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CLINICAL AND CARE PROFILE OF PATIENTS WITH SEPSIS/SEPTIC SHOCK ADMITTED TO INTENSIVE CARE: RETROSPECTIVE STUDY

Perfil clínico e assistencial de pacientes com sepse/choque séptico internados em terapia intensiva: estudo retrospectivo

Perfil clínico y asistencial de pacientes con sepsis/shock séptico ingresados en cuidados intensivos: estudio retrospectivo

Cristiane de David[1] ⓘ
Vanessa Machado da Silva[2] ⓘ
Lucas Souza Ventura[3] ⓘ
Edison Luiz Devos Barlem[4] ⓘ
Silomar Ilha[5] ⓘ
Oclaris Lopes Munhoz[6] ⓘ

RESUMO
Objetivo: descrever o perfil clínico e assistencial de pacientes com sepse e choque séptico internados em uma unidade de terapia intensiva. **Método:** estudo retrospectivo, documental, desenvolvido em unidade de terapia intensiva adulta. Utilizou-se formulário específico para coletar dados de prontuários de pacientes adultos com sepse ou choque séptico. Com análise de dados descritiva. **Resultados:** identificaram-se 188 pacientes com sepse (n=77; 40,1%) e/ou choque séptico (n=111; 59%), pertencentes ao sexo masculino (n=106; 56,4%) e 57,9 anos de idade média. Hipertensão arterial (n=81; 43,1%) e diabetes mellitus (n=66; 35,1%) estiveram prevalentes. Predomínio de vasopressores e sedativos, como noradrenalina (n=153; 81,3%), fentanil (n=143; 76,1%) e midazolam (n=131; 69,7%). Quanto aos antibióticos, sobressaíram-se a piperacilina+tazobactam (n=45; 23,9) e a vancomicina (n=40; 21,3%). A Acinetobacter (n=37) foi a bactéria mais prevalente. **Conclusão:** pacientes com sepse/

[1,2,3,4] Universidade Federal do Rio Grande, Rio Grande, Rio Grande do Sul, Brazil.
[5,6] Universidade Federal de Santa Maria, Palmeira das Missões, Rio Grande do Sul, Brazil.

CORRESPONDING AUTHOR: Cristiane de David
E-mail: cris_gringa@yahoo.com.br

choque séptico necessitam do uso significativo de vasopressores, sedativos e antibioticoterapia; também, são acometidos por alta prevalência de infecções bacterianas.

DESCRITORES: Sepse; Choque séptico; Adulto; Unidades de terapia intensiva; Cuidados críticos.

ABSTRACT

Objective: to describe the clinical and care profile of patients with sepsis and septic shock admitted to an intensive care unit. **Method:** retrospective, documentary study, developed in an adult intensive care unit. A specific form was used to collect data from medical records of adult patients with sepsis or septic shock. With descriptive data analysis. **Results:** 188 patients with sepsis (n=77; 40.1%) and/or septic shock (n=111; 59%) were identified, male (n=106; 56.4%) and 57, 9 years average age. Hypertension (n=81; 43.1%) and diabetes mellitus (n=66; 35.1%) were prevalent. Predominance of vasopressors and sedatives, such as norepinephrine (n=153; 81.3%), fentanyl (n=143; 76.1%) and midazolam (n=131; 69.7%). As for antibiotics, piperacilina+tazobactam (n=45; 23.9) and vancomycin (n=40; 21.3%) stood out. Acinetobacter (n=37) was the most prevalent bacteria. **Conclusion:** patients with sepsis/septic shock require significant use of vasopressors, sedatives and antibiotic therapy; They are also affected by a high prevalence of bacterial infections.

DESCRIPTORS: Sepsis; Septic shock; Adult; Intensive care units; Critical care.

RESUMEN

Objetivo: describir el perfil clínico y asistencial de los pacientes con sepsis y shock séptico ingresados en una unidad de cuidados intensivos. **Método:** estudio documental retrospectivo, desarrollado en una unidad de cuidados intensivos para adultos. Se utilizó un formulario específico para recolectar datos de las historias clínicas de pacientes adultos con sepsis o shock séptico. Con análisis descriptivo de datos. **Resultados:** se identificaron 188 pacientes con sepsis (n=77; 40,1%) y/o shock séptico (n=111; 59%), del sexo masculino (n=106; 56,4%) y edad promedio de 57, 9 años. Predominaron la hipertensión (n=81; 43,1%) y la diabetes mellitus (n=66; 35,1%). Predominio de vasopresores y sedantes, como noradrenalina (n=153; 81,3%), fentanilo (n=143; 76,1%) y midazolam (n=131; 69,7%). En cuanto a los antibióticos, destacaron piperacilina+tazobactam (n=45; 23,9) y vancomicina (n=40; 21,3%). Acinetobacter (n=37) fue la bacteria más prevalente. **Conclusión:** los pacientes con sepsis/shock séptico requieren uso importante de vasopresores, sedantes y terapia antibiótica; También se ven afectados por una alta prevalencia de infecciones bacterianas.

DESCRIPTORES: Sepsis; Choque séptico; Adulto; Unidades de cuidados intensivos; Cuidados críticos.

INTRODUCTION

Sepsis is an organic dysfunction caused by a deregulated and excessive immune response in the host, due to an infection that can be caused by a range of pathogens, including bacteria, fungi, viruses and protozoa. It is characterized by a high prevalence rate and morbidity and mortality, especially in Intensive Care Unit (ICU) beds, due to the complexity of its treatment and the fact that it progresses rapidly to septic shock when left untreated.[1,2,3]

Septic shock is characterized by a patient with sepsis who suffers circulatory, cellular and/or metabolic alterations capable of leading to death, with the presence of uncorrected hypotension being one of the patient's main indicators.[2,4] The Latin American Sepsis Institute (ILAS) has described sepsis and septic shock as one of the main public health problems, as they are among the ten most fatal diseases present worldwide.[5]

It is estimated that 31 million patients are diagnosed with sepsis every year in the world and, of this total, 5 million die as a result of this organ dysfunction, with lethality rates varying between 30% and 50% in the most serious cases. In addition to being considered a global socio-economic problem for health, with high death rates associated with this diagnosis in ICU beds, sepsis causes costly expenses compared to those generated by diseases such as acute myocardial infarction, stroke and polytrauma.[4,6] Although sepsis can affect anyone, individuals with compromised immune systems, chronic non-communicable diseases (NCDs), the elderly over 65 and cancer patients are more likely to be affected by this dysfunction.[7]

Studies show that the main infectious foci of sepsis are of respiratory and/or urinary origin, with pneumonia accounting for the largest number of cases, followed by urinary infections.[8] However, diagnosing this condition remains a significant

challenge, since the first symptoms can go unnoticed or be confused with those of other non-infectious processes.[9]

This is why it is so important to provide rapid and correct care, so that the signs and symptoms of sepsis can be detected early, enabling more qualified care and increasing the chances of patient survival.[6,10] The greatest risk of death from sepsis or septic shock occurs in cases of late diagnosis, which is why the identification of pathogens is also essential for the rapid start of targeted antibiotic therapy, contributing to greater survival.[3,11,12]

There is an indisputable need to implement effective tools in health care that facilitate the identification of sepsis, such as organ conditions and dysfunctions linked to the evaluation of specific points in the Sequential Organ Failure Assessment (SOFA) and laboratory tests. In this way, health professionals will be able to care for these patients appropriately, increasing the efficiency of the care provided and reducing the length of hospitalization and the mortality rate.[10]

Thus, according to the scientific framework described, the organ dysfunction that constitutes sepsis is considered a public health problem and everyone's responsibility. For this reason, it is essential to know the profile of patients treated in ICUs in order to promote the best procedures and protocols to meet the needs of the sector. This study therefore aimed to describe the clinical and care profile of patients with sepsis and septic shock admitted to an ICU.

METHOD

Type of study

Retrospective, documentary study. The report of this study followed the recommendations of the STROBE checklist (Strengthening the Reporting of Observational Studies in Epidemiology)[13]

Study scenario

This research was carried out in the general ICU of a university hospital in southern Brazil. The ICU currently provides care for different specialties. It has 6 beds, 1 of which is for respiratory isolation and 5 for other patients, and the care team is made up of nurses, nursing technicians, doctors, physiotherapists, psychologists, occupational therapists, pharmacists, nutritionists and speech therapists.

Period, selection criteria and study sample

The data accessed referred to the period from January 2019 to December 2020. Eligible records were those of adult patients diagnosed with Sepsis and/or Septic Shock in the period investigated, and treated in the aforementioned setting. Records with missing data relating to the research objective were excluded.

We analyzed 188 medical records of patients admitted to the General ICU, considering that, according to the survey carried out in 2018, the annual average number of admissions was 220 patients. This constitutes an intentional census sample.

Data collection

Data from hospital records was accessed between May and July 2021. Firstly, all patients admitted to the General ICU between January 2019 and December 2020 were checked and listed in the hospital system, totaling 437 patients. From this list, the patients diagnosed (medical diagnosis) with sepsis and/ or septic shock were identified using data from the medical records (physical and digital). Once the list was finalized, data collection began, using a semi-structured form designed for this purpose.

The data was collected by a nurse specializing in intensive care, with experience in the area and the subject. Data was collected on the sociodemographic and health profile (gender, age, marital status, ethnicity, weight, height, use of drugs, tobacco or alcohol and previous comorbidities) and care (medications used, growth of microorganisms, culture media, gender and type of bacteria) of patients with sepsis/septic shock.

Data treatment and analysis

The data collected was entered into Excel spreadsheets and double-checked to identify possible inconsistencies. The Statistical Package for the Social Sciences (SPSS) software version 22.0 was then used to carry out the analysis. The variables were described as numbers and percentages or as mean and standard deviation.

Ethical aspects

The research was approved by the Research Ethics Committee (CEP) of the Catholic University of Pelotas (UCPel) under Opinion No. 4.642.511, issued on April 11, 2021. The study followed the principles established in Resolutions 466/12 and 510/16, respecting the ethical guidelines applicable to scientific research involving human beings.

RESULTS

A population of 437 patients were admitted to the general ICU in 2019 and 2020, of whom 188 (43%) were diagnosed

with sepsis or septic shock. It was found that 77 (40.1%) of the patients were diagnosed with sepsis and 111 (59%) with septic shock. The average age of these patients was 57.9 years, with a predominance of males (n=106; 56.4%). In addition, most were single (n=71; 37.8%), white (n=107; 56.9%) and had an average body mass index (BMI) of 26.7 kg/m². It was observed that 57.4% (n=108) used drugs, smoked or consumed alcoholic beverages. The average hospital stay was 12.8 days (±14.2).

Table 1 - Clinical characteristics of patients admitted to the general intensive care unit of a university hospital, Rio Grande, RS, Brazil, 2019-2020

Variables		n (%)
Comorbidities prior to hospitalization	Systemic Arterial Hypertension	81 (43,1%)
	Diabetes Mellitus	66 (35,1%)
	Human Immunodeficiency Virus (HIV)	38 (20,2%)
	Chronic Renal Insufficiency	29 (15,4%)
	Chronic Obstructive Pulmonary Disorder	28 (14,9%)
	Neoplasia	28 (14,9%)
	Ischemic heart disease	27 (14,3%)
	Cerebrovascular Accident	26 (13,8%)
	Tuberculosis	24 (12,8%)
	Other Comorbidities	24 (12,8%)
	Congestive heart failure	16 (8,5%)
	Obesity	15 (8,0%)
	Hepatopathy	13 (6,9%)
	Malnutrition	13 (6,9%)
	Hepatitis C Virus (HCV)	10 (5,3%)
	Dyslipidemia	10 (5,3%)
	Anemia	9 (4,8%)
	Depression	4 (2,1%)
	Alzheimer's disease	3 (1,6%)
	Hepatitis B Virus	1 (0,5%)
Diagnosis/condition on admission to the General ICU	Sepsis	82 (43,6%)
	Respiratory Failure	59 (31,4%)
	Chronic Renal Failure	30 (16,0%)
	Emergency Surgery	17 (9,0%)
	Post Cardiorespiratory Arrest	15 (8,0%)
	Nervous System Diseases	7 (3,7%)
	Cardiac Complications	3 (1,6%)
	Diseases of the Digestive System	3 (1,6%)
	Vascular Diseases	2 (1,1%)
	Liver Diseases	2 (1,1%)
	Obstetric Emergencies	1 (0,5%)
	Fractures	1 (0,5%)
	Non-specific trauma	1 (0,5%)
	Endocrine-metabolic diseases	1 (0,5%)

Source: prepared by the authors.

As shown in Table 1, the most frequent comorbidities were systemic arterial hypertension (n=81; 43.1%) and diabetes mellitus (n=66; 35.1%). In addition, 82 (43.6%) of the patients were admitted with an initial diagnosis of sepsis and 59 (31.4%) with respiratory failure.

As for the use of vasopressors, noradrenaline was the most commonly used (n=153; 81.3%). Among the patients, 131 (69.7%) were sedated with midazolam and the same number (n=131; 69.7%) used fentanyl (Table 2).

Table 2 - Medications used by patients during hospitalization in the general intensive care unit of a university hospital, Rio Grande, RS, Brazil, 2019-2020

Variables		n (%)
Sedative	Midazolam	131 (69,7%)
	Precedex	17 (9,0%)
Analgesic/ Anesthetic	Fentanyl	143 (76,1%)
	Ketamine	24 (12,8%)
	Precedex	17 (9,0%)
	Propofol	13 (6,9%)
Blocker	Atracurium	17 (9,0%)
Vasopressor	Noradrenaline	153 (81,3%)
	Vasopressin	37 (19,7%)
	Dobutamine	4 (2,1%)
	Dopamine	1 (0,5%)
Antifungal	Fluconazole	9 (4,8%)

Source: prepared by the authors.

The most commonly used antibiotics in the first hour and after 24 hours in the ICU are shown below (Table 3).

Table 3 - Antibiotic therapy administered in the first hour and after 24 hours of hospitalization in a general intensive care unit. Rio Grande, RS, Brazil, 2019-2020

Variables		n (%)
Antibiotics administered in the first hour of hospitalization	Piperacillin Tazobactam	45 (23,9%)
	Vancomycin	40 (21,3%)
	Meropenem	34 (18,1%)
	Cefepime	33 (17,6%)
	Clindamycin	28 (14,9%)
	Ceftriaxona	17 (9,0%)
	Metronidazol	12 (6,4%)
	Imipenem	11 (5,9%)
	Ciprofloxacin	10 (5,3%)
	Clarithromycin	8 (4,3%)
	Ampicilin + Sulbactam	8 (4,3%)
	Levofloxacin	6 (3,2%)
	Amikacin	6 (3,2%)
	Amphotericin	6 (3,2%)
	Polymyxin B	4 (2,1%)
	Cotrimoxazol	4 (2,1%)
	Sulfadiazine	3 (1,6%)
	Oxacilin	2 (1,1%)
Antibiotics administered after 24 hours of hospitalization	Meropenem	30(16,0%)
	Vancomycin	27(14,4%)
	Cefepime	16(8,5%)
	Polymyxin B	12(6,4%)
	Amikacin	10(5,3%)
	Cotrimoxazole	9(4,8%)
	Piperacillin / Tazobactan	9(4,8%)
	Clindamycin	9(4,8%)
	Metronidazole	6(3,2%)
	Clarithromycin	6(3,2%)
	Imipenem	5(2,7%)
	Ampicillin + Sulbactam	5(2,7%)
	Ciprofloxacin	4(2,1%)
	Oxacillin	4(2,1%)
	Amphotericin	3(1,6%)

Source: prepared by the authors.

It can be seen that in the first hour of hospitalization, 45 (23.9%) of the patients used piperacillin + tazobactam, 40 (21.3%) vancomycin and 34 (18.1%) meropenem. The antibiotic most used after the first hour was meropenem (n=30; 16%).

Table 4 - Detection of microorganisms and culture media evaluated in patients admitted to the general intensive care unit of a university hospital. Rio Grande, RS, Brazil, 2019-2020

Variables		Sample/ total sample ratio	Percentage (%)
Types of microorganisms	Bacteria	120 (124)	96,8%
	Fungus and Bacteria	3 (124)	2,4%
	Fungus	1 (124)	0,8%
Bacteria genus	Acinetobacter	37(123)	30,1%
	Klebsiella	35 (123)	28,5%
	Staphylococcus	31 (123)	25,2%
	Other Genera	16 (123)	13,0%
	Pseudomonas	13 (123)	10,6%
	Enterobacter	6 (123)	4,9%
	Escherichia	5 (123)	4,1%
	Enterococcus	5 (123)	4,1%
	Stenotrophomonas	3 (123)	2,4%
	Citrobacter	3 (123)	2,4%
	Morganella	2 (123)	1,6%
	Serratia	2 (123)	1,6%
	Proteus	2 (123)	1,6%
	Providencia	2 (123)	1,6%
	Streptococcus	2 (123)	1,6%
Gram bacteria	Negative	85 (123)	69,1%
	Positive	29 (123)	23,6%
	Negative and Positive	9(123)	7,3%
Culture medium for detecting microorganisms	Tracheal aspirate	48 (124)	38,7%
	Blood culture	36 (124)	29,0%
	Rectal Swab	26 (124)	21,0%
	Uroculture	25 (124)	20,2%
	Ascitic fluid	5 (124)	4,0%
	Operative Wound	3 (124)	2,4%
	Central venous catheter tip	2 (124)	1,6%
	Pleural fluid	1 (124)	0,8%

Source: prepared by the authors.

Table 4 shows that 124 patients had microorganisms detected, of which 120 (96.8%) were of bacterial origin. The most common bacterium was Acinetobacter (n=37; 30.1%). In addition, 85 (69.1%) of the bacteria detected were gram-negative. As far as identification methods are concerned, the most common were tracheal aspirate cultures (n=48; 38.7%) and blood cultures (n=36; 29.0%).

DISCUSSION

In this retrospective study, data from 188 patients with sepsis were analyzed, representing almost half of the ICU admissions during the study period. As in other studies, there was a predominance of the male population.[10,12,14] This finding may be related to men's lower adherence to health services, as well as being the population that consumes the most alcohol and tobacco, factors that contribute to the onset of various comorbidities.[15,16] It should be noted that 57.4% (n=108) of the individuals had used some illicit drug.

As for age, more than half of the patients were over 65. These results are consistent with other studies[2,9,14,17], although they contradict an investigation which identified a higher incidence of sepsis in people under 60.[15] The higher incidence in the elderly population can be explained by the fact that these individuals become more vulnerable to infectious processes due to the presence of pre-existing medical conditions.[9,10,17] With regard to the color/race variable, there was a predominance of white individuals, who accounted for 56.9% (n=107) of the patients, followed by the brown population. These results are in line with other studies[2,14,17], although they differ from a study carried out in the state of Tocantis, where the most affected population was brown.[10]

The majority of patients stayed in the ICU for more than 12 days. These data corroborate what is reported in the scientific literature, which shows an average ICU stay of 11.7 days.[5] However, one study identified a length of stay of two days18, which contrasts significantly with the majority of studies.[2,12,15] Length of stay is directly associated with sepsis mortality and is one of the main risk factors for ICU patients.[9,10]

In addition to the length of stay, another relevant aspect is the presence of previous comorbidities, which reflects the increase in life expectancy, the prevalence of NCDs and the incidence of immunosuppressive conditions.[10,16] In the context of the study carried out, hypertension (n=81; 43.1%) and diabetes mellitus (n=66; 35.1%) were found to be present in patients with sepsis, in line with other studies.[10,11,18]

The most frequent diagnoses/conditions among ICU patients were sepsis (n=82; 43.6%), acute respiratory failure (n=59; 31.5%) and chronic renal failure (n=30; 16.0%). These findings are very similar to those of a study carried out in a hospital in the far south of Santa Catarina[11], in which sepsis and respiratory failure also stood out as the main hospitalization diagnoses.

The administration of vasopressor drugs is essential to maintain Mean Arterial Pressure (MAP) at adequate levels. With this in mind, noradrenaline was the most commonly used drug, administered to 81.3% (n=153) of patients. Similar data was found in other studies, highlighting the importance of hemodynamic support and maintaining tissue perfusion in patients with sepsis in order to prevent progression to septic shock.[2,11,15]

The use of sedatives, analgesics, anesthetics and blockers is widely used in these patients. Among the most commonly administered medications in this study, midazolam stood out in 69.7% (n=131) of cases and fentanyl in 76.1% (n=143) of patients. These medications are necessary for maintaining patients' hemodynamics.

As shown in the scientific literature, the speed and effectiveness of administering appropriate medication in the first hours of sepsis are determining factors for a more favorable prognosis.[5,7,8,19] This initial period of treatment has a significant impact on reducing mortality and the sequelae associated with the condition, with tests that help to confirm the infection, identify the pathogen and determine the main focus.[12,18,19]

Thus, the immediate and appropriate start of antimicrobial therapy becomes indispensable in the management of patients with sepsis and septic shock. A study carried out in India[20] illustrates this importance, where all patients who received appropriate antibiotics within the first hour of care were discharged from hospital, while those who did not receive adequate treatment had a mortality rate of 25%. This information highlights the need for rapid and efficient action.

When the causative agent of sepsis has not been identified, it is recommended to start empirical broad-spectrum therapy within the first hour.[21] This approach uses one or more antimicrobials in order to cover the probable pathogens and ensure greater efficacy in combating the infectious agent.[20,22] In this study, the most commonly administered antibiotics in the first hour were piperacillin+tazobactam in 45 (23.9%) of cases, followed by vancomycin in 40 (21.3%) and meropenem in 34 (18.1%). After the first hour, meropenem was the most used, in 30 (16%) of the patients. All these drugs are considered broad-spectrum, which demonstrates the importance of this strategy in the initial treatment of sepsis and septic shock.[21,22]

Furthermore, any type of infection can trigger sepsis, whether caused by bacteria, viruses or fungi. That said, in this

study, microorganisms grew in 124 patients, of whom 96.8% (n=120) had bacterial growth. The most frequent bacterium was Acinetobacter, which differs from the scientific literature, which points to Staphylococcus aureus as the main causative agent of sepsis.[23,24]

Gram-negative bacteria accounted for 69.1% (n=85) of the cases, corroborating other studies which highlight the prevalence of this group of bacteria.[15,24] However, some studies report that the majority of patients with sepsis are contaminated by gram-positive bacteria.[23,24] In this context, blood culture remains the gold standard for diagnosing the etiological agent of sepsis and septic shock.[5,24] In addition, the main detection methods identified in this study were tracheal aspirate cultures and blood culture.[15]

This study therefore had some limitations, as it was a retrospective analysis based on hospital documents such as medical records. Some variables could not be collected due to missing information, illegibility or inadequate records, which led to data losses that may have restricted more detailed analysis. Despite this, the results obtained provide relevant information for understanding the clinical and epidemiological profile of patients with sepsis. Finally, these findings contribute to expanding knowledge on the subject and serve as a basis for future research that can address these gaps and deepen the debate on prevention strategies, early diagnosis and targeted treatment.

CONCLUSION

A clinical and care profile of adult patients with sepsis/septic shock was identified. There was a predominance of men with pre-existing chronic conditions. The care characteristics revealed the need to use vasopressors, sedatives, analgesics and antibiotic therapy. There was also a high prevalence of bacterial infections in these patients. The most frequent comorbidities were systemic arterial hypertension and diabetes mellitus. The most commonly used medications were noradrenaline, midazolam and fentanyl, as well as piperacillin+tazobactam, vancomycin and meropenem.

It is suggested that future studies expand the sample and include different types of specialized ICUs, in order to provide a broader understanding of specific management, allowing protocols and conduct to be compared. In addition, the importance of studies that explore the long-term impact of sepsis, especially the physical and cognitive sequelae in post-discharge patients, is highlighted.

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