NURSING CARE IN ADULT PATIENT WITH SUPRARECTAL AMPUTATION

MARIUXI JOHANNA ZURITA DESIDERIO[1], VILMA ROCIO QUIJIJE CHAVEZ[2], BLANCA JAHAYRA MUÑOZ TORRES[3], GLADYS TASINCHANA BASTIDAS[4]

[1]*Universidad Técnica Estatal de Quevedo; mzuritad@uteq.edu.ec, orcid:0000-00010-9238-6251*
[2]*Universidad Técnica Estatal de Quevedo; vquijijec@uteq.edu.ecorcid: 0000-0002-9284-6972*
[3]*Universidad Técnica Estatal de Quevedo;bmunozt@uteq.edu.ec, orcid: 0009-0004-4372-0160*
[4]*Universidad Técnica Estatal de Quevedo; gtasinchanab@uteq.edu.ec, orcid:0009-0009-9114-1215*

KEYWORDS
Supracondylar amputation, nursing care, type 2 diabetes mellitus, rehabilitation, quality of life.

ABSTRACT
This study examines nursing care for an adult patient with supracondylar amputation associated with type 2 diabetes mellitus. The research highlights the physical, emotional, and social challenges faced by the patient after the amputation, emphasizing the importance of comprehensive and multidisciplinary care. Using Marjorie Gordon's functional patterns model, key intervention areas were identified, including pain management, self-care education, and adaptation to a new physical reality. The patient, a 58-year-old man, presented complications such as malnutrition, anemia, and renal impairment, complicating recovery. Strategies focused on infection monitoring, physical rehabilitation, and emotional support were implemented to promote independence and quality of life. The results show significant improvements in infection control, mobility, and psychosocial adaptation. Furthermore, the study highlights the need for structured education for patients and their families, aimed at preventing future complications and promoting overall well-being. This study underscores the crucial role of nursing in the rehabilitation of patients with amputations, proposing innovative and collaborative approaches that integrate medical, emotional, and social aspects.

1. INTRODUCTION

In the field of nursing, comprehensive and specialized care for patients with complex conditions such as suprapatellar amputation has become a growing challenge for health systems. Adrodellar amputation, which involves the removal of a lower limb above the kneecap, is generally associated with chronic diseases such as type 2 diabetes mellitus (DM2), the prevalence of which has increased exponentially in recent decades. According to recent data, between 15 and 25% of people with T2DM will develop foot ulcers, of which 14 to 24% will require major amputation (Zhang et al., 2024). This scenario underscores the need for specialized nursing care that addresses the physical, emotional, and social aspects of affected patients.

The relationship between DM2 and amputations has been the subject of numerous recent studies. For example, research by Kumar et al. (2022) highlights that poor glycemic control, combined with peripheral neuropathy and peripheral artery disease, are the main risk factors for amputation in this population. Additionally, Poggio Cano et al. (2023) evidenced that patient education and early detection of diabetic ulcers are essential to prevent serious complications.

From a clinical point of view, care for patients with suprapatellar amputation is not only focused on wound healing and pain control, but also on comprehensive rehabilitation. Recent research emphasizes that early rehabilitation, combined with the use of devices such as prosthetics and assisted mobility tools, significantly improves functional and psychosocial outcomes (Font Jiménez, 2023). In addition, the multidisciplinary approach that integrates nurses, physiotherapists and psychologists has proven to be effective in adapting the patient to their new reality.

However, one of the most significant challenges remains patient adherence to treatment. Studies by Pérez Martínez, V. T. (2010) show that 40% of amputation patients do not follow medical recommendations due to psychological, social and economic barriers. In this context, the role of nursing acquires crucial importance not only to address medical needs, but also to provide emotional and educational support.

The high incidence of amputations related to DM2 represents a significant problem for health systems in terms of costs and patient quality of life. In addition, the emotional and social impact of losing a limb profoundly affects both the patient and their family environment. This study is justified by the need to optimize nursing care through evidence-based strategies that consider the clinical and psychosocial dimensions of care.

In specific terms, this work seeks to identify risk factors that contribute to adpatellar amputation in patients with T2D and to evaluate the effectiveness of a nursing care plan adapted to the individual needs of the patient. This approach not only has the potential to improve clinical outcomes, but also to foster patient independence and quality of life.

2. Materials and Methods

The present study is part of a qualitative exploratory-descriptive research, complemented by quantitative analyses to evaluate the clinical results of the patient. This approach allows for a comprehensive understanding of the phenomenon by combining objective data with subjective perceptions.

A case study design was used, focusing on an adult patient with adpatellar amputation associated with DM2. This design facilitates an in-depth and contextualized analysis, allowing the interactions between clinical, emotional, and social factors that affect the patient's rehabilitation to be explored.

Several methods were applied, such as a systematic review of the literature indexed in Scopus from 2018 to 2023, with emphasis on studies related to nursing care, rehabilitation, and DM2. Semi-structured interviews were then conducted, interviewing the patient and his family to explore their perceptions of the care received, their needs and perceived barriers. With this information, a clinical analysis was carried out by collecting and analyzing clinical data from the patient, including vital signs, laboratory results and progression in wound healing.

For a better development of the research, it was divided into phases. The first phase included the selection of the case, the design of the research protocol and the obtaining of informed consent (Planning). Data collection was then carried out through interviews, participant observation, and review of medical records (Data Collection). With this, it was possible to move on to phase three, which is the intervention in which an evidence-based nursing care plan was implemented, adapted to the patient's needs, including education in self-care and emotional support, and finally the phase in which the effectiveness of the care plan was evaluated through clinical (such as the reduction of infections) and psychosocial (such as the patient's emotional adaptation) indicators.

Data Analysis

Qualitative data were analyzed using the thematic analysis method, while quantitative data were processed using descriptive statistics to identify relevant trends and patterns.

The study respected the ethical principles set out in the Declaration of Helsinki, ensuring the confidentiality of patient data and obtaining informed consent to participate in the research.

3. Results and Discussion

Description of the case study

Patient medical history

The patient is a 58-year-old man who was admitted to the hospital area on June 16, 2023 due to complications related to his type II diabetes mellitus associated with his malnutrition, which triggered peripheral circulatory complications. As for his medical history, the patient has suffered from diabetes mellitus for 16 years. However, in the last year, he did not maintain adequate medical control and was administered 30 units of insulin randomly whenever he considered necessary, which suggests a lack of adherence to the recommended medical treatment. This neglect in managing his diabetes could have contributed to the peripheral circulatory complications that ultimately led to the adrodellar

amputation.

The patient also presented a state of malnutrition, which could be related to his lack of control and management of diabetes. This malnutrition weakened their peripheral circulatory system, increasing their susceptibility to vascular complications and ulcer formation in their lower extremities. Lack of proper medical management and poor management of their diabetes have contributed to increased vulnerability to infections and poor healing. In addition to his diagnosis of diabetes and malnutrition, the patient presented with anemia, which could further affect his ability to heal properly. No other previous illnesses or previous surgeries were reported in her medical history, nor were significant allergies identified that could have influenced her treatment or care.

The patient in question presented a series of symptoms and clinical signs that reflected a deteriorated state in his health condition. At the time of admission, significant alterations in his hemodynamics were observed, suggesting a tendency to sepsis due to the state of necrosis of the toes. Upon assessment of his vital signs on admission, a blood pressure of 140/90 mmHg, a heart rate of 105 beats per minute, a respiratory rate of 20 breaths per minute, and a temperature of 37°C were recorded.

As for the gastrointestinal system, it was observed that the patient was ingesting food in small quantities, without presenting nausea, vomiting or diarrhea. On the other hand, the renal system presented relevant alterations, marked by elevated levels of urea (47.0) and creatinine at the upper limit of normal (0.83), as well as slightly elevated uric acid (4.1). These abnormalities could be associated with necrosis in the toes and systemic infection. In addition, the patient was passing urine through a bladder catheter, underscoring the need for meticulous monitoring of kidney function and urinary elimination.

Clinical analyses indicated the presence of mild respiratory alkalosis, hypokalemia, and anemia, factors that added complexity to the clinical picture. These metabolic imbalances must be addressed to restore acid-base balance and potassium levels in the body. In relation to the results of the laboratory and diagnostic studies, the following values were obtained: white blood cells (WBC) 12.08, red blood cells (RBC) 3.65, hemoglobin (HGB) 10.1, hematocrit (HCT) 31.4 and platelets 360.0. The percentages of neutrophils and lymphocytes were 65.4 and 20.5 respectively. These results highlighted the presence of a significant inflammatory response.

As far as treatment is concerned, 0.9% saline was administered to maintain fluid and electrolyte balance, as well as the infusion of 1g ascorbic acid and B-complex to support the immune system and fight inflammation. In addition, 0.9% sodium chloride was used along with tramadol and metoclopramide to control pain and prevent nausea and vomiting. Omeprazole was also given to reduce gastric acid production and prevent ulcers. Antibiotic therapy was composed of piperacillin, tazobactam, and metronidazole to treat systemic infection.

As for supportive therapy, subcutaneous heparin was administered to prevent the formation of blood clots, especially due to the risk of sepsis and immobilization of the patient. Paracetamol was administered as prescribed by a doctor to control pain and fever. In addition, doses of NPH insulin were administered to maintain normal glucose levels in the patient.

Comprehensive Nursing Assessment

In this case study, the assessment of functional patterns was used using Marjorie Gordon's model, thus allowing the identification of the areas of greatest strength and risk, this being essential to provide quality and personalized nursing care, adapted to the unique needs of the patient to ensure optimal recovery and the prevention of complications.

The first pattern of perception and management of health the patient reported feeling his health deteriorated due to everything he has experienced, he said he felt worried, anxious and even depressed because of the amputation, however, he expressed that he understands the importance of

controlling his diabetes to prevent future complications and is willing to follow the recommendations of health professionals.

In the Nutrition-metabolic pattern, it was important to monitor food intake and consider nutritional interventions in these types of patients, as these conditions can affect nutrition and metabolic balance. The patient reported having a poor appetite, however, he consumed his three meals a day in which he maintained a balanced diet rich in proteins and fiber, suitable to control his blood glucose levels and that there are no problems with healing.

With respect to the pattern of elimination, altered urea, creatinine, and uric acid values suggested possible renal dysfunction, requiring careful evaluation. The patient reported feeling a little discomfort due to the placement of the tube and not being able to get up to relieve himself as he did before surgery.

The measurement of diuresis was approximately 1300 to 1600cc per day and with respect to her bowel movements she manifested a frequency of 1 or 2 per day without any difficulty.

In the Activity-exercise pattern, the patient's mobility, endurance and energy were evaluated, being vital to avoid complications related to lack of movement. The patient reported feeling limited in his ability to move, emphasizing that he used to be very active, but now he feels fatigue much more frequently and is afraid of hurting himself. Regarding the sleep-rest pattern, in this case the patient expressed having normal hours of sleep, however, sometimes he has difficulty falling asleep due to discomfort, pain and discomfort of the stump. Assessing their sleep pattern and providing comfort measures to relieve pain was critical to improving the quality of rest.

Regarding the cognitive-perceptual pattern, the patient stated that he is concerned about how the amputation will affect his daily life and his ability to perform certain activities. Assessing their level of awareness, information processing, and response to external stimuli helped identify potential cognitive problems and support needs.

The amputation of the residual limb impacts the pattern of self-perception-self-concept. The patient reported feeling often with low self-esteem and shows concern about not being able to adapt to changes in his body and in his ability to perform daily tasks. In the role-relationship pattern, he expressed concern about how the amputation will affect his ability to perform his work and help his family financially at home, in the same way, he expressed that he always tries to stay united and connected with his family to overcome his situation.

In relation to Sexuality-reproduction, the patient, despite being married, did not manifest feeling problems with this aspect, however, a safe space was provided to discuss concerns and provide education on how to handle changes in this issue. In the coping-stress tolerance pattern, the patient reported putting all his effort and dedication to face his situation in a positive way, but sometimes he feels overwhelmed by the anxiety and stress caused by having lost one of his limbs.

Finally, the pattern of values-beliefs the patient referred to seeking support in his spiritual beliefs since he belongs to a religious community being evangelical and trusts God a lot, to find meaning and strength in his current situation.

Nursing Care Plan

The first diagnosis of risk of infection (0004) related to the surgical procedure (adrodellar amputation) and its vulnerable state to the invasion of pathogenic organisms, the patient is at risk of developing secondary infections, which predisposes him to the entry of infectious agents through the surgical wound. The expected results (NOC) include risk control: infectious process (1924), where the indicator identifies signs and symptoms of infection, a score of two was found in the patient that was rarely demonstrated, so it was established that in a time of three or four days it went to a score of four frequently demonstrated. The patient has been evaluated for what currently shows an absence of

infection in relation to the adpatellar amputation, this is evidenced by vital signs within normal ranges and the absence of signs of local infection in the amputation wound. However, to address this risk, nursing interventions (NICs) focused on infection control (6540) were implemented, which included regular temperature monitoring which was taken every 4 hours to detect the presence of fever, as this is an early sign of infection. Pulse, respiration, and blood pressure were monitored every 8 hours, noting any changes that might indicate a systemic infectious response, as well as wound evaluation in which visual inspection was performed daily, to identify any signs of infection at the amputation site such as redness, warmth, swelling, and drainage. Changes in white blood cell count were taken into account, which were checked periodically for the presence of leukocytosis, which could indicate an infection. An adequate nutritional intake was also promoted, and a nutritionist was collaborated to ensure a diet rich in proteins, vitamins and minerals, essential for wound healing. Visitors were instructed to wash their hands with soap and water or use hand sanitizer when entering and leaving the patient's room. In addition, education on infection preventive measures was implemented to promote proper hygiene and wound care, antimicrobial therapy was administered as medically directed to monitor adverse effects and effectiveness of treatment, and the patient and family were instructed about the signs and symptoms of infection and when to notify the caregiver.

The second diagnosis is impairment of physical mobility (00085) related to the loss of a lower limb, affecting the patient's ability to move independently and perform activities of daily living and manifested by the inability to perform active movements of the affected limb and the need for assistance with mobilization. It is expected that the result of the NOC, adaptation to physical disability (1308) where the indicators, adapt to functional limitations, modify lifestyle to adapt to disability and identify ways to cope with changes in their life were rarely demonstrated, so it is established that in a time of one week these indicators are frequently demonstrated, through the NIC intervention of help with self-care (1800), which included interventions such as providing help until the patient is fully capable of assuming self-care by determining which activities the patient can perform on his or her own and in which he or she needs assistance, teaching and explaining to the family the importance of promoting independence, To intervene only when the patient is unable to perform the given action, the patient was encouraged to stay active and perform normal activities of daily living adjusted to their level of ability, early mobility was also encouraged to prevent complications related to immobility such as pressure ulcers or muscle atrophy, in addition an individualized exercise plan was created in which they included stretching and muscle strengthening adapted to the needs To help maintain flexibility in the remaining limb by continuously assessing their progress, assistive devices such as prostheses, walkers, and wheelchairs were evaluated and recommended to facilitate the patient's mobility and autonomy.

Finally, the diagnosis of ineffective coping (00069) was identified related to the patient's adaptation to the loss of their lower limb, which can generate emotional stress and difficulties in coping, manifested by the expression of feelings of sadness, anxiety or hopelessness and the lack of participation in social or therapeutic activities. It is expected that the result of the NOC, acceptance of the state of health (1300), with the indicators, recognizes the reality of the health situation, adapts to change and faces its state of health, will be able to go from rarely demonstrated to always demonstrated in the period of one week, through the nursing intervention (NIC) emotional support (5270), which included providing a calm environment where the patient can feel safe and relaxed, making empathetic and supportive affirmations showing understanding of their situation, encouraging the patient to express feelings of anxiety, anger or sadness by asking them daily how they felt or what they thought, it was suggested that the patient have a journal to express and reflect on their emotions, Provide support during denial, anger, acceptance of the phases of grief, encourage participation in recreational activities such as board games, reading, or artistic activities, facilitate participation in support groups where you can share experiences and receive support from others in similar situations. In addition, other interventions were implemented in the patient that served as help, offering accurate and timely information about their condition, keeping the patient and their family informed about the progress in their treatment and any changes in the care plan, relaxation and stress management techniques such as deep breathing, meditation and progressive muscle relaxation were taught to help the patient develop effective coping skills in the face of the situation physician.

Evaluation

The evaluation of the results of the NOC reflected a positive progress in the patient, in relation to the "risk control: infectious process" a significant improvement was observed through the Likert scale by managing to go from a score of 2 "rarely demonstrated" to a score of 4 "frequently demonstrated" in an expected period of 3 or 4 days. This indicates that infection prevention measures, antibiotic administration, and education to the patient and family on appropriate hygiene measures were effective in preventing secondary infections and wound care.

As for interventions focused on "adaptation to physical disability" after amputation, the NOC results reflected a noticeable advance in the Likert scale going from a score of 2 "rarely demonstrated" to a 3 "sometimes demonstrated" in one week, however, they presented some challenges as it was expected to reach a score of 4 "frequently demonstrated". Despite this, the patient showed a significant improvement in the ability to participate in activities of daily living, greater independence when performing tasks and reflected an improvement in his confidence to take care of himself, progress was also observed in flexibility and muscle strength, thanks to the implementation of the exercise plan and the gradual increase in the level of physical activity offered to the patient.

It was emphasized that in relation to "acceptance of the state of health", the results of the NOC were successful, evidenced through the Likert scale, going from a score of 2 "rarely demonstrated" to a score of 5 "always demonstrated" and 4 "frequently demonstrated" in the span of one week. This indicates a significant improvement in the patient's emotional well-being, their ability to cope with worries and the stress associated with their medical situation, as well as greater active participation in the rehabilitation and adaptation process, and a better understanding of their medical condition and recovery process.

DISCUSSION OF THE CASE STUDY

The main nursing interventions in the care of diabetic patients with lower limb amputations are multifaceted, diabetic foot education is essential to increase patient awareness of the risks and importance of self-care, this education addresses topics such as foot hygiene, blood glucose control and injury prevention. In addition, wound management is critical to ensure effective ulcer healing and prevent infection. Nurses play a central role in cleaning and debrideing wounds, as well as choosing appropriate dressings, rehabilitation is another key intervention, including training in the use of prosthetics, muscle-strengthening exercises, and psychological support to help patients regain their functional independence.

Nursing interventions have demonstrated significant impacts on the care of diabetic patients with lower extremity amputations. One of the most notable results is the reduction of major amputations, which improves the quality of life of patients by preserving the maximum possible length of limb. In addition, these interventions have led to a marked improvement in the quality of life of amputee patients, as proper rehabilitation and psychological support allow them to regain their independence and emotional well-being. An increase in awareness of self-care in patients has also been achieved, reducing the risk of future complications.

A study on the prevalence of suprapatellar amputations in diabetic patients by Jarro Villavicencio (2022) was analyzed. Their results show a prevalence of 4%, especially in patients over 60 years of age and in men. This figure aligns with previous research highlighting amputations as a serious complication of diabetes worldwide.

In the article Prevention and Management of the Diabetic Foot by Font Jiménez (2016), he emphasized the importance of early detection, patient education and multidisciplinary care in the prevention of the diabetic foot. Preventive strategies such as glycemic control, the use of appropriate footwear and the treatment of risk factors are highlighted. These recommendations are consistent with practices supported by the scientific literature and are critical to preventing complications in diabetic patients.

Poggio Cano and García Elvira (2018) discuss the causes of lower extremity amputations in diabetic patients and the associated clinical decisions. Their findings, which identify neuropathies, infections and minor trauma as common causes of amputation, are consistent with the scientific literature highlighting these risk factors. In addition, they underscore the importance of making careful clinical decisions about the level of amputation and preservation of limb length, in line with recommended medical practices.

In addition, these findings have important implications for amputee rehabilitation and nursing education. Comprehensive care and proper prescription of prostheses, as well as training of the patient and their family, are essential components in rehabilitation.

Based on the findings and discussions presented, key recommendations emerge to improve clinical practice related to diabetic foot, it is recommended to adopt a comprehensive approach to prevention from the moment of diagnosis of diabetes. This involves educating patients about the importance of foot self-care and proper footwear use to prevent diabetic foot-related complications. In addition, the formation of multidisciplinary care teams that include doctors, nurses, podiatrists and physiotherapists is suggested.

It is recommended to offer comprehensive rehabilitation to patients with lower limb amputations. This includes training in the use of prosthetics, exercises to improve muscle strength, and psychological support to help patients adapt to changes in their daily lives and body image.

CONCLUSIONS

Risk factors were identified as they are crucial for the primary and secondary prevention of adpatellar amputation in diabetic patients, allowing early intervention and targeting these factors, which can help prevent disease progression and reduce the incidence of amputations. These risk factors included peripheral neuropathy, peripheral artery disease, infection, malnutrition, lack of adherence to treatment, and inadequate diabetes control.

It was possible to comply with the evaluation of the effectiveness of the nursing care plan in patients with adpatellar amputation through this systematic and continuous evaluation, significant improvements were shown in wound healing, pain control, physical mobility, psychosocial adaptation and quality of life. Proper follow-up and patient education were critical to achieving positive outcomes.

The challenges faced by the patient were determined, being essential to provide comprehensive and holistic care. In addition, it allowed nursing professionals to address not only the patient's physical needs, but also their emotional and social needs, which helped to significantly improve the patient's quality of life and adaptation to their new situation, including rehabilitation to learn how to use a prosthesis, prevention of complications such as pressure ulcers and skin lesions, and adaptation to a new form of mobility.

Bibliographic References

- Cano, D. P., & Elvira, R. G. (2018). Amputations of the lower extremity in diabetic patients. *Mon Act Soc Esp Med Cir Ankle Foot*, *10*, 57-65.
- Font Jiménez, M. I. (2016). Characteristics and experiences of the patient with diabetic foot and amputation. Relational nursing practices during hospitalization.
- Font Jiménez, I., Ortega Sanz, L., González Pascual, J. L., González Sanz, P., Aguarón García, M. J., & Jiménez-Herrera, M. F. (2023). Reflective based learning for nursing ethical competency during clinical practices. *Nursing Ethics*, *30*(4), 598-613.
- Kumar, Y., & Nachankar, A. (2022). Effect of COVID-19 Lockdown on Glycemic Status of Patients with T2DM and Effects of Various Factors Involved. *Journal of Marine Medical Society*, *24*(Suppl 1), S11-S17.

- Pérez Martínez, V. T. (2010). The diabetic elderly and the adaptive response to the disease. *Cuban Journal of Integral General Medicine*, *26*(2), 0-0.
- Ruiz-Riquelme, P., Poggio-Cano, D., Sala-Blanch, X., Cuéllar Bernal, D., Baduell, A., Garcia-Elvira, R., & Testa, E. A. (2023). Ultrasound evaluation of a new surface reference line to describe sural nerve location and safe zones to consider in posterior leg approaches. *Knee Surgery, Sports Traumatology, Arthroscopy*, *31*(6), 2216-2225.
- Villavicencio, I. G. J., Zapata, C. F. V., Cofré, A. F. D., & Ruiz, M. F. B. (2022). Clinical factors related to lower limb amputation in diabetic patients. *Educational synergies*.
- Zhang, Y., Liu, H., Yang, Y., Feng, C., & Cui, L. (2024). Incidence and risk factors for amputation in Chinese patients with diabetic foot ulcers: a systematic review and meta-analysis. *Frontiers in Endocrinology*, *15*, 1405301.