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Nursing care plan for a patient with septic shock: case report

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Abstract

Septic shock is a critical condition that requires personalized nursing care in the intensive care unit (ICU) due to hemodynamic compromise. This case study aimed to document the nursing interventions provided to a patient with septic shock admitted to an ICU in southwestern Colombia in 2023. An observational and descriptive methodology was employed, during which a nursing care plan was implemented based on the NANDA-NIC-NOC taxonomy. Additionally, a systematic assessment was conducted according to Marjory Gordon's functional health patterns. In this case, a patient with septic shock due to peritonitis received nursing care in the ICU, including antibiotics and other clinical care. After executing the nursing activities, it was determined that the interventions were sufficient to meet the care objectives. Based on the physiological and psychological needs of the individual, it is concluded that nursing care for this type of patient is indispensable and requires solid knowledge on the part of the nursing staff.

Keywords: septic shock; pelvic infection; critical care; nursing care

Case report article, result of research conducted by the Specialization in Nursing for the Care of Critically Ill Patients: *Estudio de caso: paciente con shock séptico por Escherichia coli Enteropatógena, atendido en la UCI en una institución de III nivel de atención*, año 2023.

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Plan de cuidados de enfermería para un paciente con choque séptico: caso clínico

Resumen

El choque séptico es un estado crítico en el que el paciente presenta compromiso hemodinámico, lo cual requiere de cuidados personalizados de enfermería en la unidad de cuidados intensivos (UCI). Por lo tanto, el objetivo del presente estudio de caso fue establecer las intervenciones del profesional de enfermería en un paciente con choque séptico internado en la UCI de una institución de salud del suroccidente colombiano en el año 2023. Para ello, se empleó una metodología de tipo observacional y descriptiva, en la cual se aplicó un plan de cuidados de enfermería, mediante el uso de la taxonomía NANDA-NIC-NOC; además, se realizó una valoración sistemática basada en los patrones funcionales de salud de Marjory Gordon. En este caso, se brindó cuidado de enfermería a un paciente que presentaba choque séptico secundario a peritonitis. El paciente fue tratado con antibiótico y cuidados clínicos en la UCI. Una vez ejecutadas las actividades de enfermería, se comprobó que las intervenciones fueron adecuadas para alcanzar los objetivos de cuidado propuestos. Finalmente, se concluye que el cuidado de enfermería en este tipo de paciente es indispensable y requiere de conocimientos sólidos por parte del personal de enfermería, basados en las necesidades fisiológicas y psicológicas del individuo.

Palabras clave: choque séptico; infección pélvica; cuidados críticos; atención de enfermería

Plano de cuidados de enfermagem para um paciente com choque séptico: relato de caso

Resumo

O choque séptico é uma condição crítica que exige cuidados de enfermagem personalizados na unidade de terapia intensiva (UTI) devido ao comprometimento hemodinâmico. Este estudo de caso teve como objetivo, documentar as intervenções de enfermagem fornecidas a um paciente com choque séptico internado em uma UTI no sudoeste da Colômbia em 2023. Foi empregada uma metodologia observacional e descritiva, durante a qual foi implementado um plano de cuidados de enfermagem com base na taxonomia NANDA-NIC-NOC. Além disso, foi realizada uma avaliação sistemática de acordo com os padrões de saúde funcional de Marjory Gordon. Nesse caso, um paciente com choque séptico devido a peritonite recebeu cuidados de enfermagem na UTI, incluindo antibióticos e outros cuidados clínicos. Após a execução das atividades de enfermagem, foi determinado que as intervenções foram suficientes para atender aos objetivos do atendimento. Com base nas necessidades fisiológicas e psicológicas do indivíduo, conclui-se que a assistência de enfermagem a esse tipo de paciente é indispensável e exige sólidos conhecimentos por parte da equipe de enfermagem.

Palavras-chave: choque séptico; infecção pélvica; cuidados críticos; cuidados de enfermagem

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Introduction

According to the Pan American Health Organization (PAHO) and the World Health Organization (WHO) (n.d.), septic shock is so serious that it increases the risk of mortality:

> Each year, approximately 31 million people have an episode of sepsis. Of these, about 6 million people die from sepsis. In low and middle-income countries, the burden of sepsis is higher and represents one of the leading causes of maternal and neonatal death. Despite this, it is very difficult to assess the burden of disease worldwide due to limitations in diagnosis and notification. (para. 6)

«Sepsis is the systemic response to infection» (Espinoza et al., 2015, p. 5), presenting with two or more of the following conditions:

1. Heart rate > 90/min

2. Respiratory rate > 20/min or PaCO2 < 22 mm Hg

3. Leukocytes > 12,000 mm3, < 4,000 mm3, or > 10% band cells

4. Temperature above 38.3 °C or below 36 °C. (Sanabria et al., 2015, p. 31)

Septic shock is a leading cause of morbidity and mortality in hospitals. It is a severe condition involving hemodynamic compromise:

> Sepsis-induced hypotension (systolic blood pressure < 90 mm Hg or a reduction of 40 mm Hg from baseline) despite adequate fluid resuscitation. With perfusion abnormalities that may include (but are not limited to) lactic acidosis, oliguria, or acute altered mental status. (Sanabria et al., 2015, p. 31)

It is important to have a professional team with adequate knowledge to make an early diagnosis and evaluation and provide timely treatment. This ensures a comprehensive approach for the patient, since it is a time-dependent pathology. Interventions aimed at managing, prognosing, and evolving the condition depend on early diagnosis and the initiation of effective treatment and care.

In a study carried out in Mexico by González et al. (2020), it was found that the mortality rate was higher in patients over 65 years of age with septic shock (67.5%), compared to those under 65 years of age (36%). These patients had comorbidities, such as type 2 diabetes mellitus and systolic arterial hypertension. Notably, the abdominal origin of septic shock was the most frequent, at 39.7% in patients under 65 years of age and 62.5% in patients over 65 years of age.

Another study conducted in Quito by Ruilova et al. (2021) states that healthcare providers caring for patients with this condition should have access to updated information to help improve patient outcomes.

Font et al. (2020) report that 1.7 million cases of sepsis are admitted to intensive care units (ICUs) in the United States annually, with an increasing trend every year. Almost 250,000 people die from this condition each year, making it the leading cause of death in non-cardiac ICUs. This emphasizes the importance of nursing care for patients with septic shock and the need for comprehensive care to ensure positive outcomes.

A study by Soto et al. (2022) in Colombia reports that the main foci of sepsis were pulmonary (38.5%), urinary (16.3%), and biliary (10.4%). Isolations of *Escherichia coli*, *Staphylococcus aureus*, and *Streptococcus pneumoniae* also predominated. Additionally, the mortality rate was 18.5%.

The study by Rangel-Vera et al. (2019) points out that the incidence of this event is increasing due to the rapid aging of the population. The authors found that 60% of septic patients are 65 years of age or older. Additionally, comorbidities and immunosuppressive treatments are present. Intra-abdominal infections were the most frequent cause at 18.6%, followed by hospital-acquired pneumonia at 17% and community-acquired pneumonia at 12.4%.

In Cali, Colombia, the abdominal cavity was the most common septic focus among ICU patients, according to the study by Chávez-Vivas et al. (2018). It should be noted that the causative microorganisms corresponded to

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Gram-negative bacteria, with *E. coli* being the most frequent, at 19.2%.

According to the Instituto Departamental de Salud de Nariño (IDSN, 2022), there were two cases of sepsis in the department of Nariño in 2018 and 51 cases in 2022. Notably, the most frequent age range was 60 years or older. Similarly, in the city of Pasto, there was one case of septic shock in the 27-44-year age range in 2018; however, the number of cases increased to 16 in 2022. These data show that older people are most likely to suffer from this clinical condition.

Because sepsis is a critical condition that severely affects a person, nursing care plays an essential role. Therefore, it is a priority for nurses to promptly identify the early signs and symptoms of infection, as doing so may allow for the implementation of interventions that prevent the condition from progressing to a more serious state (Suarez, 2023).

In this context, developing a care plan based on the NANDA, NIC, and NOC taxonomies provides a structured guide for clinical decision-making. This approach favors personalized, effective, and evidence-based interventions that identify not only physical needs but also emotional and social needs. This contributes to humanized care. The objective is to establish the interventions of the nursing professional for a patient with septic shock who is hospitalized in the ICU of a health institution in southwestern Colombia in 2023.

Methodology

Observational, descriptive case study, oriented to a patient attended in the ICU of a third-level public hospital in the city of Pasto, Nariño, Colombia, during the year 2023. During this time, through the Nursing Care Plan (PAE), comprehensive care was implemented during her stay in the ICU. The assessment was based on Marjory Gordon's conceptual model. The NANDA, NOC, and NIC taxonomies were utilized to document the nursing interventions. (Butcher & Moorhead, 2021).

Results

Case description

A 19-year-old patient with a pathological history of polycystic ovary syndrome consulted at the first level of care for abdominal pain in the epigastrium, associated with discomfort and vomiting. Despite receiving outpatient treatment, her condition worsened. The following day, she returned due to continued pain; an ultrasound of the abdomen was performed, which was positive for urinary tract infection (UTI), with positive uroculture, isolation of *Escherichia coli* sensitive to cephalexin. She was discharged for outpatient management again, but she decided to consult a third time due to a worsening of her clinical condition. She presented with increased abdominal pain, vomiting, dehydration, mucocutaneous pallor, and refractory hypotension; therefore, she was referred as an emergency.

Upon admission to the Level III clinic, the patient was in poor condition. She was hypotensive with a mean arterial pressure (MAP) of 50 mmHg, which was refractory to volume. She required titratable vasoactive support to improve her MAP and perfusion. She was also dehydrated and had acidosis that was compensated by hyperlactatemia, as well as signs of shock. The physician decided to admit her to the ICU for invasive monitoring and mechanical ventilation. The diagnosis was septic shock of an abdominal-pelvic focus, with a Sequential Organ Failure Assessment (SOFA) score of seven.

Valuation

A nursing assessment was performed using anamnesis, a physical examination, and data from the reviewed medical records. The nursing care plan was based on Marjory Gordon's conceptual model of functional health patterns (Álvarez et al., 2010). The data obtained from the pattern-based assessment are detailed below:

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Pattern 1. Health perception-management

The patient has no known drug allergies; she has a pathological history of polycystic ovary syndrome; leukocytosis and neutrophilia are present.

Pattern 2. Metabolic Nutrition

- Size: 1,60 cm
- Weight: 50 kg
- Body mass index: 19.8 (adequate).
- Presence of parenteral nutrition by central venous catheter, located in the subclavian region.
- In the operating room, exploratory laparoscopy, laparotomy, appendectomy, release of adhesions, and peritoneal lavage were performed, which showed pelviperitonitis, bilateral salpingitis, edematous cecal appendix, peritoneal fluid of serous inflammatory reaction, 500 cc.
- After surgery, the patient presented soft abdomen, depressible, surgical wound in the midline of approximately 10 cm, covered with sterile dressing, without bleeding, with a Hemovac drain in the right hemiabdomen with serohematic production.

Pattern 3. Elimination

- Carrier of Foley urethral catheter type N.◦ 16, coluric urine, without sediment.
- Urine culture report of Escherichia coli sensitive to cephalexin.
- Positive ultrasound of abdomen for urinary tract infection (UTI), with positive urine culture.
- Patient under mechanical ventilation, CT of the thorax with report of pulmonary atelectasis and mild pleural effusion.

Pattern 4. Activity-exercise

- Mean arterial pressure on admission: 50 mmHg
- Heart rate: 115 bpm
- Respiratory rate: 16 rpm and oxygen saturation at 96% under mechanical ventilation
- Mobility: limited, patient under sedation, with assessment according to the Richmond Agitation and Sedation Scale (RASS) at -4
- Braden score of 9: high risk.

Pattern 5. Sleep-rest

Patient at the time of assessment under sedoanalgesia.

Pattern 6. Cognitive-perceptual

- Unconscious, Glasgow 3/15 under sedoanalgesia (fentanyl 100 mcg/hour, midazolam 10 mg/hour).
- Rass at -4 (no response to verbal call, but with response to physical stimulus); refers to slight residual pain in the perineal area of up to 3 points out of 10 on a verbal numerical scale, which is controlled using prescribed analgesia.
- For hypotension with vasopressor support, noradrenaline 0.1 mcg/kg/min.
- SOFA Score with a value of 7.

Pattern 7. Self-perception - self-concept

Patient does not refer, due to her clinical condition.

Pattern 8. Role relationships

The patient was accompanied by her mother and sister, with whom she shares a family unit.

Pattern 9. Sexuality-reproduction

Gestations: 1

Abortions: 1

Births: 0

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Cesarean Sections: 0

Alive: 0

Pattern 10. Stress coping-tolerance

Due to the patient's unstable condition at the time, this pattern was not assessed.

Pattern 11. Values-beliefs

The family members state that they belong to the Catholic religion.

After performing the analysis of the data collected, dysfunctional patterns were identified, namely:

- Pattern 2. Nutritional-metabolic
- Pattern 3. Elimination
- Pattern 4. Activity-exercise
- Pattern 6. Cognitive-perceptual.

Pathology study

The patient's septic shock was caused by an infection of the pelvic peritoneum (pelviperitonitis). Inflammatory septic involvement of the internal genitalia and adjacent organs was found. The most common cause is an ascending infection resulting from an alteration in the balance of normal vaginal flora or structural changes (Puente et al., 2021).

The patient initially presented with appendicitis caused by an obstruction of the proximal lumen of the appendix. In these cases, two processes occur:

a. Over distension and increased intraluminal pressure, which produces increased secretion in the appendicular mucosa, where visceral afferent pathways are activated and result in nonspecific visceral pain.

b. Vascular engorgement and congestion of the lymphatic, venous, and arterial vessels increase pressure, resulting in ischemia, necrosis, and perforation. Additionally, bacterial proliferation occurs, which the body attempts to control. This process generates an appendicular plastron and stromal tissue, where inflammatory substances are released. This produces a tissue response, including exudate and fibrin. These substances cause the migration of macrophages, neutrophils, and fibroblasts, which form collagen. This results in appendicular phlegmon, which is formed by the omentum, terminal ileum loops, colon, and inflamed appendix (Puente et al., 2021).

This process forms a purulent secretion in the cavity, creating an appendicular abscess and allowing microorganisms, such as *Escherichia coli*, to migrate to the peritoneal cavity. The migration of microorganisms and the proximity of structures affect the fallopian tubes, causing an inflammatory reaction with vasodilation, plasma transudation, and purulent exudate within the open tubal lumen. The exudate then leaks through the fimbriae into the pelvic cavity, ultimately causing pelvic peritonitis (Chiscano-Camón et al., 2022).

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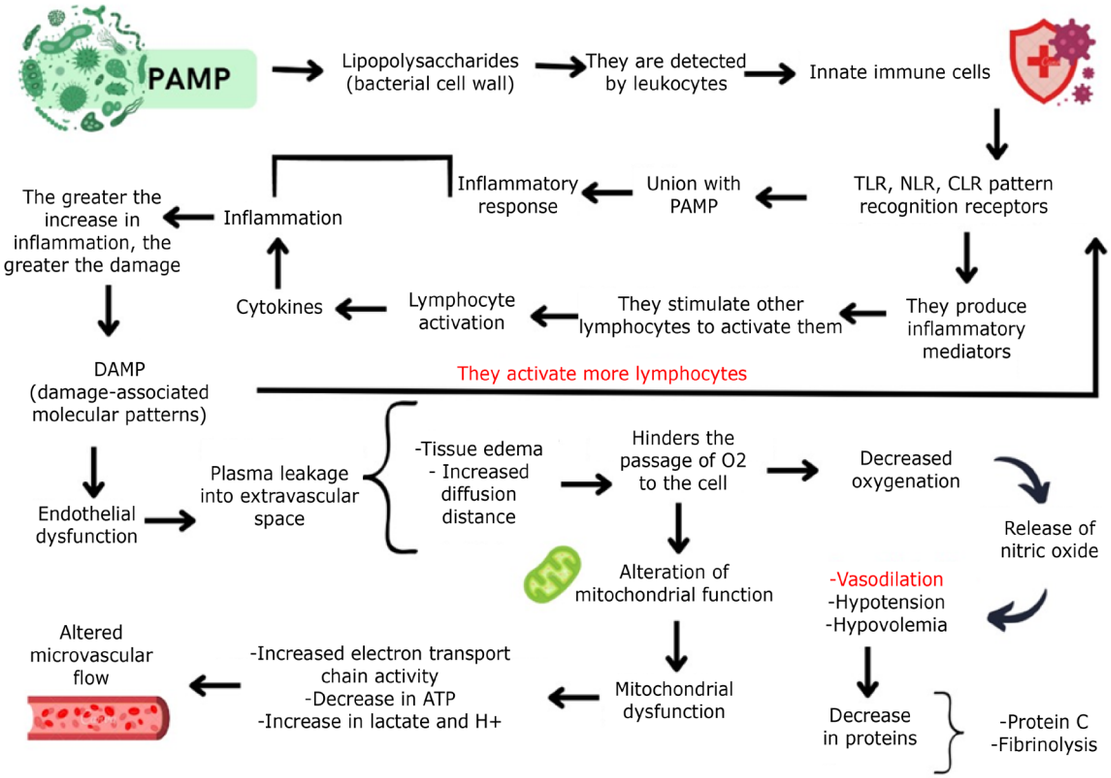
Figure 1

Pathophysiology of septic shock associated with pelviperitonitis



Note. Taken from Chiscano-Camón et al., 2022.

The body's advanced response to microorganisms allows pathogen-associated molecular patterns (PAMPs) to be recognized by cells of the innate immune system. PAMPs are present in the lipopolysaccharides of bacterial cell walls and are recognized by cells such as leukocytes. This recognition occurs through pattern-recognition receptors (PRRs), including Toll-like receptors (TLRs), NOD-like receptors (NLRs), and C-type lectin receptors (CLRs). These receptors activate two main types of immune response:

1. They bind with PAMP, triggering an inflammatory response.

2. They produce inflammatory mediators that stimulate other lymphocytes, activating them. Upon activation, these lymphocytes release cytokines that increase the inflammatory response, causing further damage.

This response chain also includes damage-associated molecular patterns (DAMPs), which can cause:

1. Activation of lymphocytes to create new pattern recognition receptors TLR (Toll-like receptors), NLR (NOD-like receptors), CLR (C-type lectin receptors), and continuation of the response.

2. They cause endothelial dysfunction, allowing plasma to leak into the extravascular space. As a result, tissue edema and an increase in diffusion distance occur, as the accumulated fluid separates the vessel walls from the surrounding cells.

This is triggered by difficulty passing oxygen into the cell. Decreased oxygenation leads to vasodilation, hypotension, and hypovolemia. Additionally, there is a decrease in proteins, such as protein C, as well as in fibrinolysis.

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Similarly, difficulty in oxygen transfer leads to altered mitochondrial function. This is characterized by increased electron transport chain activity, decreased ATP production, and increased release of hydrogen ions and lactate. These changes trigger definitive alterations in microvascular flow (Chiscano-Camón et al., 2022).

Nursing care plan for the patient with septic shock

After examining the patient and reviewing the clinical data recorded in the medical history, we developed a care plan that considered the activities to be carried out in an interdependent manner.

Table 1

Nursing care plan for the patient with septic shock

Diagnosis	NOC (Results)	NIC	
		Intervention	Activity
Domain 03: Disposal and Exchange Need 01: breathe normally Pattern 04: activity and rest Class 04: Respiratory function Diagnosis 00030: oxygen support deficit R/C pleural inflammatory process S/A, infectious process	Domain 02: Physiological health Pattern 04: activity and rest Class E: cardiopulmonary NOC 0402: monitor respiratory status (gas exchange)	Class K: respiratory control NIC 3350: oxygen monitoring NIC 3320: oxygen therapy	Administration of medications such as antibiotics, diuretics, and vasoactive drugs Suctioning of secretions Prepare the O2 equipment and administer through a humidified system Watch for signs of hypoventilation Observe signs of toxicity in the patient Use nebulizers Determine the need for aspiration Hyper oxygenate between each suction pass and after the last pass Record the type and amount of secretions aspirated.

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Diagnosis	NOC (Results)	NIC	
		Intervention	Activity
Domain 11: Safety and security Need 08: hygiene/ skin Pattern 02: Nutritional metabolic Class 02: physical injury Diagnosis 00047: Risk of skin integrity impairment R/C decreased physical mobility	Domain 02: Physiological health Pattern 02: Nutritional metabolic Class L: Tissue integrity NOC 1101: Skin condition	Class L: skin and wound control NIC 3590: monitoring skin integrity Class V: risk control NIC 3540: prevention of pressure ulcers	Place the patient on a suitable therapeutic bed/mattress Position the patient with proper body alignment Keep bedding clean, dry, and wrinkle-free Monitor skin condition Postural changes at least every two hours Help with hygiene measures Perform a thorough assessment of peripheral circulation (check peripheral pulses, edema, capillary refill, color, and temperature of extremities) Apply anti-embolism measures Eliminate excessive moisture on the skin Inspect the skin on bony prominences and areas of pressure/friction
Domain 04: activity/ rest Need 04: move Pattern 04: activity/ rest Class 5: Self-care Diagnosis 00182: Self-care deficit R/C sedation, manifested by total dependence for basic self-care activities	Domain 01: Functional health Pattern 04: Activity/Exercise Class D: Self-care NOC 0300: Self-care, feeding, bathing, dressing, elimination	Class F: Facilitating self-care NIC 1800: Assistance with self-care	Make sure the person receives the proper nutrition according to the doctor’s orders Instruct support staff on the water temperature for bathing Provide privacy during bathing and observe the condition of the skin (at the time of integration) Obtain comfortable clothing (hospital gown) Keep track of urine and fecal output Monitor fluid intake Monitor urine retention Monitor kidney function tests and report Position changes to prevent pressure ulcers (PUs) Skin hydration

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Diagnosis	NOC (Results)	NIC	
		Intervention	Activity
Domain 04: activity/ rest Need 01: breathe normally Pattern 01: perception of health management Class 04: cardiovascular/ pulmonary responses Diagnosis 00228: risk of ineffective tissue perfusion R/C decreased mean arterial pressure	Domain 02: Physiological health Pattern 01: perception of health management Class E: Cardiopulmonary NOC 0422: Monitor perfusion status	Class N: perfusion control Code 0422: hemodynamic monitoring	Monitor level of consciousness Keep head elevated at 30-45° Keep head and trunk aligned to avoid jugular compression Monitor vital signs Observe the need to administer active vasopressors Avoid hyperglycemia or hypoglycemia Maintain oxygen saturation above 93% Monitor lactate (currently at 0.8 mmol/L) Monitor arterial gases Monitor electrocardiographic recording (patient with sinus tachycardia) Prevent fever Ensure good oxygenation: patient saturated at 92%, with FiO2 30% and hemoglobin value at 8.2 g/ dL. Maintain TAM above 70 mmHg Monitor the patient's blood volume Avoid hypoxemia

Note. Based on Butcher and Moorhead (2021).

Evaluation of interventions

After undergoing surgery and staying in the ICU, the patient had a remarkable recovery. With the help of various healthcare professionals, including nursing staff, all of her needs were addressed effectively. Notably, the patient did not develop pressure ulcers, and her nutritional status was optimal. Additionally, she achieved adequate elimination, and a significant improvement in spontaneous ventilation was observed, contributing to her recovery.

Discussion

This case study focuses on a 19-year-old female patient who was diagnosed with septic shock of abdominal origin secondary to pelviperitonitis. According to Enríquez (2019), this type of shock has a poor prognosis because it is a systemic response to an infectious process. However, early detection and appropriate intervention can help maintain physiological balance and prevent complications.

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On the other hand, as Macas et al. (2021) mentioned, septic shock is one of the most frequent causes of mortality. Despite advances in scientific knowledge and available technological means, there has been an increase in cases in recent years.

Therefore, early diagnosis is essential. In this case, the patient was initially diagnosed with a urinary tract infection that became complicated over time. This coincides with the case of a patient classified as having an acute inflammatory abdomen who was not given adequate treatment, leading to complications, as reported by Haro et al. (2021).

Similarly, Llamas et al. (2022) describe the case of a 23-year-old female patient who received empirical treatment with ceftriaxone and doxycycline due to clinical suspicion of complicated pelvic inflammatory disease. However, due to her poor progress, an exploratory laparoscopy was performed. During the procedure, a sample of peritoneal fluid was obtained for culture, and the patient received appropriate pharmacological treatment.

Puente et al. (2021) point out that making a correct diagnosis is challenging in clinical practice because numerous pathologies cause abdominal pain. If not treated promptly, these pathologies can lead to septic shock. It is also important to consider the professional's diagnostic capacity and knowledge to ensure timely and appropriate care.

Various case studies of septic shock reveal similarities in the signs and symptoms presented by patients, though these depend on the affected organ or system. Enríquez (2019), for example, argues that septic shock of abdominal origin manifests with abdominal pain, low blood pressure, and abdominal distension.

In this case, the patient remained with a Hemovac drain in the right hemi abdomen, with serosanguineous discharge. She also received broad-spectrum antibiotic treatment while awaiting the results of the peritoneal fluid culture. Once the results were obtained and *Escherichia coli* was identified, treatment with carbapenems was initiated to cover anaerobes.

According to Restrepo-Álvarez et al. (2019), *Escherichia coli* is a common cause of a wide range of infections, from uncomplicated urinary tract infections to severe sepsis and septic shock. These infections are associated with high-impact outcomes, such as ICU admission and mortality. León-Ruiz et al. (2000) indicate that the female genital tract is the most common entry point for Gram-negative bacteria. Therefore, a thorough gynecological examination should be performed in cases of sepsis caused by these microorganisms.

Similar to the study conducted by Enríquez (2019), in which the patient was discharged in a hemodynamically stable condition, the patient in this clinical case improved significantly as a result of teamwork, treatment, and appropriate care. Several factors influence the outcome of patients' clinical conditions, including age, underlying conditions, care, and treatment provided.

Conclusions

This case study emphasizes the importance of taking a thorough medical history, performing a physical examination, conducting a general assessment, and using diagnostic tools. These steps facilitate early diagnosis and enable rapid, priority care depending on the patient's condition and complexity. It also highlights the need to perform a comprehensive assessment of patients with abdominal pain to prevent complications, stabilize them promptly, and promote a favorable outcome and prognosis.

The development of an individualized nursing care plan made it possible to identify problems, establish nursing diagnoses, and define interventions that optimized the care of this patient with septic shock, which requires nursing staff to have up-to-date and sufficient knowledge to contribute to improving the patient's quality of life and promoting rapid recovery.

Conflict of interest

None declared by the authors.

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Ethical Responsibilities

The patient's consent was obtained before sharing any information related to the case study analyzed. The study was based on Resolution 8430 of 1993.

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Contribution

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Norma Viviana Moreno Montenegro: development of methodology, critical review of article, participation in introduction, methodology, analysis of results, discussion, and conclusions.

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