed fingers. In the following years she was therefore subjected to surgical dressings for recurrent skin ulcers of the right foot of a neurotrophic nature.
For about 6 months, the patient reported the appearance of a new ulcerative lesion in the plantar region of the right foot with progressive clinical worsening, up to the appearance of a dorsal-lateral fistulosis, from which abundant exudate came out. So she performed orthopedic specialist visits and underwent to local dressings. Repeated wound swabs showed constant evidence of Proteus Mirabilis infection. For this reason, the patient has undergone courses of targeted antibiotic therapy and medications. The latter involved disinfection with povidone iodine and oxygen peroxide and subsequent coverage with sterile gauze or sometimes iodoform gauze. On the occasion of the last orthopedic examination in consideration of the clinical worsening, indications were given for major amputation surgery.
The patient therefore comes to our observation on April 21, 2022. She presented apyretic with severe pain in the foot that she managed with little effectiveness through the intake of painkillers (NSAIDs). Her foot showed skin hyperemia and edema in the latero-dorsal region with abundant leakage of secretion from the fistulous through the dorsal region of the foot (Figs. 1, 2).
On physical examination, the peripheral arterial pulses are present and the maneuvers of Homans and Bauer were negative. Through the use of 18 G needle cannula, the presence of a significant link between the two ulcerative lesions was documented. A wound swab was therefore performed for targeted microbiological examination and possible development of an antibiogram (Fig. 3).

Fig. 1: Fistulous ulcerative in the plantar region of the right foot with skin maceration, hyperkeratosis and local hyperemia. April 21, 2022.

Fig. 2: Skin ulceration in the lateral dorsal region of the right foot. Hyperemic peri-lesional skin with abundant exudative-corpuscular secretions. Local edema. April 21, 2022.

Bacteriology	**Microbiology and virology**	
Skin lesion swab		
Material:	Skin Swab	
Isolates:	Proteus Mirabilis	
	Upload media	
		Proteus Mirabilis
Amikacina	4	S
Amoxicillina CLAV	< = 2	S
Cefepime	< = 0.12	S
Ceftazidime	< = 0.25	S
Ciprofloxacina	> = 4	R
Ertapenem	< = 0.12	S
Gentamicina	< = 1	S
Imipenem	2	I
Meropenem	< = 0.25	S
Piperacillina/Tazobactam	< = 4	S
Trimetoprim/Sulfam.	< = 20	S

Fig. 3: Microbiological examination on a wound swab with relative antibiogram (performed on 21 April).

The blood chemistry analyzes did not reveal any leukocytosis with ESR and CRP values within normal limits. Ultrasound examination of the lower limbs documented the regular patency of the femoral-popliteal-tibial arterial axis of the right lower limb, albeit in the presence of diffuse calcific parietal thickenings not determining stenosis of haemodynamic significance, and in the presence of triphasic flowmetry up to the arteries tibialis (Figs. 4, 5). During the first visit, in the light of the clinical-instrumental condition, the patient was informed about the complexity of the clinical picture and by mutual agreement it was then decided to make a last medical conservative attempt. Infectious disease consultation and lymphoscintigraphic examination were prescribed to rule out the presence of osteomyelitis. The following dressing protocol was set up: Disinfection with disinfectant based on Poliesanide and Betaine, with the use of Nelaton 6 Fr catheter (and subsequent dressings with 18 G needle cannula), inside the fistulous channel. Subsequent abundant washing with 0.9% saline solution. Application of oily phyto-product Mix of Neem Oil and Hypericum Perforatum (1-Primary Wound Dressing), inoculating it with the catheter inside the medium and checking its leakage from both sides (Fig. 6). So, cover with sterile gauze and bandage with cohesive bandage. Podiatry examination was also prescribed for the pack-

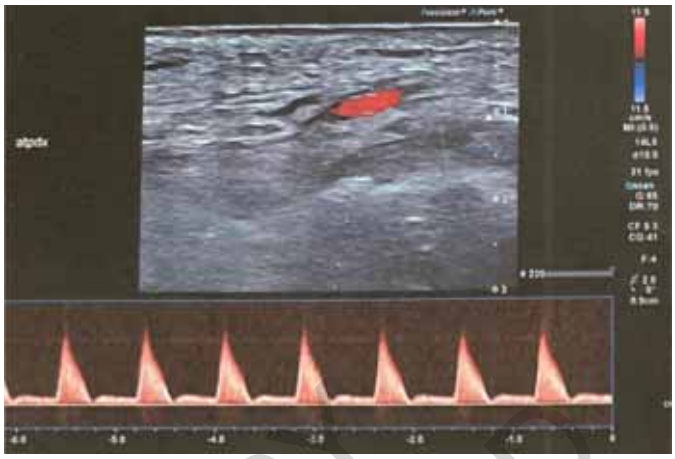

Fig. 4: Ultrasound image. Triphasic flow on the right posterior tibial artery.

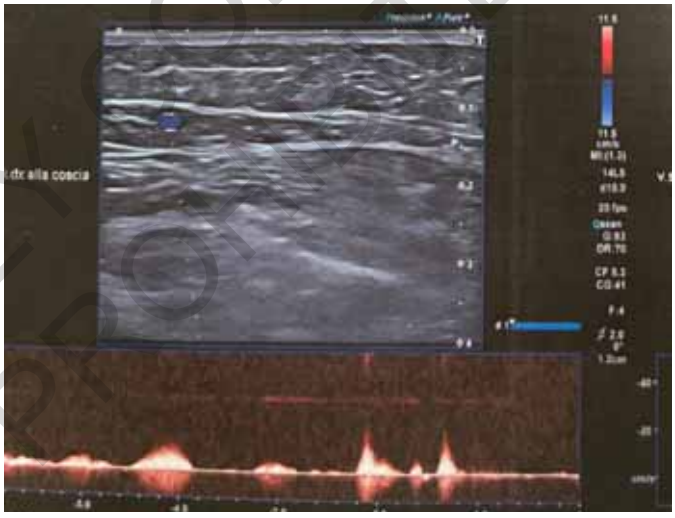

Fig. 5: Ultrasound image. No pathological refluxes on the right internal saphenous axis which is regularly patent.

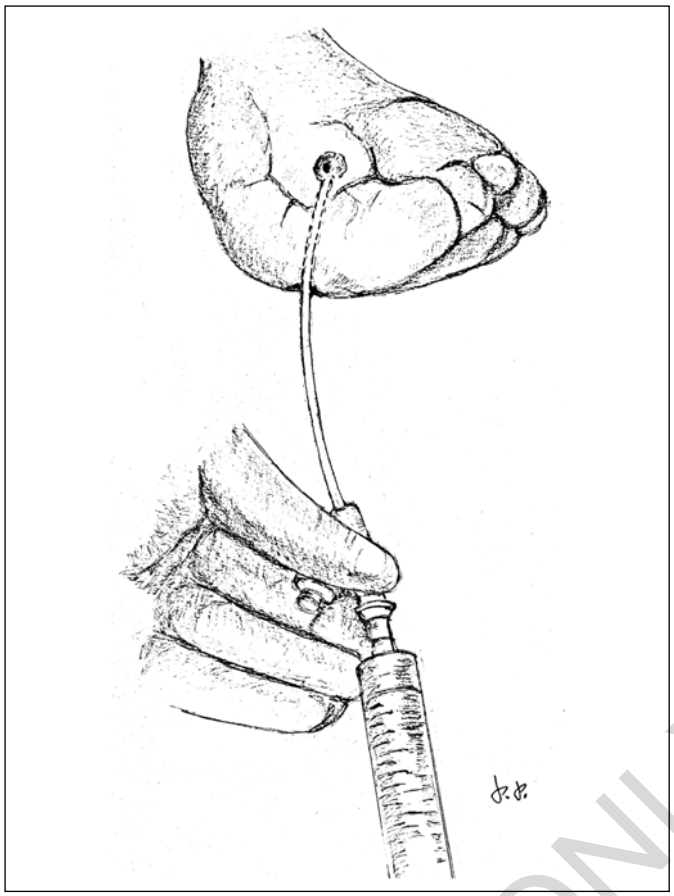

Fig. 6: Disinfection, washing and dressing procedure carried out using Nelaton 6Fr catheter (image reproduced by Pia Petrucci, Anatomical Designer).

aging of plantar orthoses with selective pressure relief corresponding to the plantar ulcerative medium.
Following an infectious disease evaluation, monitoring of the inflammatory-infectious hematochemical values™ was performed and the need to perform a scintigraphic examination was confirmed in order to exclude the osteomyelitis process. Targeted antibiotic therapy with Cefpodoxime was subsequently set up.
200 mg 1 tablet every 12 hours for 15 days and then with 100 mg 1 tablet every 12 hours for a further 15 days.
At the "whole body" Scintigraphic examination there was an over-uptake of the tracer at the level of the right foot, in the early images, which was reduced in extent and intensity in the late images. This picture was therefore compatible with an inflammatory process in progress, with a low leukocyte component (Fig. 7).
Therefore, excluding an osteomyelitis process, the patient continued to undergo the same medication protocol with progressive reduction of exudate, edema, skin hyperaemia and pain. After 4 weeks there was a reduction in the size of the fistula and the disappearance of serum-corpuscular secretions. At 7 weeks, complete re-epithelialization of the skin ulcerative lesion was observed (Fig. 8).

Fig. 7a: Anterior and posterior scan scintigraphic examination. Early.

Fig. 7b: Anterior and posterior scan scintigraphic examination. Late.

Fig. 8: Re-epithelialization of skin ulcers of the right foot (11 June 2022).

Discussion

This case report refers to the conservative medical treatment of a complex case of non-healing pressure skin ulcer with distant fistulization. Several factors contributed to the worsening of this injury. Among these we certainly include the excessive local pressure load caused by skeletal alterations and reduced sensitivity.
However, the main difficulty in managing this lesion was identifying the right dressing that could reach and spread within the fistulous channel, favoring the reduction of the inflammatory-infectious process.
The dressing used, as it was in an oily formulation, therefore had the right characteristics as it was easy to inoculate. Among the observed effects of the drug we report a high anti-inflammatory and antibacterial action, without however damaging the biological tissues. In fact, the cytolesive and strongly oxidizing power generated by commonly used liquid disinfectants, such as those based on povidone iodine, chlorhexidine or hydrogen perox-

ide, is known. The oily mix of Neem and Hypericum Perforatum (1-Primary Wound Dressing) has in fact performed a prolonged antiseptic function while maintaining the right degree of local hydration, essential for the correct carrying out of the reparative processes. This herbal product is a class II b medical device obtained from the oily mixing of these two herbs, which has been shown in numerous experimental reports to be able to remove the biofilms present in infected tissues thanks to the action of the polyphenols of which it is composed. In fact, these are active on biofilms as they inhibit the enzyme glycosyltransferase responsible for the synthesis of glucan, a polysaccharide that makes up the water-soluble part of the biofilm that makes the biofilm adhere to the bottom of the infected wound.
Furthermore, the polyphenols also dissolve the protein component of the biofilm matrix by blocking the terminal carbon and interposition between the beta chains. In this way the chosen phytotherapic exerts a double effect on the soluble polysaccharide wall and on the solid protein component of the biofilm which gradually dissolves upon contact with this phytotherapic [10]. Other experimental studies [10] have shown that the phytotherapeutic device has an inhibitory and modulatory capacity on the Matrix Metallo Protease (MMP) enzymes that are known to increase in chronic wounds preventing their healing.
Certainly it is essential to exclude in the case of a plantar pressure ulcers the absence of vascular problems that could compromise the blood supply of the tissues. In fact, according to the current recommendations in cases of trophic skin ulcers associated with obstructive peripheral arterial disease, typical for example of diabetic foot, it is not recommended to maintain a humid environment since in this case it is associated with a greater risk of wet necrosis [11]. On the contrary, as reported by this experience, excessive alcoholization of the tissues, in the presence of a valid arterial circulation, slows down the reparative process.

Conclusions

In undermined or fistulous ulcers, the use of oil-based dressings, such as the oily mix of Neem and Hypericum Perforatum (1-Primary Wound Dressing), can represent a valid local therapeutic choice as it is capable of spreading easily and guaranteeing both a anti-inflammatory effect that of maintaining a moist environment necessary for cell replication. However, it is mandatory to first rule out any arterial vascular deficiency.

Riassunto

Introduzione: Tra le alterazioni congenite correlate alla Spina Bifida (SB) va annoverato il piede torto congenito (PTC), noto anche come piede torto congenito equinovarus. Le ulcere da pressione cutanee rappresentano una frequente complicanza associata a SB e PTC, determinata sia da deficit di sensibilità che da alterazioni scheletriche del supporto plantare. Queste condizioni possono portare all'insorgenza di frequenti ulcere cutanee neurotrofiche.
Caso Clinico: paziente donna di 72 anni affetta da spina bifida con condizione congenita del piede torto, complicata da lesione ulcerosa nella regione plantare con fistola e infezione (Proteus Mirabilis). Nel tentativo di salvataggio d'arto, in prima istanza è stata eseguita una valutazione della malattia infettiva con monitoraggio dei valori ematochimici infiammatorio-infettivi e terapia antibiotica mirata. La paziente ha eseguito dunque esame scintigrafico che escludeva processo osteomielitico. Il protocollo di medicazione predisposto è stato: Disinfezione con disinfettante a base di Poliesanide e Betaina, con utilizzo di catetere Nelaton 6 Fr (e successive medicazioni con cannula ago 18 G), all'interno del canale fistoloso. Successivo lavaggio abbondante con soluzione fisiologica allo 0,9%. Applicazione del fitoprodotto oleoso Mix di Olio di Neem e Hypericum Perforatum (1-Primary Wound Dressing Spray), inoculandolo con il catetere all'interno del tramite fistoloso e verificandone la fuoriuscita da entrambi i lati, ricopriendo successivamente il piede con garza sterile e bendaggio con bendaggio coesivo. Dopo 4 settimane si osservava una riduzione delle dimensioni della fistola e la scomparsa delle secrezioni siero-corpuscolate. A 7 settimane è stata osservata una completa riepitelizzazione della lesione ulcerosa cutanea
Discussione: Questo Case Report si riferisce al trattamento medico conservativo di un caso complesso di ulcera cutanea non-healing da pressione con fistolizzazione a distanza**.** La principale difficoltà nella gestione di questa lesione è stata individuare la giusta medicazione che potesse raggiungere e diffondersi all'interno del canale fistoloso, favorendo la riduzione del processo infiammatorio-infettivo. La medicazione utilizzata, essendo in formulazione oleosa, aveva quindi le giuste caratteristiche in quanto facile da inoculare. La miscela oleosa di Neem e Hypericum Perforatum (1-Medicazione Primaria per Ferite) ha infatti svolto una prolungata funzione antisettica mantenendo il giusto grado di idratazione locale, fondamentale per il corretto svolgimento dei processi riparativi.
Conclusioni: Nelle ulcere sottominate o fistolose, l'uso di medicazioni a base oleosa, come la miscela oleosa di Neem e Hypericum perforatum (1-Medicazione per Ferita Primaria), può rappresentare, in casi selezionati, una valida scelta terapeutica locale.

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