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Renal transplanted woman with amputation, calciphylaxis, and Monckeberg´s sclerosis: a case report

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ABSTRACT

Case description: 40-year-old woman with a past medical history of diabetes, hypertension, and chronic kidney disease. She becomes the recipient a deceased donor kidney transplant and 2 years later begins with signs of arterial insufficiency, being diagnosed with calciphylaxis and Mönckeberg's sclerosis. Conservative management is provided, however, given the unfavorable evolution, left hand disarticulation is decided.

Care Plan Description: The patient's needs were identified, pain level was controlled with IV analgesia and a buprenorphine patch. A thorough assessment was performed to timely identify any signs of peripheral tissue perfusion and surgical wound infection. Given the body image disorder, activities were conducted to enhance her self-esteem.

Plan Evaluation: The patient's response to the interventions was evaluated, she reported mild pain. Since there were no signs of surgical wound infection, recommendations were provided to enhance the patient's self-esteem.

Conclusions: Multidisciplinary management in which the nursing professional is actively involved is crucial in the management of these patients to improve their quality of life.

Keywords: chronic kidney disease; calciphylaxis; Monckeberg's medial calcific sclerosis; nursing care plans.

RESUMEN

Mujer trasplantada renal con amputación, calcifilaxis y enfermedad de Monckeberg: a propósito de un caso

Descripción del caso: Mujer de 40 años con antecedentes de diabetes, hipertensión arterial y enfermedad renal crónica. Recibe trasplante renal de donador fallecido y dos años después, comienza con datos de insuficiencia arterial, diagnosticándose calcifilaxis y enfermedad de Mönckeberg. Se brinda manejo conservador, sin embargo, ante la evolución no favorable se decide realizar desarticulación de mano izquierda.

Descripción del plan de cuidados: Se identificaron las necesidades de la paciente, se controló el nivel de dolor mediante analgesia intravenosa y parche de buprenorfina. Se realizó una valoración exhaustiva para identificar de manera oportuna datos de perfusión tisular periférica y de infección de herida quirúrgica. Dado el trastorno de la imagen corporal se realizaron actividades para potenciar su autoestima.

Evaluación del plan: Se evaluó la respuesta de la paciente a las intervenciones, se refirió con dolor leve, no se presentaron datos de infección de herida quirúrgica, se brindaron recomendaciones para la potenciación de la autoestima.

Conclusiones: El manejo multidisciplinario donde participa de manera activa el profesional de enfermería es crucial en la atención de estos pacientes, a fin de contribuir a una mejora en su calidad de vida.

Palabras clave: enfermedad renal crónica; calcifilaxis; esclerosis calcificante de la media de Monckeberg; planes de atención en enfermería.

INTRODUCTION

Calciphylaxis is a clinical syndrome characterized by necrotic ulceration of the skin due to calcification of the tunica media and fibrosis of the arteriolar intima, followed by thrombosis of the subcutaneous microcirculation. Given its association with chronic kidney disease (CKD), it is also described as uremic calcific arteriolopathy[1], although it can affect individuals with normal or mildly impaired renal function, including kidney transplant recipients[2].

Calciphylaxis has a multifactorial etiology. Non-modifiable risk factors include time on renal replacement therapy (RRT), female sex, and diabetes. Among the most relevant modifiable factors are hyperphosphatemia, use of high doses of phosphate binders, treatment with vitamin D analogues, hyperparathyroidism, and anticoagulation with vitamin K antagonists[1].

On the other hand, Mönckeberg's arteriosclerosis is described as calcification of the tunica media of medium- and small-caliber muscular arteries of the limbs, such as the femoral, popliteal, and radial arteries[3,4]. It is a condition of unknown origin, mainly associated with age, diabetes, and CKD[5,7]. Its clinical manifestations depend on the resulting vascular occlusion, and diagnosis is often incidental through histopathological samples. Therefore, clinical suspicion is the cornerstone for early management to avoid accelerated disease progression[6]. In terms of nursing care, timely diagnosis is necessary to develop a specialized care plan that truly meets the needs of our patients.

The following is the nursing process for a female kidney transplant recipient with a hand amputation, who presented with calciphylaxis and Mönckeberg's arteriosclerosis—both rare but rapidly progressive and potentially fatal entities. The importance of nursing care is highlighted, having contributed to improved well-being in a patient with not only physiological but also emotional needs due to deterioration of her health status.

CASE PRESENTATION

A 40-year-old woman with a past medical history of type 1 diabetes mellitus and hypertension diagnosed at age 16. In 2016, she was diagnosed with CKD stage G5, and in 2022, she received a kidney transplant from a deceased donor. In March 2024, she underwent digital tip remodeling of the third finger bilaterally due to necrosis with bone exposure. The wounds healed favorably at the level of the middle phalanx stumps of both third fingers.

In May 2024, she presented with necrosis and soft tissue infection extending proximally 1–1.5 cm from the middle phalanx stump of the left hand's third finger. Erythema involved the rest of the finger, extending to the dorsum and palm of the hand. Disarticulation of the second phalanx of the middle finger on the left hand was performed.

During this hospital admission, the patient developed acute renal graft dysfunction secondary to a complicated urinary tract infection, with creatinine at 2.8 mg/dL. Urinalysis showed 30 mg/dL of protein, uncountable leukocytes, and abundant bacteria. Following antibiotic treatment, serum creatinine decreased to baseline levels of 1.1–1.3 mg/dL.

In June 2024, the patient presented with secondary hyperparathyroidism and glycemic decontrol. Severe arterial calciphylaxis of the upper limbs was diagnosed with the following labs: potassium 4.5 mmol/L, calcium 8.3 mg/dL, phosphorus 4.5 mg/dL, and glycated hemoglobin (HbA1c) 12%. Physical examination revealed necrosis of the 2nd and 4th fingers of the left hand, and a deep dorsal wound with bone and tendon exposure. The patient was not a candidate for free flap reconstruction due to insufficient local or regional tissue. The wound was managed with specialized dressings at a wound care clinic.

A biopsy of the radial artery in the left arm was performed, and Doppler imaging showed early signs of distal arterial insufficiency. In July 2024, she was diagnosed with Mönckeberg's disease, and underwent debridement of the left hand dorsum. However, due to poor evolution, disarticulation of the left hand was performed. The patient was discharged with outpatient follow-up.

NURSING ASSESSMENT

In the week prior to hospital discharge, the patient appeared older than her chronological age, with a depressed facial expression, and poor body integrity and symmetry. **Table 1** presents the assessment based on the nursing domains of the North American Nursing Diagnosis Association (NANDA-I).

NURSING CARE PLAN

The patient's priority human needs were identified, and a care plan was developed using the NANDA-I[8], Nursing Outcomes Classification (NOC)[9], and Nursing Interventions Classification (NIC)[10] taxonomies **(Table 2)**.

Evaluation of the care plan

Patient response to interventions was periodically evaluated, with the last follow-up before hospital discharge. The following are the results of that evaluation:

- **Acute pain:** Managed in coordination with the pain management team for somatic and neuropathic pain. The patient reported mild pain (2 on the Visual Analog

Table 1. Assessment According to the NANDA Nursing Domains.

Nursing Domains	Significant Data
Health Promotion	Lives in an urban area, has access to water, electricity, and sewage; no overcrowding, no drug use.
Nutrition	Weight: 62.2 kg; Height: 161 cm; BMI: 24.8 kg/m^2. Weekly Nutritional Intake at Home; Fruits: 0 out of 7 days; Vegetables: 7 out of 7 days; Meats: 3 out of 7 days; Dairy products: 0 out of 7 days; Sugary beverages: 0 out of 7 days; Water intake: 2.5–3 liters per day
Elimination	No acute renal graft dysfunction.
Activity and Rest	Vital signs: blood pressure 110/75 mmHg, heart rate 86 bpm, respiratory rate 19 rpm, O_2 saturation 95% in ambient air. Leads a sedentary lifestyle, performs household chores during the day.
Perception/Cognition	Alert, cooperative, oriented in all three spheres.
Self-Perception	Acknowledges being in a deteriorated state of health.
Role/Relationships	Homemaker, single mother with two teenage children. Main support network: her parents and children.
Sexuality	Underwent total hysterectomy in 2019 due to abnormal uterine bleeding.
Coping/Stress Tolerance	Reports a positive attitude and maintains hope for improvement.
Life Principles	States that her beliefs do not interfere with health care.
Safety/Protection	Left upper limb bandaged; supraradial-ulnar amputation; at risk of infection due to immunosuppressed state.
Comfort	Moderate pain in the left hand, measured at 6 on Visual Analogue Scale; controlled with IV analgesics and buprenorphine patch.
Growth/Development	Patient with chronic degenerative diseases and vascular complications.

Scale), allowing her to perform activities with some restrictions but no major complications.

- **Risk of surgical wound infection:** Left hand stump showed no discoloration, no signs of infection, and adequate healing. Patient followed by endocrinology for glycemic control.
- **Risk of ineffective peripheral tissue perfusion:** No edema in limbs, 3-second capillary refill, rhythmic and weak peripheral pulses in the lower extremities.
- **Risk of situational low self-esteem:** Patient expressed calmness and enthusiasm about returning home. She displayed a positive attitude and willingness to follow instructions to improve her current health condition. She had an open appointment for psychological follow-up.

DISCUSSION

Calciphylaxis in patients with CKD is rare but has a 1-year mortality of up to 60–80%, mainly due to skin-derived sepsis[11,12]. In renal transplant recipients, a vigilant attitude is necessary since, despite the resolution of uremia, vascular calcification and its complications may still develop due to other risk factors[1]. This is especially relevant in our case, where the patient experienced rapid vascular complications in < 6 months.

This clinical scenario requires a multidisciplinary approach addressing 3 therapeutic axes: **a)** medical-surgical management of lesions to prevent progression to sepsis[13]; **b)** modification of all possible precipitating factors of ectopic calcification; and **c)** use of tools to inhibit the cutaneous calcification process[1].

Our patient also had Mönckeberg's arteriosclerosis, which is increasingly recognized in CKD patients. However, its clinical significance is often underestimated. Notably, its presence increases the risk of peripheral vascular disease and limb amputations[6]. Therefore, in patients with risk factors and clinical suspicion, tissue biopsy should be performed to confirm the diagnosis[14].

This case study contributes to scientific knowledge by presenting the progression of two rare pathological entities –calciphylaxis and Mönckeberg's arteriosclerosis– that may become increasingly prevalent due to the rising number of CKD patients requiring RRT. Addressing this case also highlights the contribution of nursing professionals in providing comprehensive care, considering the patient as a

Table 2. Nursing Care Plan with NANDA, NOC, NIC Taxonomies.

NANDA Nursing Diagnosis	NOC Outcome Indicators	NIC Interventions and Activities
00132. Acute pain related to biological damaging agents as evidenced by expressive behavior, facial expression of pain, and verbal report.	**1605.** Pain Control. **Indicators:** **160502.** Recognizes the onset of pain. **160503.** Uses preventive measures. **160511.** Reports controlled pain.	**1400.** Pain Management: Acute **Activities:** - Perform a thorough pain assessment. - Ensure the patient receives analgesic care. **2210.** Administration of Analgesics **Activities:** - Monitor vital signs before and after administering narcotic analgesics. - Provide a comfortable environment and other relaxation-promoting activities.
00266. Risk of surgical wound infection Associated conditions: Diabetes mellitus. Immunosuppression.	**1924.** Risk Control: Infectious Process. **Indicators:** **192426.** Identifies infection risk factors. **192405.** Identifies signs and symptoms of infection. **192407.** Identifies strategies to protect self from others. **1102.** Wound Healing: Primary Intention. **Indicator:** **110213.** Wound edge approximation.	**6550.** Infection Protection **Activities:** - Monitor complete blood count. - Provide appropriate skin care. - Inspect for erythema, excessive heat, or discharge on skin and mucous membranes. - Encourage adequate fluid intake and sufficient nutrition. - Teach the patient to take antibiotics as prescribed.
000228. Risk of ineffective peripheral tissue perfusion related to inadequate knowledge of modifiable factors, sedentary lifestyle.	**0407.** Tissue Perfusion: Peripheral. **Indicators:** **040712.** Peripheral edema. **040715.** Capillary refill of fingers. **040729.** Necrosis.	**4040.** Circulatory Precautions. **Activities:** - Perform a thorough assessment of peripheral circulation. -Instruct the patient on proper skin care and the importance of good glycemic control.
00153. Risk for situational low self-esteem related to body image disturbance, stressors. Associated condition: Physical illness.	**2302.** Adaptation to Physical Disability. **Indicators:** **130808.** Identifies ways to cope with life changes. **130820.** Reports increased psychological well-being.	**5400.** Self-Esteem Enhancement **Activities:** - Encourage the patient to identify personal strengths. - Express confidence in the patient's ability to manage a situation. - Make positive affirmations about the patient.

bio-psycho-social being, thus improving the quality of care for this patient group.

In conclusion, while kidney transplantation helps manage bone and mineral metabolism disorders in CKD, a combination of risk factors can still predispose patients to vascular complications, increasing morbidity and mortality[15]. A multidisciplinary approach, with active involvement of nursing professionals, helps improve the quality of life for CKD patients by meeting therapeutic goals and addressing their individual needs.

Conflicts of interest

The authors declare no conflicts of interest related to the research, authorship, and/or publication of this manuscript.

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