REVISTA CHILENA DE ENFERMERÍA RchE FACULTAD DE MEDICINA UNIVERSIDAD DE CHILE

CASE STUDY

Nursing care for an adult with vancomycin-induced red man syndrome: a case study

Cuidados enfermeros en un adulto con síndrome del hombre rojo por vancomicina: un estudio de caso

Cuidados de enfermagem em um adulto com síndrome do homem vermelho da vancomicina: um estudo de caso

Tania Carrasco-Iturrieta [1], **Lorena Bettancourt-Ortega** [2a]

[1] Hospital Dr. Gustavo Fricke, Viña del Mar, Chile.
[2] Universidad de Valparaíso, Valparaíso, Chile.
[a] **Corresponding Author** lorena.bettancourt@uv.cl

Cite us: Carrasco-Iturrieta T, Bettancourt-Ortega L. Nursing care for an adult with vancomycin-induced red man syndrome: a case study. Rev. chil. enferm. 2024;6:76519. https://doi.org/10.5354/2452-5839.2024.76519

Received: October 31, 2024
Approved: December 03, 2024
Published: December 13, 2024

Editor: Felipe Machuca-Contreras

ABSTRACT

Objective: To develop the nursing process for an adult patient with severe vancomycin red man admitted to a Critical Patient Unit of a Chilean public hospital. **Case Presentation:** This case report focuses on an adult patient diagnosed with Red Man Syndrome induced by vancomycin and hospitalized in an Intensive Care Unit. The patient had a history of chronic renal failure and a prior mild adverse reaction to the medication. The nursing process was applied, using Virginia Henderson's need theory as an assessment framework. Taxonomy II of the North American Nursing Diagnosis Association International (NANDA-I) and Linda Carpenito's Bifocal Clinical Practice Model were used for care planning. **Discussion:** Nurses play a pivotal role in the preparation and administration of medications. The nursing process is an effective tool for delivering care, preventing medication errors, and mitigating their potential consequences for patients. **Conclusions:** Implementing the nursing process in patients with Red Man Syndrome underscores the critical role of nurses in enhancing care quality, improving patient outcomes, and guiding care delivery. Additionally, it contributes to strengthening post-care quality of life.

Keywords: Vancomicyn; Critical Care Nursing; Drug-Related Side Effects and Adverse Reactions; Case Reports; Nursing Process.

RESUMEN

Objetivo: Desarrollar el proceso enfermero a una persona adulta con hombre rojo por vancomicina grave ingresada a una Unidad de Paciente Crítico de un hospital público chileno. **Presentación del caso:** Estudio de reporte de caso a persona adulta hospitalizada en Unidad de Cuidados Intensivos afectada por el síndrome de hombre rojo por Vancomicina con antecedentes de Insuficiencia renal crónica y reacción adversa al medicamento leve previo, a quien se le aplica el Proceso de enfermería, se utilizó cómo guía para la valoración la teoría de la satisfacción de las necesidades de Virginia Henderson y para la planificación del cuidado, la Taxonomía II de la *North American Nursing Diagnosis Association International* y el modelo de Práctica clínica Bifocal de Linda Carpenito. **Discusión:** las enfermeras cumplen un rol protagónico como responsables de la preparación y administración de los medicamentos. La aplicación del proceso de enfermería representa una herramienta eficaz para la provisión de cuidados que puede prevenir los errores de medicación y las posteriores consecuencias en las personas atendidas **Conclusiones:** El desarrollo de este proceso de enfermería en usuarios que cursan con síndrome del hombre rojo aporta a evidenciar el rol de la enfermera en la mejora de la calidad de los cuidados, mejorar el pronóstico y puede representar una ayuda para guiar el proceso de cuidados y la calidad de vida posterior.

Palabras claves: Vancomicina; Enfermería de Cuidados Críticos; Efectos Colaterales y Reacciones Adversas Relacionados con Medicamentos; Informes de Casos; Proceso de Enfermería.**RESUMO**

Objetivo: Desenvolver o processo de enfermagem para um paciente adulto com homem vermelho grave por vancomicina internado em uma Unidade de Pacientes Críticos de um hospital público chileno. **Apresentação do caso:** Estudo de relato de caso de um adulto hospitalizado na Unidade de Terapia Intensiva acometido pela Síndrome do Homem Vermelho da Vancomicina, com histórico de insuficiência renal crônica e reação adversa a medicamento leve anterior, ao qual foi aplicado o Processo de Enfermagem. A teoria da satisfação das necessidades de Virginia Henderson foi usada como guia para avaliação e planejamento de cuidados, a Taxonomia II da Associação Internacional de Diagnósticos de Enfermagem da América do Norte e o modelo de Prática Clínica Bifocal de Linda Carpenito. **Discussão:** Os enfermeiros desempenham um papel de liderança como responsáveis pela preparação e administração de medicamentos. A aplicação do processo de enfermagem representa uma ferramenta eficaz para a prestação de cuidados que pode evitar erros de medicação e as consequências subsequentes para as pessoas que estão sendo cuidadas: O desenvolvimento desse processo de enfermagem em usuários que sofrem da síndrome do homem vermelho contribui para destacar o papel do enfermeiro na melhoria da qualidade da assistência, melhorando o prognóstico e pode representar um auxílio na orientação do processo de assistência e na qualidade de vida subsequente.

Palavras-chave: Vancomicina; Enfermagem de Cuidados Críticos; Efeitos Colaterais e Reações Adversas Relacionados a Medicamentos; Relatos de Casos; Processo de Enfermagem.

INTRODUCTION

Vancomycin is a bactericidal antimicrobial agent widely used to treat severe infections caused by multidrug-resistant gram-positive bacteria. When administered parenterally, it is the first-line treatment for diseases caused by methicillin-resistant *Staphylococcus aureus* (MRSA), including soft tissue infections, bacteremia, osteomyelitis, and pneumonia.[1,2] In clinical practice, vancomycin is frequently administered during the early stages of severe sepsis, typically as part of empirical therapy

alongside β-lactam antibiotics to broaden the spectrum of bactericidal activity until the infectious agent is identified.[3]

The pharmacokinetics of vancomycin have been well studied, and its use can result in adverse events such as nephrotoxicity and ototoxicity if not monitored to maintain its concentrations within therapeutic ranges. Such monitoring maximizes efficacy while minimizing the risk of toxicity.[1-3]

A preventable adverse event associated with improper administration of vancomycin—whether due to infusion rate or solution concentration—is known as Red Man Syndrome (RMS), also referred to as vancomycin flushing syndrome, "red neck," or "red person" syndrome.[4,5] RMS is characterized by a massive release of histamine, leading to paresthesia, intense itching, and a maculopapular rash on the neck, face, upper trunk, and upper extremities, though other locations may also be affected. Clinically, this reaction is typically a self-limiting dermatological response that causes the patient to experience discomfort and distress. In more severe cases with systemic involvement, additional symptoms may include angioedema, hyperthermia, hypotension, tachycardia or bradycardia, and, in extreme cases, cardiac arrest.[4,5]

The estimated incidence of RMS ranges from 4% to 50% among hospitalized patients receiving vancomycin.[5-6] Diagnosis is primarily clinical and does not rely on laboratory tests or other diagnostic procedures. These reactions generally subside within 20 to 30 minutes after discontinuing the infusion, although symptoms may persist for several hours. When vancomycin is administered as a diluted infusion at a maximum concentration of 5 mg/mL and infused slowly over at least 60 minutes, such adverse events are infrequent.[6] Identified risk factors for RMS include Caucasian ethnicity, age ≥2 years, a history of RMS, vancomycin dose ≥10 mg/kg, vancomycin concentration ≥5 mg/mL, and prior use of antihistamines.[6]

Vancomycin-induced Red Man Syndrome has been extensively documented in both adult and pediatric patients in the existing literature, particularly before the 2000s, due to its high incidence at the time. However, with advancements in drug monitoring techniques and administration protocols, the occurrence of RMS has significantly decreased, underscoring the importance of strict monitoring. This would ideally include assessing clinical efficacy across different administration regimens (intermittent vs. continuous infusion).[7] Current reported cases are predominantly mild, resolving within 20 minutes after discontinuing the infusion, and often managed with antihistamines. Nonetheless, moderate to severe cases, although infrequent, may require intensive management. Notably, the literature lacks reports addressing this issue or providing evidence on the care delivered to such patients in critical care units.

Red Man Syndrome is a preventable adverse drug reaction resulting from errors in medication administration, particularly the rapid infusion of vancomycin.[8] This highlights the critical role of nursing in medication management, as nurses are primarily responsible for preparing and administering medications as prescribed by physicians.

From an intensive care perspective, patient assessment through Virginia Henderson's theory provides a comprehensive framework for identifying and addressing individual patient needs. By applying clinical judgment, nurses can recognize which aspects require greater intervention—from physiological to biopsychosocial factors. This theory allows for care delivery while simultaneously addressing vital risks, underscoring the importance of holistic nursing care.[9]

This article aims to explore the nursing process in the management of an adult patient who developed severe RMS following vancomycin administration in an Intensive Care Unit (ICU) at a public hospital in Chile. The case is analyzed using Henderson’s theory of the fourteen fundamental human needs and the bifocal clinical nursing model to guide nursing interventions in response to this adverse event.

CASE PRESENTATION

Background

The assessment was conducted through a review of medical records with the patient's authorization, ensuring confidentiality and the protection of sensitive clinical information.

The patient is a 64-year-old woman with a medical history of hypertension, obesity, insulin-dependent type II diabetes mellitus, and chronic kidney disease requiring thrice-weekly hemodialysis.

She initially sought medical attention after a ground-level fall, presenting with pain and functional impairment in her left hip. Trauma evaluation ruled out hip and knee fractures, and she was discharged. However, she returned several days later with worsening dorsolumbar pain and fever. Laboratory results showed elevated inflammatory markers with no clear infectious focus. A lumbar CT scan and MRI revealed signs of an inflammatory process in the lumbosacral region (L3-L4 and L5-S1), with poorly defined fluid collections, edema, and synovitis, leading to a diagnosis of spondylodiscitis.

The neurosurgery team was consulted, but surgical intervention was deemed unnecessary. Instead, medical treatment was initiated with vancomycin (1 g every 72 hours) and ceftriaxone (1 g daily) for six weeks. Two days before completing the antibiotic regimen, the patient developed a maculopapular rash on her face, chest, and upper extremities, accompanied by eosinophilia without other clinical symptoms. Antihistamine therapy was started.

Following the completion of antibiotic therapy, the patient experienced a clinical deterioration. Blood cultures revealed *Staphylococcus aureus haemolyticus* and extended-spectrum β-lactamase (ESBL)-producing *Klebsiella*. A new antibiotic regimen was initiated with a vancomycin loading dose of 2 g and ertapenem (500 mg/day). Shortly after vancomycin administration, the patient developed a widespread maculopapular rash affecting the face, neck, anterior and posterior chest, and upper extremities. Additionally, she exhibited signs of acute respiratory distress, including moderate dyspnea, hypotension (mean blood pressure of 50 mmHg, requiring adrenaline at 0.05 mcg/kg/min), tachycardia (150-160 bpm), and hyperthermia (peaking at 39.8°C).

Initial treatment included intravenous (IV) chlorpheniramine (10 mg), hydrocortisone (100 mg), and paracetamol (1 g). Vancomycin was discontinued, and the patient’s antibiotic regimen was switched to linezolid (600 mg IV every 12 hours). She was admitted to the Intensive Care Unit (ICU) for monitoring and management, with a differential diagnosis of vancomycin hypersensitivity reaction versus septic shock.

A review of clinical records revealed that vancomycin had been administered as a loading dose over one hour, which deviated from institutional protocol recommendations. Shortly after infusion, the patient developed the described clinical presentation, raising suspicion of Red Man Syndrome secondary to vancomycin administration.

In the following days, vancomycin levels were monitored, and a decision was made to reintroduce the antibiotic at a reduced dose (1 g every 72 hours), administered over two hours in 250 mL of normal saline. To date, the patient has not exhibited any dermatologic or systemic reactions to vancomycin re-administration, further supporting the diagnosis.

The nursing process was applied as a fundamental tool in patient management,[10] beginning with a comprehensive assessment guided by Virginia Henderson's theory of human needs. This framework allows nurses to identify patient needs to ensure satisfaction across biological, psychological, sociocultural, and spiritual dimensions,[9] facilitating targeted nursing interventions.[9]

Assessment Based on Basic Needs

The patient's health status was evaluated upon admission to the ICU. Table 1 presents a basic needs assessment, highlighting only the aspects most relevant to the case analysis.

Table 1. Assessment Based on Virginia Henderson's Theory of Basic Needs

Need	Assessment	Status
Normal breathing	Spontaneous ventilation, polypnea (25–30 breaths per minute) with moderate dyspnea. Oxygen support via Venturi mask at FiO_2 40%, pulse oximetry at 94%. ABG results: pO_2 88.2 mmHg, pH 7.39, pCO_2 36.8 mmHg, HCO_3 22.7 mEq/L, PaFi 220. Hypertensive with mean blood pressures above 90 mmHg, requiring adrenalin infusion (0.05 mcg/kg/min), which was rapidly tapered and discontinued 30 minutes after ICU admission. Maintains mean blood pressure >65 mmHg. Tachycardia (150–160 bpm), cutaneous flushing, normal capillary refill, diaphoretic.	Dependent (5) → Requires assistance.
Eating and drinking adequately	NPO, experiencing nausea; intravenous antiemetics administered. Hyperglycemic (200–250 mg/dL), managed with subcutaneous crystalline insulin per standard protocol.	Dependent (5) → Requires assistance.
Eliminating bodily waste	Anuric due to chronic kidney disease, undergoing hemodialysis (three sessions per week; most recent session completed without complications). No bowel movements by day 2.	Dependent (6) → Totally dependent
Moving and maintaining posture	Strict bed rest. Moves with difficulty and reports acute lumbar pain (Visual Analog Scale [VAS] 6–7/10), partially relieved with analgesics. Requires assistance for repositioning every two hours, as tolerated.	Dependent (5) → Requires assistance.
Sleeping and resting	Discomfort due to skin rash, sleep disturbances exacerbated by ICU routine and monitor noise. Administered neuroleptics to promote nocturnal rest.	Dependent (5) → Requires assistance.
Maintaining body temperature within normal limits and adjusting the environment	Febrile (up to 39.8°C), with poor response to intravenous antipyretics. Physical cooling measures were applied (uncovering, cooling blankets).	Dependent (5) → Requires assistance.
Maintaining personal hygiene and skin integrity	Personal hygiene preserved. Maculopapular rash on face, neck, torso, and upper limbs, with no loss of skin integrity.	Dependent (5) → Requires assistance.
Communicating, and expressing emotions, needs, fears, or opinions	Glasgow Coma Scale (GCS) score: 14 (Eye Opening [E]: 3, Verbal Response [V]: 4, Motor Response [M]: 6). Somnolent, bradyphrenic but cooperative.	Dependent (4) → Needs partial help.

Source: Author's elaboration.

Standardized Care Plan

The bifocal clinical practice model was used to develop a standardized care plan. This model aims to identify independent problems—those specific to the nursing discipline, addressed through NANDA-II nursing diagnoses—and interdependent ones, which require collaboration with other healthcare professionals for interdisciplinary care.[10]

Based on the level of dependency established using Henderson's model, three priority nursing diagnoses were identified (Table 2, Annex 1 and 2).[3] One diagnosis was developed in detail using the NANDA-I (Table 2), Nursing Interventions Classification (NIC) (Tables 3, 4, and 5), and Nursing Outcomes Classification (NOC) (Tables 6 and 7).[11-13]

Table 2. Priority Nursing Diagnosis (NANDA)

DOMAIN	**11**	**Safety/Protection**	**CLASS**	**6**	**Thermoregulation**
LABEL	00007 Hyperthermia				
DxE	Hyperthermia related to an anaphylactoid reaction due to incorrect administration of intravenous vancomycin, manifested by fever up to 39.8°C, flushing, tachycardia (160 bpm), tachypnea (25-30 breaths/min), diaphoresis, lethargy, and vasodilation.				

Source: Prepared by the authors based on NANDA.[11]

Table 3. Outcome Criterion (NOC) Thermoregulation

DOMAIN	**II**	**CLASS**	**I**

Physiological Health		**Metabolic Regulation**				
CRE	Thermoregulation	**ESCALE**	Extremely to Not Compromised			
INDICATORS		**1**	**2**	**3**	**4**	**5**
080001 Core body temperature.			2 →			5
080019 Hyperthermia		1 →			4	
080006 Drowsiness				3 →		5
080007 Skin color changes			2 →		3	

* Arrow indicates baseline and expected state.

Source: Prepared by the author based on NOC.[13]

Table 4. Outcome Criterion (NOC) Systemic Allergic Response

DOMAIN	**II**	**CLASS**	**H**

Physiological Health		**Immune Response**				
CRE	Systemic Allergic Response	**ESCALE**	Severe to None			
INDICATORS		1	2	3	4	5
070606 Tachycardia			2 →		4	
070610 Decreased Level of Consciousness				3 →		5
070617 Erythema			2 →		4	
070619 Fever		1 →			4	

* Arrow indicates baseline and expected state.

Source: Prepared by the author based on NOC.[13]

Tabla 5. Outcome Criterion (NOC) Medication Response.

DOMAIN	**II**	**CLASS**	**A**

Physiological Health		**Therapeutic Response**				
CRE	Medication Response	**ESCALe**			Gravemente comprometido a No Comprometido.	
INDICATORS		1	2	3	4	5
230105 Allergic Reaction			2 →		4	
230106 Adverse Events			2 →			5

* Arrow indicates baseline and expected state.

Source: Prepared by the author based on NOC.[13]

Table 6. Interventions Classification (NIC)

LEVEL 1	**2. COMPLEX PHYSIOLOGICAL**	NIVEL 2	**RISK**
FIELD	**CARE SUPPORTING HOMEOSTATIC REGULATION**	CLASS M	**MANAGEMENT**
LEVEL 3	**3900 TEMPERATURE REGULATION**	Frequency / Responsible	
INTERVENTION			
Activities	Check temperature at least every 2 hours, as appropriate.	Nurse on duty	
	Monitor blood pressure, pulse, and respiration, as appropriate.	Nurse on duty	
	Use a cooling mattress, circulating water blankets, lukewarm baths, ice packs, or gel packs, as well as intravascular cooling catheterization to lower body temperature, as appropriate.	Nurse on duty	
	Administer antipyretic medications, if indicated.	Nurse on duty	
	Observe for signs and symptoms of hyperthermia.	Nurse on duty	
	Observe skin color and temperature.	Nurse on duty	
INTERVENTION	**3786 TREATMENT OF HYPERTHERMIA**		
Activities	Ensure airway patency.	Nurse on duty	
	Monitor vital signs.	Nurse on duty	
	Administer oxygen, if necessary. Discontinue the suspected causative medication.	Nurse on duty	
	Apply external cooling methods (cold compresses to the neck, chest, abdomen, armpits, and groin).	Nurse on duty	
	Wet the patient's body surface and fan them.	Nurse on duty	
	Establish IV vascular access.	Nurse on duty	
	Administer IV fluids using chilled solutions.	Nurse on duty	
	Insert a nasogastric tube as appropriate.	Nurse on duty	
	Monitor for abnormalities in mental status (e.g., confusion, unusual behavior, anxiety, loss of coordination, agitation, seizures, and coma).	Nurse on duty	
	Monitor core body temperature using an appropriate device (e.g., rectal or esophageal probe).	Nurse on duty	
	Obtain laboratory values for serum electrolytes, cardiac enzymes, liver enzymes, and complete blood count, monitoring the results.	Nurse on duty	
	Monitor arterial blood gases (e.g., acid-base imbalance).	Nurse on duty	
	Monitor for the presence of complications.	Nurse on duty	
INTERVENTION	**2100 HEMODIALYSIS THERAPY**	CLASE G **ELECTROLYTE AND ACID-BASE CONTROL**	
Activities	Record baseline vital signs: weight, temperature, pulse, respiration, and blood pressure.	Nurse on duty	
	Check the equipment and solutions according to the protocol.	Nurse on duty	
	Use sterile technique to initiate hemodialysis and for needle insertion and catheter connections.	Nurse on duty	
	Initiate hemodialysis according to the protocol.	Nurse on duty	
	Check the system monitors (flow, pressure, temperature, pH, conductivity, clot detection, air detection, negative pressure for ultrafiltration, and blood flow sensor) to ensure patient safety.	Nurse on duty	
	Monitor blood pressure, pulse, respiration, temperature, and patient response during dialysis.	Nurse on duty	
	Administer heparin according to the protocol.	Nurse on duty	
	Discontinue hemodialysis according to the protocol.	Nurse on duty	

Source: Prepared by the author based on NIC.[12]

Table 7. Classification of Interventions (NIC) Safety Level.

LEVEL 1 FIELD	**4. SAFETY CARE SUPPORTING PROTECTION AGAINST HARM**	LEVEL 2 CLASS V	**RISK CONTROL**
LEVEL 3 INTERVENTION	**6412 MANAGEMENT OF ANAPHYLAXIS (K)**	Frequency / Responsible	
Activities	Identify and eliminate the source of the allergen, if possible.	Nurse on duty	
	Administer antihistamines or corticosteroids and document if urticaria, angioedema, or bronchospasm is present.	Nurse on duty	

Source: Prepared by the author based on NIC.[12]

Additionally, after developing the NANDA/NOC/NIC framework, potential complications (Table 8), nursing interventions with their rationale (Table 9), interventions related to medical treatment (Table 10), and assessment (Table 11) were outlined.

Table 8. Potential Complication according to Carpenito.

POTENTIAL COMPLICATION	Distributive shock secondary to Red Man Syndrome
NURSING GOAL	The nurse assesses for signs and symptoms of distributive shock.
INDICATORS	Mean arterial pressure ≥ 65 mmHg
	Heart rate 60-100 bpm
	Body temperature 36°C-36.9°C
	Respiratory rate 12-20 breaths/min
	Level of consciousness equal to GCS 15 points (AO:4 RV:5 RM:6)
	Pulse oximetry ≥ 94%

Source: Prepared by the author based on Carpenito.[10]

Table 9. Nursing Interventions and Rationale.

NURSING INTERVENTIONS	**RATIONALE** [10]
Invasive hemodynamic monitoring	Hemodynamic monitoring provides critical data on cardiocirculatory pathophysiology, assisting in diagnosis and guiding therapeutic interventions in cases of hemodynamic instability.
Assessment of circulatory status: blood pressure, skin color, temperature, heart rate and rhythm, peripheral pulses, and capillary refill	Peripheral circulation is compromised in shock states, leading to pallor, weakened peripheral pulses, and delayed capillary refill.
Evaluation of respiratory rate, depth, and effort; observation for signs of inadequate tissue oxygenation (cyanosis, tachypnea)	The clinical presentation of respiratory insufficiency varies depending on pulmonary impairment and the patient's underlying health status. In severe cases, advanced airway management may be required.
Observation of sensory changes (lethargy, confusion, disorientation, anxiety)	Cerebral hypoperfusion secondary to shock can manifest as observable altered mental status.
Monitoring body temperature	High fever significantly increases metabolic demand and oxygen consumption, leading to impaired cellular oxygenation.
Observation for signs of clinical deterioration, including hypotension, pallor, cyanosis, altered consciousness, and persistent fever despite interventions	Shock requires immediate medical intervention; otherwise, it can lead to multi-organ failure and death.

Source: Prepared by the author based on Carpenito.[10]

Table 10. Interventions Derived from Medical Treatment

INTERVENTIONS DERIVED FROM MEDICAL TREATMENT	RATIONALE
Insertion of a central vascular access and arterial line for invasive hemodynamic monitoring	The purpose of invasive monitoring is to detect, recognize, and promptly correct systemic disturbances that may lead to complications in critically ill patients. The data obtained allows optimized tissue oxygenation in vital organs and effective management of global tissue hypoxia, shock, and multi-organ failure.[14]
Medication administered as prescribed:	
Hydrocortisone 50 mg IV every 8 hours	Corticosteroids used in anaphylactic shock and immediate hypersensitivity reactions.[15]
Chlorphenamine 10 mg IV every 12 hours	H1 histamine receptor antagonist used for allergic reactions to blood or plasma.[15]
Linezolid 600 mg IV every 12 hours	Oxazolidinone-class antibiotic used for complicated skin and soft tissue infections.[15]
Paracetamol 1 g IV every 8 hours	Analgesic and antipyretic.[15]
Folic acid 5 mg orally once daily	Vitamin B9 supplement used for anemia prevention in chronic kidney disease patients.[15]
Losartan 50 mg orally every 12 hours	Angiotensin II receptor synthetic antagonist used as an antihypertensive agent.[15]
Pregabalin 75 mg orally at night	Gabapentinoid used for the management of peripheral and central neuropathic pain.[15]
Epoetin alfa 4,000 IU subcutaneously on Mondays, Wednesdays, and Fridays	Glycoprotein hormone used to prevent anemia.[15]
Heparin sodium 5,000 IU subcutaneously every 12 hours	Antithrombotic agent that enhances antithrombin III activity to inhibit factors IIa and Xa, preventing clot formation.[15]
Metamizole 1 g IV as needed for T > 38.0°C or pain score (EVA) > 4	Analgesic-antipyretic is used for severe and refractory pain and fever.[15]
Assessment of supplemental oxygen requirements	The goal of oxygen therapy is to maintain PaO_2 above 60 mmHg (or oxygen saturation above 90%). The delivery method should ensure adequate oxygenation while considering patient tolerance.[12]
Monitoring with laboratory tests and cultures	Comprehensive testing includes indicators of perfusion and organ function.[12] -Plasmatic levels of vancomycin: Revealing therapeutic concentrations of the medication that could affect or contribute to disease progression.12
Intermittent hemodialysis as assessed by nephrology	Renal replacement therapy for intoxication is required in only 0.1% of cases and is reserved for patients with life-threatening toxicity, prolonged ICU stay, permanent sequelae, or multi-organ dysfunction unresponsive to standard supportive measures.[16]

Source: Prepared by the author based on Carpenito.[10]

Table 11. Assessment according to Carpenito.[10]

INDICATORS	NURSING ASSESSMENT
Mean Blood Pressure equal to or greater than 65 mmHg	The patient maintains blood pressures between 65 - 70 mmHg, with adrenaline infusion discontinued.
Heart Rate 60-100 beats/min	The patient exhibits heart rates between 110-120 beats/min; despite being tachycardic, there was a significant reduction from admission.
Body Temperature 36°C-36.9°C	Reduction in body temperature after antipyretic and physical cooling measures, within a maximum of 8 hours.
Breathing Rate 12-20 breaths/min	The patient is polypneic, with respiratory rates between 20-25 breaths/min, without signs of dyspnea; oxygen supply reduced from mask to nasal cannula with FiO2 at 28%.
Consciousness level equal to GCS 15 points (E: 4, V: 4, M: 6)	Persistent GCS of 14 points, with no focal neurological deficit or other cognitive deterioration.

Pulse Oximetry greater than or equal to 94%	Pulse oximetry readings greater than 95%, with reduced oxygen supply through the nasal cannula.

Source: Prepared by the author based on Carpenito.[10]

DISCUSSION

This Red Man Syndrome case shows an adverse event resulting from incorrect vancomycin administration, closely related to the intravenous administration rate and the infusion concentration. As mentioned in the reviewed cases, when vancomycin is administered via a diluted infusion with a maximum concentration of 5 mg/ml and at a slow rate over at least 60 minutes, this event is rare.[4-6]

The dosage and administration rate of vancomycin given to the patient differs from the above recommendations. Other risk factors contributing to RMS in this clinical case include a previous appearance of the syndrome. Considering the patient previously developed a maculopapular rash on the face, chest, and upper extremities following vancomycin administration without other associated symptoms, we may suspect that was a mild RMS episode, which increases the likelihood of recurrence.[6] Lastly, the antihistamine treatment administered after the first event is described in the literature as another risk factor.[6]

Regarding the severity of the episode, a concomitant variable was the patient's kidney failure. A documented case of vancomycin-induced RMS from oral administration in a patient with kidney failure clarifies that patients with impaired kidney function are more prone to developing this clinical presentation.[17]

The management of RMS in this clinical case aligns with what is recommended in the literature, including discontinuing vancomycin, administering corticosteroids and antihistamines, and controlling pseudo-anaphylaxis.[6,18]

This case highlights the importance of nursing care during drug administration, particularly concerning monitoring and adherence to administration protocols.[8] No reports were found in the literature regarding severe cases requiring intensive management or a care-focused approach.

CONCLUSIONS

The application of the nursing process in an adult patient affected by Red Man Syndrome in an ICU proves it is an effective tool for nursing care, fulfilling the main objective of this clinical case. The nursing assessment, guided by Virginia Henderson's Needs Theory and developed through the application of the NANDA, NIC, and NOC taxonomy, allowed for the identification of the patient's most dependent needs. Once defined, these needs informed the creation of a care plan with objectives and indicators to assess the impact of interventions and the patient's progress toward health recovery. The bifocal clinical practice model was key in preventing the main potential complication, which was the onset of distributive shock.

The development of this nursing process in patients with RMS contributes to the improvement of care and can serve as a valuable resource for nurses working with these patients.

CONFLICTS OF INTEREST: The authors declare no conflicts of interest.
FUNDING: No Funding.
AUTORSHIP:
TCI: Conceptualization, Visualization, Writing – Original Draft Preparation, Writing – Review & Editing.
LBO: Conceptualization, Visualization, Writing – Original Draft Preparation, Writing – Review & Editing.

REFERENCES

1. Alvarez-Arango S, Yerneni S, Tang O, Zhou L, Mancini CM, Blackley SV, Blumenthal, KG. Vancomycin Hypersensitivity Reactions Documented in Electronic Health Records. The Journal of Allergy and Clinical Immunology: In Practice 2021;9(2):906-912. https://doi.org/10.1016/j.jaip.2020.09.027
2. Matsumoto K, Oda K, Shoji K, Hanai Y, Takahashi Y, Fujii S, Hamada Y, Kimura T, Mayumi T, Ueda T, Nakajima K, Takesue Y. Clinical Practice Guidelines for Therapeutic Drug Monitoring of Vancomycin in the Framework of Model-Informed Precision Dosing: A Consensus Review by the Japanese Society of Chemotherapy and the Japanese Society of Therapeutic Drug Monitoring. Pharmaceutics 2022;14(3):489. https://doi.org/10.3390/pharmaceutics14030489
3. Wolff M, Quintanilla R, Carrasco JP, Cifuentes M. Análisis crítico de un antimicrobiano sub-óptimo, de frecuente sobre-utilización e inadecuada dosificación: Vancomicina. Rev. chil. Infectol 2019;36(6):687-697. http://dx.doi.org/10.4067/S0716-10182019000600687.
4. Martel TJ, Jamil RT, King KC. Vancomycin Flushing Syndrome. En: StatPearls. Treasure Island (FL): StatPearls Publishing; 2023.
5. Tallón Martínez JC, Manzano Lorenzo R, Ramos Amador JT, Martínez Sesmero JM. Síndrome del hombre rojo en pediatría: a propósito de 2 casos. Rev. OFIL·ILAPHAR 2021; 31(2): 206-207. https://dx.doi.org/10.4321/s1699-714x2021000200017
6. Myers AL, Gaedigk A, Dai H, James LP, Jones BL, Neville KA. Defining risk factors for red man syndrome in children and adults. Pediatr Infect Dis J 2012;31(5):464–8. http://dx.doi.org/10.1097/inf.0b013e31824e10d7
7. Galvis A, Piñeros L. Revisión sistemática de metodologías de seguimiento de las concentraciones séricas de vancomicina, y análisis de métodos de administración en Colombia frente a otros países. [Tesis de Pregrado]. Bogota, Colombia: Universidade del Bosque; 2023.
8. Ortiz Namur NP, Ortuño Lazarte PE, Paniagua Sánchez S. Sindrome del hombre rojo por vancomicina reporte de un caso. Revista Científica Ciencia Médica 2008;11(1):28-30.
9. Pino Armijo P. Aplicación de la teoría de Henderson y su aproximación al cuidado avanzado en enfermería en un servicio de pediatría. MEDWAVE 2012;12(10):e5548. http://doi.org/10.5867/medwave.2012.10.5548
10. Carpenito LJ, Carpenito-Moyet, LJ. Diagnósticos de enfermería: aplicaciones a la práctica clínica. Bogotá, Colombia: McGraw-Hill Interamericana, 2002.
11. Herdman TH, Kamitsuru S. (editores) Diagnósticos enfermeros. Definiciones y clasificación. 2021-2023. 12 ed. Barcelona, España: Elsevier; 2021.
12. Bulechek GM, Butcher HK, Dochterman JM. (Editores). Clasificación de Intervenciones de Enfermería (NIC). 6 ed. Barcelona, España: Elsevier; 2013.
13. Moorhead S, Johnson M, Maas ML, Swanson E. (Editores). Clasificación de Resultados de Enfermería (NOC). 5 ed. Barcelona, España: Elsevier; 2013.
14. Moreno Sasig NG, Vélez Muentes JR, Campuzano Franco MA, Zambrano Córdova JR, Vera Pinargote RG. Monitorización invasiva y no invasiva en pacientes ingresados a UCI. RECIMUNDO 2021;5(3):278-92. https://doi.org/10.26820/recimundo/5.(2).julio.2021.278-292
15. Vidal Vademecum Spain. Medicamentos de Chile [Internet]. Madrid, España: Vidal Vademecum Spain; 2024. [citado el 9 de noviembre de 2024]. https://www.vademecum.es/chile/cl/alfa
16. Palavecino CM. Toxicidad antibacterianos: farmacocinética-farmacodinamia: prevención y manejo. Rev médica Clín Las Condes 2014;25(3):445–56. http://dx.doi.org/10.1016/s0716-8640(14)70061-6

17. Yadav S, Hashmi M, Shah S, Sarwar A, Ibrahim R. Vancomycin Flushing Syndrome Due to Oral Vancomycin in Chronic Kidney Disease Patients: A Case Report. Cureus 2022;14(8):e28024. https://doi.org/10.7759/cureus.28024
18. Shrivastava S, Shrivastava. Vancomycin Flushing Syndrome: A Case Report. Cureus 2024;16(4):e58487. https://doi.org/10.7759/cureus.58487

APPENDICES

Secondary Nursing Diagnoses

Appendix 1: Second Nursing Diagnosis

DOMAIN	**11**	**Safety/Protection**	**CLASS**	**6**	**Thermoregulation**
LABEL	00032 Ineffective Breathing Pattern				
DxE	00032 Ineffective breathing pattern related to hyperventilation and decreased energy, as evidenced by moderate dyspnea, respiratory rate of 25-30 breaths per minute, requirement for supplemental oxygen via Venturi mask, FiO2 40%, pulse oximetry reading of 94%, PaO2/FiO2 ratio: 220.				

Source: Prepared by the author based on NANDA.[11]

Appendix 2: Third Nursing Diagnosis

DOMAIN	**11**	**Safety/Protection**	**CLASS**	**6**	**Thermoregulation**
LABEL	00132 Acute Pain				
DxE	00132 Acute pain related to an inflammatory process at L3-L4 and L5-S1 with fluid collection, manifested as lower back pain upon mobilization in bed (VAS 6-7/10).				

Source: Prepared by the author based on NANDA.[11]