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Nursing care in the management of opportunistic infections and postoperative complications in a kidney transplant patient

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ABSTRACT

Introduction: Renal transplantation requires immunosuppressive treatment to prevent graft-host rejection, with an increased risk of opportunistic infections. This risk is higher in the late post-transplant phase and in patients with a past medical history of rejection, potentially leading to severe complications requiring hospitalisation.

Case Report Description: The case of a renal transplant patient admitted for fever and lymphadenopathy is presented, diagnosed with pulmonary tuberculosis and disseminated aspergillosis. During her hospitalisation, she suffered complications requiring an ostomy and temporary haemodialysis due to her critical condition.

Care Plan Description: Care plan was designed through an initial assessment and weekly re-evaluations according to Marjory Gordon's functional patterns. Fifteen days after admission, the diagnoses of readiness for enhanced knowledge, potential complication: infection, and risk for electrolyte imbalance were established as priorities. Nursing intervention focused on infection control, treatment management, and patient and family education.

Care Plan Evaluation: The care plan was evaluated weekly, with adjustments made according to clinical evolution. After a length of stay of 42 days, the established objectives were achieved, with subsequent follow-up at the post-transplant nursing consultation.

Conclusions: This case highlights the importance of comprehensive assessment from admission and the intervention of a multidisciplinary team to optimise care, prevent complications, and provide health education. Furthermore, it emphasises the role of nursing in emotional support and adapting the transplant patient to the physical and social changes resulting from their illness.

Keywords: renal transplant; immunosuppressive therapy; opportunistic infections; nursing care; postoperative complications; patient education as topic.

RESUMEN

Cuidados de enfermería en el manejo de infecciones oportunistas y complicaciones postquirúrgicas en una paciente trasplantada renal

Introducción: El trasplante renal requiere tratamiento inmunosupresor para prevenir el rechazo injerto-huésped, con mayor riesgo de infecciones oportunistas. Este riesgo es mayor en la fase tardía postrasplante y en pacientes con antecedentes de rechazo, pudiendo derivar en complicaciones graves que requieran hospitalización.

Descripción del caso clínico: Se presenta el caso de una paciente trasplantada renal que ingresó por fiebre y adenopatías, siendo diagnosticada de tuberculosis pulmonar y aspergilosis diseminada. Durante su hospitalización, sufrió

complicaciones que requirieron una ostomía y hemodiálisis temporal debido a su estado crítico.

Descripción del plan de cuidados: El plan de cuidados se diseñó mediante una valoración inicial y reevaluaciones semanales según los patrones funcionales de Marjory Gordon. A los 15 días de ingreso, se establecieron como prioritarios los diagnósticos de disposición para mejorar los conocimientos, complicación potencial: infección y riesgo de desequilibrio electrolítico. La intervención enfermera se enfocó en el control de infecciones, manejo del tratamiento y educación del paciente y su familia.

Evaluación del plan de cuidados: El plan de cuidados se evaluó semanalmente, realizando ajustes según la evolución clínica. Tras 42 días de ingreso, se lograron los objetivos establecidos, con seguimiento posterior en consulta de enfermería postrasplante.

Conclusiones: Este caso destaca la importancia de una valoración integral desde el ingreso y la intervención de un equipo multidisciplinario para optimizar la atención, prevenir complicaciones y proporcionar educación sanitaria. Además, resalta el papel de la enfermería en el apoyo emocional y la adaptación del paciente trasplantado a los cambios físicos y sociales derivados de su enfermedad.

Palabras clave: trasplante renal; terapia inmunosupresora; infecciones oportunistas; cuidados de enfermería; complicaciones postoperatorias; educación del paciente como tema.

INTRODUCTION

Infections represent one of the primary complications in patients undergoing renal transplantation, due to the immunosuppressive treatment required to prevent graft rejection. This therapeutic regimen, typically comprising a calcineurin inhibitor, an antimetabolite, and a corticosteroid, compromises the host's immune response, significantly increasing the risk of opportunistic viral, fungal, and bacterial infections[1,2]. The incidence of these infections varies according to the post-transplant period, with community-acquired infections being more frequent in the late phase, i.e., more than 365 days after transplantation[3,4].

Furthermore, an ostomy is a surgical procedure involving the externalisation of an intestinal segment through the abdominal wall, requiring the immediate placement of a collection bag for the elimination of faeces. This device plays a fundamental role in maintaining patient hygiene, protecting the peristomal skin from irritation, and preventing associated complications. To ensure adequate adaptation, it is essential to use a transparent bag, fitted to the morphology of the stoma, allowing for its observation and preventing constriction of the surrounding tissue[5].

CASE PRESENTATION

A 31-year-old woman, blood group B Rh positive, with a history of chronic kidney disease of undetermined aetiology since 2008, requiring renal replacement therapy via peritoneal dialysis for 4 years. In 2013, she received a cadaveric renal transplant, presenting positive anti-donor specific antibodies (LSA) for class II and a baseline creatinine at discharge of 1.0 mg/dL. Subsequently, she underwent 2 renal biopsies due to acute graft dysfunction, revealing episodes of acute cellular rejection. Her clinical history includes opportunistic infections, such as cytomegalovirus infection in June 2018 and recurrent urinary tract infections.

In May 2023, she was admitted with nocturnal fever, diaphoresis, odynophagia, cervical and inguinal lymphadenopathy, and acute graft dysfunction. A multi-pronged diagnostic approach was undertaken using blood cultures, pharyngeal swab cultures, acid-fast bacilli (AFB) smears, and excisional biopsy of cervical and inguinal lymph nodes, confirming pulmonary tuberculosis via AFB in sputum. In June 2023, the inguinal lymph node biopsy revealed disseminated fungal infection by aspergillosis.

During her hospitalisation, she presented with sudden haemodynamic deterioration requiring vasopressor amines and an acute abdominal condition. Abdominopelvic computed tomography revealed intestinal perforation, leading to urgent exploratory laparotomy. In the immediate postoperative period, she developed acute graft dysfunction, requiring the placement of a non-tunnelled vascular access for renal replacement therapy and a central venous catheter due to a state of shock. Subsequently, a soft tissue infection was identified at the Penrose drain exit site. Following haemodynamic stabilisation and two haemodialysis sessions, she showed improvement in renal function, allowing for the reinitiation of immunosuppression.

NURSING ASSESSMENT

A nursing assessment was conducted according to Marjory Gordon's functional health patterns upon admission **(table 1)**, in addition to weekly periodic evaluations.

CARE PLAN

The care plan was developed using NANDA taxonomies for nursing diagnoses, NOC for outcome criteria, and NIC for nursing interventions **(table 2)**.

The diagnoses identified upon patient admission were related to late infectious complications of renal transplantation: impaired tissue integrity (00044), impaired physical mobility (00085), readiness for enhanced knowledge (00161), risk for electrolyte imbalance (00195), potential complication: infection (10024).

Table 1. Nursing assessment on admission according to Marjory Gordon's functional patterns.

Pattern	Assessment Data
Pattern I: Health perception and management	- Personal history: Chronic kidney disease diagnosed in 2008, requiring peritoneal dialysis for 4 years (2004–2008). - Cadaveric donor kidney transplant in 2013. - History of opportunistic infections: cytomegalovirus in 2018 and recurrent urinary infections since 2019. Complete vaccination schedule. - Good adherence to immunosuppressive treatment. Regular follow-up in medical consultations. - Expresses interest and commitment to the therapeutic regimen. - Fall risk assessment using the Downton scale: 3 points (moderate risk).

Pattern II: Nutritional-metabolic	- Height: 160 cm; Weight: 55 kg; Body Mass Index (BMI): 21.5 kg/m².
	- Nutritional risk assessment:
	  - Norton Scale: 18 points (low risk of pressure ulcers).
	  - Malnutrition Universal Screening Tool (MUST): 2 points (high risk of malnutrition).
	  - Mini Nutritional Assessment (MNA): no indication for nutritional supplements, no chewing problems or dysphagia.
	- No nausea or vomiting.
	- Adequate hydration status.
	- Afebrile.
	- Carrier of a central venous catheter in the left jugular region (No. 9G) and a hemodialysis catheter in the right jugular region (No. 12G).

Pattern III: Elimination	- Presents oliguria. - Preserved fecal continence, with a daily bowel movement pattern.
Pattern IV: Activity and Physical exercise	- Baseline oxygen saturation of 95%. - Absence of dyspnea. - Blood pressure: 115/60 mmHg. - Heart rate: 60 bpm. - Partial dependence for performing basic and instrumental activities of daily living.
Pattern V: Sleep and rest	- Preserved sleep pattern, no disturbances or insomnia.
Pattern VI: Cognitive and Perceptual	- Conscious and oriented in all 3 spheres. - No communication alterations or sensory deficits present. - Pain assessment using the Visual Analog Scale (VAS): 0 points (no pain). - Requires specific health education regarding her clinical condition and treatment.
Pattern VII: Self-concept and self-esteem	- No alterations identified. - Stable mood, calm patient.
Pattern VIII: Role and relations	- Family support.
Pattern IX: Sexuality and reproduction	- No reported issues.
Pattern X: Coping and stress tolerance	- Preserved coping ability, no signs of anxiety or significant stress.
Pattern XI: Values and beliefs	- No alterations identified in this area.

Of the diagnoses identified in the weeks following admission, readiness for enhanced knowledge (000161), potential complication: infection (10024), and risk for electrolyte imbalance (00195) were established as priorities[6].

EVALUATION OF THE CARE PLAN

From hospital admission, a health education programme (HEP) was implemented, aimed at both the patient and her family, with the objective of providing information about the reason for hospitalisation, associated risks, and planned procedures. The main axes of the HEP included stoma assessment and management, fluid and electrolyte control, prevention and management of

Table 2. Care plan with NANDA-NOC-NIC taxonomies during the weeks following admission.

NANDA	NOC	NIC
(000161) Readiness for enhanced knowledge. Manifested by the expressed desire to improve learning.	**(1829)** Knowledge: Ostomy care. Indicators: - 182902: Ostomy dressing. - 182901: Ostomy function. - 182907: Stoma complications. - 18915: Procedure for changing the ostomy bag. Initial score: 4 points. Target score: 20 points. **(1808)**	**(5606)** Individual teaching - Assess the patient's current level of knowledge and understanding. - Instruct the patient. - Allow time for questions and concerns. **(0480)** Ostomy care - Monitor possible postoperative complications. - Monitor stoma healing. - Assist the patient in practicing self-care. - Instruct the patient and family on care techniques.
(10024) Potential complication: Infection. Due to handling and immunosuppressive therapy, manifested by fever. **(00205)** Risk of shock.	**(1924)** Identifies infection risk in daily activities. Indicators: - 192404: Identifies infection risk in daily activities. - 192406: Identifies signs and symptoms. - 192415: Practices hand hygiene. Initial score: 4 points. Target score: 20 points. **(0703)** Infection severity. - 070307: Fever. - 070329: Hypothermia. - 070312: Chills. - 070326: Elevated leukocyte count. Initial score: 4 points. Target score: 20 points.	**(4054)** Central venous access management: Central insertion. - Determine catheter placement. - Follow institutional guidelines, protocols, policies, and procedures. - Provide information regarding the catheter. - Avoid use until placement is confirmed by baseline chest X-ray. - Perform catheter care. - Replace IV administration sets regularly. - Monitor for complications. - Inspect the insertion site daily. **(4255)** Shock management: Sepsis. - Determine sepsis risk level. - Use appropriate screening tools once risk is established (SOFA). - Identify risk situations (immunosuppression and invasive procedures). - Evaluate vital signs and lab values. - Remove any infection source. - Administer broad-spectrum antibiotics as prescribed. - Apply vasopressors if hypotension persists with MAP <65 mmHg. - Use aseptic techniques for all immunocompromised patients.
(00195) Risk for electrolyte imbalance. Related to acute kidney failure.	**(0504)** Renal function. Indicators: - 050418: Weight gain. - 050438: Edema Initial score: 6 points. Target score: 10 points.	**(2080)** Fluid/electrolyte management. - Determine baseline hydration status (overload, dehydration, normovolemia). - Monitor hydration status (moist mucosa, rapid pulse, blood pressure, skin turgor) as appropriate. - Monitor vital signs and hemodynamic status. - Monitor daily weight and assess progress. - Administer IV therapy at room temperature as prescribed.
(00118) Disturbed Body Image. Manifested by actual change in structure or function, related to surgical procedures.	(1205) Self-esteem. Indicators: - 12501: Verbalizations of self-acceptance. - 120511: Level of confidence. - 120519: Feelings about oneself. Initial score: 10 points. Target score: 14 points.	(5270) Emotional support. - Listen to expressions of feelings and beliefs. - Discuss emotional experiences with the patient.

septic shock, and central venous catheter care. The patient was informed about the location of her vascular access and the necessary care, and maintenance procedures were carried out, including proper care and management of the catheters[7].

After 3 weeks of admission, the following objectives were achieved:

- Readiness for enhanced knowledge: The patient demonstrated the ability to recognise and explain her clinical status, autonomously perform ostomy care, and independently assume self-care.
- Potential complication: infection and risk of septic shock: During hospitalisation, she presented with infection associated with the surgical procedure, with haemodynamic instability. Measures for infection control and prevention, central venous catheter and ostomy management, as well as monitoring and treatment of shock and fluid and electrolyte disorders, were implemented. Follow-up was scheduled in the renal transplant, general surgery, ostomy nursing, and vascular access nursing clinics. The final NOC score was 16 points.
- Risk for electrolyte imbalance: Resolution of oedema, improvement in creatinine levels to baseline values, and normalisation of biochemical parameters were evidenced. The final outcome score was 10 points.
- Disturbed body image: Adequate adaptation of the patient to her new image resulting from hospital complications was observed. Consultation with the psychology team was proposed, which was accepted, establishing weekly visits for individual and family therapy. The final outcome score was 15 points[8].

One month into hospitalisation, the patient persisted with the diagnosis of risk for electrolyte imbalance and the potential complication of infection, in the context of her immunosuppressed state secondary to immunosuppressive treatment aimed at preventing renal graft rejection. Given this condition, the need for continuous follow-up in the renal transplant and infectious disease clinics after hospital discharge was established, with the aim of monitoring clinical evolution and preventing possible post-transplant complications. Similarly, the central venous catheter was removed without incident, ensuring its proper evolution. For stoma follow-up and optimisation of self-care, specific monitoring was scheduled in the ostomy nursing clinic, ensuring continuity of care and the patient's progressive adaptation to her new condition.

Multidisciplinary Team Intervention

To achieve the proposed objectives, the coordinated intervention of a multidisciplinary team was required, including:

- Nephrology nursing: Responsible for the care of the transplant patient with systemic infectious complications and ostomy. They were in charge of continuous assessment of the clinical state and health education directed at the patient and her family.
- Stoma therapy nursing: Specialists in the assessment, evolution, and management of the ostomy, providing health education and advice on self-care.
- Nephrologists, infectologists, and general surgeons: Responsible for the supervision of infectious complications associated with immunosuppression and the surgical procedure, as well as the follow-up of clinical and biochemical parameters and the patient's general evolution.
- Psychology team: Intervened in addressing body image disturbance, providing individual and family psychological therapy to favour the patient's adaptation to physical changes derived from her clinical process.

This interdisciplinary approach allowed for comprehensive care, optimising the patient's evolution and facilitating her progressive reintegration into daily life with adequate management of her post-transplant health status.

DISCUSSION

Health education provided by nursing staff, along with the intervention of a multidisciplinary team, is fundamental to ensuring adequate learning in complication surveillance, management of specific care, and the prevention and early detection of possible adverse events[9,10]. In critically ill transplant patients, proper management of devices such as the central venous catheter and ostomy is essential, given that their mismanagement can lead to serious complications such as bacteraemia, central venous catheter exit site infection, or stoma retraction, significantly prolonging hospital stay and increasing associated morbidity and mortality[11].

Furthermore, it is essential to provide comprehensive support to the patient and their family, facilitating adaptation to the physical, emotional, and social changes that this new stage entails. For this, the design of an individualized care plan should include follow-up by the psychology team and the implementation of family therapy, thus promoting better adherence and quality of life in the transplant patient[12,13].

Renal transplantation remains the most effective therapeutic option for patients with chronic kidney disease requiring renal replacement therapy. According to data from the Mexican Social Security Institute, the overall survival of deceased donor graft recipients is 91.18%, while graft function reaches 84.19% 1 year after the transplant. These results reinforce the key role of nursing in all phases of the transplant process, from the early to the late period, underscoring the need for specialized and continuous care that responds to the specific needs of each patient[14,15].

CONCLUSIONS

This case report highlights the complexity of managing a renal transplant patient with infectious and surgical complications, emphasising the importance of early intervention and a multi-

disciplinary approach to optimise clinical outcomes. Adequate health education, provided to both the patient and her family, has proven to be a fundamental pillar in the prevention of complications and in promoting autonomy in self-care.

Similarly, continuous assessment of the patient's clinical status allowed for the early identification of complications such as opportunistic infection and fluid and electrolyte imbalance, enabling timely management and reducing the risk of haemodynamic deterioration. The implementation of an individualized care plan, including strict monitoring of the central venous catheter and ostomy, contributed to a favourable evolution and minimisation of associated risks. The role of nursing in post-transplant follow-up is essential, both in monitoring signs of rejection and infection, and in emotional and psychosocial support. The inclusion of the psychology team in the care process favoured the acceptance of physical changes derived from the surgical process, facilitating the patient's adaptation to her new condition.

Finally, this case underscores the need for standardised care protocols in transplant patients, ensuring a comprehensive approach that encompasses not only clinical stability but also the patient's quality of life and psychosocial well-being in the post-transplant context.

Conflicts of interest

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

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