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Case Report

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Nutritional therapy in adolescents with necrotizing fasciitis: a case report

Abstract

Objective: To report a case of an adolescent with necrotizing fasciitis (NF), emphasizing the Nutritional Therapy (NT) carried out by the Multidisciplinary Team.

Methods: The data's were obtained through the medical records, the NT protocol, an interview with the patient of 13-year-old and her relatives and a photographic record of the lesion.

Case report and discussion: Surgical procedures for cleaning and debridement of the wound, regular dressings, broad spectrum antibiotic therapy and NT were performed. The nutritional management consisted in the use of hypercaloric and hyperproteic diet through the three alimentary pathways, aiming supplying the exacerbated nutritional demand, helping in the recovery of nutritional status and reversion of the lesion generated by NF. No signs or symptoms of NT intolerance were identified and the patient was discharged maintaining good acceptance of the exclusive oral NT, already with the wound in the healing phase.

Conclusion: Although specific nutritional recommendations for adolescents are not elucidated in the scientific literature, proper planning of NT, initiated early and progressively, can be considered an essential element for success in the treatment of NF in adolescents.

Keywords: nutrition, nutritional therapy, nutritional assessment, necrotizing fasciitis, adolescent

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Introduction

Necrotizing fasciitis (NF) is a bacterial infection of the subcutaneous tissue and superficial fascia.[1] It is a predominant disease among adults,[2] and if not diagnosed early, it can be fatal.[3] In this context, Nutritional Therapy (NT) can contribute to the maintenance of body composition, reduction of metabolic complications,[4] and improvement of wound healing.[5] However, there is no scientific evidence regarding NT in adolescents with NF. Considering the unusual incidence and lack of publications of the disease among adolescents and aiming to contribute elucidating aspects related to NT, the purpose of this study is to report a case about on the nutritional intervention carried out by the Multidisciplinary Nutritional Therapy Team (MNTT).

Case report

Information was obtained through medical records, NT protocol, interview with the patient and their caregivers, as well as a photographic record of the lesion during hospitalization [*Hospital Municipal Drº Moacyr Rodrigues do Carmo* (HMMRC)-Duque de Caxias/RJ). Informed consent was obtained from the patient for publication of data and photos in this journal. A 13-year-old male patient, without preexisting diseases, was attended at HMMRC, with a report of ankle sprain. A plaster splint was placed and he was referred to outpatient care.

After 72 hours, he returned with complaints of pain, fever and blister with ulceration of soft tissues on the lateral and medial sides of the left lower limb, presenting an infectious appearance, purulent secretion and foul odor. The patient was submitted to surgical cleansing and debridement. There was significant loss of soft parts of the leg, reaching subcutaneous and muscular tissue with exposure of foot extensor tendons (Figure 1). Surgical revision was performed after 48 hours and the patient was hospitalized at the Intensive Care Center with NF diagnosis. During the first 20 days, 13 cleansing and debridement surgeries were performed. During the first week, dressings were changed daily, and after this period they were spaced every 48 hours. It was prescribed broad-spectrum antibiotic therapy.

Diagnosis and nutritional management

The nutritional status was determined by age – adequate height but at-risk weight (overweight), according to the *Sistema de Vigilância Alimentar e Nutricional*.[6]

Body weight=50Kg; Height=1.50m; Body mass index(BMI)=22.2Kg/m²

Height/age>Percentile 3; BMI/age>Percentile 85 e <Percentile 97

NT (Table 1) was planned and the appearance of signs and symptoms of overfeeding was monitored, through laboratory clinical follow-up by the MNTT.

Beginning of NT

The oral diet presented a low acceptance by the patient; therefore it was necessary to institute an Oral Nutrition Therapy (ONT) through the supplementation with hypercaloric and normoproteic product. The patient presented hypoalbuminemia (1.6g/dL), high nitrogenous compounds (creatinine=2.2mg/dL, urea=120mg/dL), hematocrit of 20% and anasarca after a dialysis session. Due to the maintenance of a low food intake, hindering the planned nutritional contribution, Parenteral Nutritional Therapy (PNT), free from lipids, was initiated, associated with the replacement of electrolytes and vitamins. Enteral Nutritional Therapy (ENT) was also initiated, simultaneously, with the same purpose.

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Table 1 Protein and caloric nutritional therapy of an adolescent with necrotizing fasciitis

Initial protein caloric supply: 920Kcal (18.4 kcal/kg/day) and 50.2g protein (1.2 g/kg/day)
PNT=500ml (without the use of the lipid fraction) - 320Kcal and 25g protein;[1]
ENT=200ml of hypercaloric and hyperproteic polymeric diet - 300kcal and 15g protein;[2]
ONT=200ml of hypercaloric and normoprotein supplement - 300kcal and 11.2g protein.[3,4]
Intermediate protein caloric supply: 1900Kcal (38.0 kcal/kg/day) and 91.2g protein (1.8 g/kg/day)
PNT=1000ml of diet - 1000Kcal and 50g protein;[1]
ENT=400ml of hypercaloric and hyperproteic polymeric diet - 600kcal and 30g protein;[2]
ONT=200ml of hypercaloric and normoprotein supplement - 300kcal and 11.2g protein.[3,4]
Full protein calorie offer: 2350Kcal (47.0 kcal/kg/day) and 108.9g protein (2.2 g/kg/day)
PNT=1000ml of diet - 1000Kcal and 50g protein;[1]
ENT=500ml of hypercaloric and hyperproteic polymeric diet - 750kcal and 37.5g protein;[2]
ONT=400ml of hypercaloric and normoprotein supplement - 600kcal and 22.4g protein.[3,4]

Abbreviations: PNT, parenteral nutrition therapy; ENT, enteral nutritional therapy; ONT, oral nutrition therapy

Note: [1]Nutriflex Lipid Plus. B Braun. Formula with polyamino acids, glucose, electrolytes and lipid emulsion. 1.0kcal/mL; 5.4g/L of nitrogen; medium chain triglycerides (MCT) and long chain triglycerides (LCT).
[2]Fresubin HP Energy. Fresenius Kabi. 1.5kcal/mL; 75g/L protein; ratio ω6:ω3 of 4:1; addition of eicosapentaenoic acid and docosahexaenoic acid; 57% of MCT.
[3]Fresubin Energy Drink. Fresenius Kabi. 1.5kcal/mL; 11g protein in 200mL.
[4]In addition to small meals offered throughout the day, with low acceptance.

Figure 1 Necrotizing fasciitis in the lower left limb of an adolescent at the beginning of Nutritional Therapy.

Intermediate NT

The patient presented a reestablishment of the renal function and blood counts and albumin remained reduced, requiring a medical prescription for the treatment of anemia and albumin replacement. There was an improvement of dietary management with progression of parenteral diet volume. Physical examination evidenced weight loss, scaling skin and signs of infection control, therefore, parenteral diet received addition of the lipid emulsion.

Complete NT

Laboratory tests (hepatic and albumin), except for blood count, presented normal results and there were clinical signs of NT tolerance; therefore, enteral and oral diets were progressively evolved. There was a gradual improvement in the clinical condition of the patient and in the wound healing (Figure 2), however, the patient maintained a condition of anemia and depletion of nutritional status. Drugs composed of vitamins and minerals were prescribed with the aim of reestablishing blood and nutritional status.

Figure 2 Necrotizing fasciitis in the lower left limb of a teenager with full nutritional therapy.

NT weaning to hospital discharge

Parenteral diet was gradually weaned off and it was suspended after 23 days, maintaining ENT and ONT. After one week, enteral diet was withdrawn until its suspension. Due to a good clinical status, satisfactory acceptance of ONT and a wound aspect improvement (Figure 3), the patient was discharged after 39 days for outpatient follow-up by MNTT and Plastic Surgery.

Figure 3 Necrotizing fasciitis in the lower left limb of a teenager at the end of hospital stay.

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Discussion

The reported case brings to light the discussion about NT in NF in adolescence, a phase of development in which there is a physiological increase in metabolic demands.[7] In this context, nutritional requirements are even more significant, due to tissue loss associated with infection, the need for recovery after surgical procedures and the need for tissue reconstruction.[8] Early diagnosis, radical surgical procedure in necrotic tissue, broad-spectrum antibiotic therapy, and general aggressive support measures, such as NT, are necessary.[9] The patient was diagnosed with high nutritional risk, which indicated the need for an early NT. When properly performed in selected patients, NT is able to provide satisfactory results, contributing to attenuate metabolism, prevent oxidative cellular lesions, and modulate the immune response. Regarding the early institution of NT, it can be verified an adequate supply of nutrients and glycemic control, effects on reducing disease severity, incidence of complications and shortening of hospitalization time.[4] Patients with severe wounds require increased amounts of protein,[5] and this requirement, in critically ill patients, varies from 1.2-2.0g protein/kg/day, with potentially greater amounts in the presence of burns.[4] Since, there are no recommendations of protein supply for adolescents with NF, we consider, reasonable, an amount of protein ranging about 2.2g/kg/day. It should be noted that the patient's nitrogenous compounds presented alterations before the beginning of PNT and ENT but were soon reestablished with a single hemodialysis session, not showing any subsequent alteration, signaling absence of protein overload.

There was a reduced food acceptance when maintaining exclusive ONT, what limited nutrients intake. Thus, MNTT decided for the additional use of ENT and PNT after one week of hospitalization. PNT was instituted to aid the rapid attainment of nutritional intake and because the venous route provides good nutrient utilization, since it bypasses the regular digestion process that can reduce the bioavailability of nutrients.[10] Additionally, ENT was designed to maintain tropism and prevent intestinal translocation of pathogens,[11] since oral food intake occurred irregularly. ENT also functioned, initially, as a complement to PNT, and afterwards, it gradually replaced parenteral nutrition. According to McClave et al.,[4] PNT should be always initiated when ENT and ONT are not feasible or sufficient in patients with high nutritional risk, corroborating the adopted nutritional therapy. The use of supplemental PNT in the first 7-10 days of hospitalization may increase the amount of nutrients offered to individuals who already receive some dietary volume through another food route.[12] However, it should be considered that PNT is an expensive therapy and with high risk of complications. In a multicenter study by Casaer et al.,[13] patients who started receiving PNT on the eighth day of hospitalization were more likely to be discharged from hospital, presented fewer complications associated with the treatment, and represented lower health costs when compared to those who started on the third day. Thus, the optimal time to initiate supplemental PNT in a patient who continues to receive diet from other routes is unclear. However, PNT may be considered after the first week of hospitalization if the provision of nutritional intake by other routes does not meet the requirements.[4]

During the initial phase of PNT, lipid emulsion was not used due to potential harm in patients with infections. The use of parenteral lipid emulsion, rich in n-6 polyunsaturated fatty acid, such as those based on soybean oil, in immunocompromised patients should be discouraged. These fatty acids can interfere negatively in the functions of lymphocytes, neutrophils, macrophages and the reticuloendothelial system, aggravating the condition of immunodepression.[14] Only after inflammation control, that the lipid fraction was added to the administered parenteral diet, to restore essential fatty acids and increasing the caloric supply. There were no signs or symptoms of intolerance to the prescribed NT, and hospital discharge was determined with exclusive ONT, good food acceptance and a healing wound. All these characteristics evidence a satisfactory result of the prescribed NT. The monitoring/prevention of complications associated with prolonged nutritional support is indispensable in NT planning. The PNT candidate should be continuously evaluated for several risks, such as, hyperglycemia, electrolyte imbalances and infectious morbidities.[15] The MNTT should consider the feed rate, control and duration of PNT, transition to ENT, as well as the transition to ONT.[4] Although the importance of nutrition as part of the NF treatment plan is acknowledged, adolescent recommendations are not elucidated. However, this case report may contribute to understand, more deeply, the aspects related to nutritional support. An early clinical and nutritional diagnosis is essential to identify patients with the greatest chance of an unfavorable evolution, in order to avoid the occurrence of inadequate health outcomes, as well as identifying the need for NT.

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Conflicts of interest

In the article are cited products from different drug companies and specialized diets.

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