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Clinical profile of patients treated at a burns unit: a cross-sectional study

Perfil clínico dos pacientes atendidos em uma unidade especializada em Queimados: estudo transversal

Perfil clínico de pacientes atendidos en una unidad especializada en quemados: estudio transversal

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ABSTRACT

Objective: to describe the clinical profile of patients admitted to therapy at a Burn Treatment Center. **Method:** this retrospective, cross-sectional study was conducted at a military hospital in Rio de Janeiro city on a sample of 43 medical records to examine admission variables and death as outcome. The research protocol was approved by the research ethics committees of the institutions involved. **Results:** the group most affected was males up to 39 years old, with prevalent second- and third-degree injuries, mostly involving the thoracic region, caused by agents of physical origin, with sepsis as the main complication, and death as outcome related to greater burn surface area. **Conclusion:** the findings proved similar to data from Brazil's Ministry of Health, and constitute additional information, such as agent, extent, and degree of burns, which can contribute to care practice and human resource management.

Descriptors: Burns; Sanitary Profiles; Health Policy, Panning and Management; Patient-Centered Care; Quality of Health Care.

RESUMO

Objetivo: descrever o perfil clínico do paciente admitido terapêutica em um Centro de Tratamento de Queimados. **Método:** estudo transversal e retrospectivo realizado em um hospital militar do Rio de Janeiro da cidade do Rio de Janeiro. Amostra composta por 43 prontuários. Análise de variáveis de admissão e desfecho óbito. Protocolo de pesquisa aprovados pelos Comitês de Ética em Pesquisa das instituições envolvidas. **Resultados:** homens de até 39 anos foi o público mais afetado com lesões prevalentes de segundo e terceiro graus, com maior acometimento na região torácica, por agente causador de origem física, apresentando como principal complicação a sepse e desfecho óbito relacionada com a maior taxa de superfície corpórea queimada. **Conclusão:** os achados demonstram semelhança aos dados do Ministério de Saúde do Brasil, e representam informações adicionais como agente, extensão e grau de queimadura, que podem contribuir na prática assistencial e no gerenciamento de recursos humanos.

Descritores: Queimaduras; Perfis Sanitários; Políticas, Planejamento e Administração em Saúde; Assistência Centrada no Paciente; Qualidade da Assistência à Saúde.

RESUMEN

Objetivo: describir el perfil clínico del paciente ingresado a terapia en un Centro de Tratamiento de Quemados. **Método:** estudio transversal y retrospectivo realizado en un hospital militar de Río de Janeiro, en la ciudad de Río de Janeiro. Muestra compuesta por 43 historias clínicas. Análisis de las variables de ingreso y desenlace de muerte. Protocolo de investigación aprobado por los Comités de Ética en Investigación de las instituciones involucradas. **Resultados:** hombres de hasta 39 años fue el público más afectado, con prevalencia de lesiones de segundo y tercero grados, con mayor número de lesiones en la región torácica, por agente causal de origen físico, siendo la principal complicación la sepsis y la muerte relacionada con la tasa más alta superficie corporal quemada. **Conclusión:** los hallazgos demuestran similitud con los datos del Ministerio de Salud de Brasil y representan información adicional, como el agente, la extensión y el grado de la quemadura, que pueden contribuir para la práctica asistencial y la gestión de recursos humanos.

Descriptores: Quemaduras; Perfiles Sanitarios; Políticas, Planificación y Administración en Salud; Atención Dirigida al Paciente; Calidad de la Atención de Salud.

INTRODUCTION

According to the Brazilian Ministry of Health (*Ministério da Saúde*, MS), burns constitute a serious public health problem for causing physical problems capable of leading patients to death or for imposing permanent physical, psychological and social harms[1].

Only in Brazil, during 2021 25,518 medium- and high-complexity hospitalization cases were notified and, despite the high investment in technologies and treatments, they represented a cost of around 55 million Brazilian reais, and a 4.81% mortality rate due to burns or their complications, while other diseases accounted for 6.65% of the deaths in the country[2].

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These data are posted to Tabnet/DataSus according to standard notification items. However, they do not characterize the conditions in which these patients are being treated, such as common characteristics of the occurrence of injuries, or associated comorbidities, information that is necessary for decision-making and that would help prevent harms, reduce hospitalization time and, consequently, the costs.

Assistance to burned patients, mainly those requiring hospitalization and intensive care, represents a high demand of human, structural, material and financial resources, necessary for their therapy in order to guarantee clinical safety. However, the knowledge related to this topic is still little explored.

Burned patients are classified according to severity levels, which depend on the extent of the body that was burned, the depth of the lesions and affected organs, and the agent that caused the burns. However, severe patients are those with medium- or large-size burns, as they require more specialized care and more hours at the bedside, given the high probability of developing other complications in addition to the wounds. The main complications are respiratory and urinary tract infections and sepsis, as well as burn shock, kidney injury and death[3].

After associating the Nursing workload and the severity of the burned patients in the 24-hour care period, a study verified that patients who were victims of burns had a mean Nursing Activities Score (NAS) of 84% and required a Nursing workload of 20.2 hours[4]. These data reveal that the Nursing workload with burned patients is higher than the one established by the Federal Nursing Council resolution in Brazil, which defines, as 18 hours a standard.

These data also reinforce that burn victims need more assistance in intensive care units and that this assistance directly influences the clinical aspects and outcomes of hospitalization. Therefore, for dimensioning care, it is necessary to know the clinical profile of the clientele that will use the service, in addition to its severity, in order to predict and provide the necessary resources for the best clinical prognosis and health care safety.

In this context, this article aimed at describing the clinical profile of the patients admitted to therapy at a Burns Treatment Center.

METHOD

This is a cross-sectional, retrospective, observational and descriptive study, carried out in a Burns Treatment Center (BTC) belonging to the Military Hospital of Rio de Janeiro.

The documentary analyses were carried out from September to December 2021. The population size of this study corresponded to the total number of patients admitted to the BTC with medium- and high-complexity burns.

A total of 53 medical records were analyzed between 2017 and 2020, a period ranging from reopening of the sector until March 2020, when it was transformed into an Intensive Care Center for cases of the disease caused by the type-2 coronavirus (CTI COVID-19), to serve the population during the course of the pandemic.

The inclusion criterion considered corresponded to patients admitted to the BTC with medium- and high-complexity burns. The following exclusion criteria were listed: patients whose main comorbidity was due to another associated trauma (cranioencephalic trauma, spinal cord trauma or open abdomen trauma with evisceration), as this is considered a severity criterion of imminent risk to life, and not of complications due to the burns; in addition to pregnant women and children under 18 years of age.

Of the total sample of 53 hospitalized patients, ten were excluded for meeting the aforementioned criteria, four of which were children, five with length of stay of less than 48 hours in the unit, presenting lesser complexity and one with a comorbidity greater than the burn degree). Thus, 43 patients were evaluated as final sample.

The final version of the database was transferred from *Microsoft Excel®* to Stata®, version 16.0. The data treatment and descriptive analysis procedures were carried out through the characterization of sociodemographic, clinical and laboratory information referring to admission and hospitalization of patients in the BTC.

For the qualitative variables, unadjusted and percentage distributions were calculated. For the quantitative variables, mean and standard deviation were calculated. Chi-square and Fisher's exact tests were used to verify the association between variables of interest and the hospitalization outcome (death or discharge/transfer). The Odds Ratio for the occurrence of the outcome in the subgroups of interest was calculated. The significance level adopted throughout the analysis was 5%.

The research protocol was appreciated and approved by the Ethics Committee of the institutions involved.

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RESULTS

Most of all 43 subjects were male (n=31; 72%) and the mean age was 39.04 (±16.24) years old.

It was possible to identify that patients treated at the BTC came from other hospitals, with a mean transfer time of five days, or were admitted directly to the service. Among the transfers, those that did not belong to the state of Rio de Janeiro (n=38) came from Pará, São Paulo, Rio Grande do Norte, Piauí and Bahia.

Burned body surface of up to 18% was predominant, as well as burns with involvement of second-degree injuries. The chest was the most frequent site, with higher incidence of physical agent burns (heat – n=34; 79.07%), followed by electrical (13.95%) and chemical (6.98%) agents. The intubation rate was 23.25% (n=10), with two patients already admitted on ventilatory prosthesis.

Table 1 shows the care indicators prior to BTC admission.

TABLE 1: Characterization of the care indicators before admission to the Burns Treatment Center. Rio de Janeiro, RJ, Brazil, 2020.

Variables	n	%
Balneotherapy in the initial consultation (N=32)		
Yes	2	6.25
No	30	93.75
Installed complications (N=32)		
Yes	19	59.37
No	13	49.63

Balneotherapy was performed in the initial consultation in less than 7% of the participants. It was observed that 32 patients had their first appointment at an emergency hospital and were subsequently transferred to the BTC. Among the patients admitted, 59.37% already presented complications.

The participating institution has specific protocols for the admission of all burned patients, whether directly admitted by the BTC or coming from other hospital institutions. During hospitalization, the most frequently performed care indicators were as follows: hemodynamic monitoring record (100%) and hospital infection prevention protocol (93.02%). The mean hospitalization time was 29.02 (±29.31) days. The prevalence of death in the sample was 11.63%.

Table 2 presents data related to the hospitalization time and outcomes of the medical records analyzed.

TABLE 2: Hospitalization time and outcome of the patients admitted to the Burns Treatment Center (n=43). Rio de Janeiro, RJ, Brazil, 2020.

Variables	n	%
Hospitalization time		
Up to 15 days	11	25.58
16-30 days	19	44.19
31-60 days	6	13.95
61+ days	7	16.28
Hospitalization outcome		
Death	5	11.63
Hospital transfer	13	30.23
Hospital discharge	25	58.14

The complications due to infections were an important finding related to prolonged hospitalization and death. Related to this data, the main microorganisms identified were *Pseudomonas aeruginosa* (68.42%), followed by *Staphylococcus aureus* (36.84%), *Acinetobacter baumanin* (31.58%), *Kleibsiella pneumoniae carbapenamase* (KPC, 26.32%), carbapenem-resistant Enterobacteriaceae (CRE, 15.79%) and *Escherichia coli* (5.26%).

Table 3 presents the results of the association analysis between the studied variables.

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TABLE 3: Analysis of the association between clinical variables and the hospitalization outcome of death (n=5). Rio de Janeiro, RJ, Brazil, 2020.

	Hospitalization outcome						
	Death		Other				
Variables	**n**	**%**	**n**	**%**	**OR‖**	**95% CI†**	**p-value**
Gender							0.089‡
Female	3	25.0	9	75.0	-	-	
Male	2	6.45	29	93.55	0.206	0.029;1.438	
Age group							0.929‡
Up to 40 years old	3	12.0	22	88.0	-	-	
41+ years old	2	11.11	16	88.89	0.916	0.136;6.138	
Indicator - BBS							<0.001⁋
Up to 18%	0	0	21	100.0	-	-	
19%-54%	0	0	12	100.0	*	*	
55% or more	5	50.0	5	50.0	*	*	
Burn degree							0.143⁋
2nd degree	1	4.00	24	96.0	-	-	
2nd-3rd degree	4	23.53	13	76.47	7.384	0.745;73.134	
3rd degree	0	0	1	100.0	*	*	
Burn agent							0.473⁋
Chemical (acid)	0	0	3	100.0	*	*	
Physical (heat)	5	14.71	29	85.29	*	*	
Electric	0	0	6	100.0	-	-	
Balneotherapy at admission							0.388⁋
Yes	5	13.16	33	86.84	*	*	
No	0	0	5	100.0	-	-	
Dressing exchange protocol							0.221⁋
Yes	5	14.71	29	85.29	*	*	
No	0	0	9	100.0	-	-	

‖ Standard Deviation. † 95% Confidence Interval. ‡ Chi-square test. ⁋ Fisher's exact test. * Impossible to calculate due to lack of data.

A statistically significant association was identified between the percentage of burned body surface and the hospitalization outcome, in addition to changes in hemoglobin, urea/creatinine, platelets, sodium and potassium with the hospitalization outcome.

For the death outcome, it was possible to verify that the complicating factor was related to the percentage of burned body surface.

DISCUSSION

Burned patients considered to be of medium- and high-complexity should be referred to Burns Treatment Centers (BTC), which meet the MS requirements defined in GM/MS Ordinance No. 1,273/2000, accrediting and determining standards of physical structure and team for carrying out complex interventions in the treatment of burns[5].

The BTC is a hospital unit that has an operating room and exclusive ward and ICU beds for the care of patients who are victims of burns, in addition to having a multidisciplinary team prepared to care for patients who are victims of various forms of burns[5].

The study findings corroborate data published by the Ministry of Health[3], observing that the highest prevalence of burns remains in the male population (72%) of working age, with a mean of 39 years old. However, the mortality rate was higher in this study (11.63%), while the MS estimate would be 4.81%[3]. In addition to that, the hospitalization time was longer, ranging from 16 to 30 days (44.19%). This data variation can be associated with the severity of the patients admitted to the institution. However, it is necessary to note that 88.37% of the patients were discharged from the hospital or transferred to their city of origin. For the hospitalization variable, there is a patient with 161 hospitalization days and another with 97 hospitalization days, leading the data to increase the statistical mean.

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Burned patients require a variety of specialized care measures, involving several health categories because, depending on severity and extent of the injuries, there is a high probability of acquiring complications such as respiratory and urinary tract infections and sepsis in addition to those related to the wounds[6].

Treatment of these complications increases the hospitalization time due to the introduction of antibiotic coverage schemes and therapies related to more specific wound coverage, as well as factors that may prolong length of the treatment during the hospitalization[7].

The incidence of pathogens found in the patients with infections admitted to the BTC corroborate those found in the literature, with infections caused by *Pseudomonas aeruginosa* and *Acinetobacter*, these microorganisms being the most common among patients with multiple infections, and of high severity[6].

Another important clinical indicator is the percentage of burned body surface (%BBS) to predict the risk of developing infections, as indicated by the results of a study which showed that adults with more than 40% of BBS presented more incidence of acute respiratory syndrome, pneumonia, sepsis and multiple organ failure[8].

This clinical indicator is used in the Baux score, based on the sum of age and %BBS. However, a number of authors point out that its score should be interpreted in the light of revised modern mortality values[9]. Indicators of burn extension above 30% of the BBS lead to a 2.7% higher chance of complications, showing that health care is very specific and should be targeted according to the specific characteristics of each patient with large extensions of burns, as the chances of complications are greater[10]. This data is well demonstrated in the data included in Figure 1, showing that patients with more than 55% BBS were related to deaths.

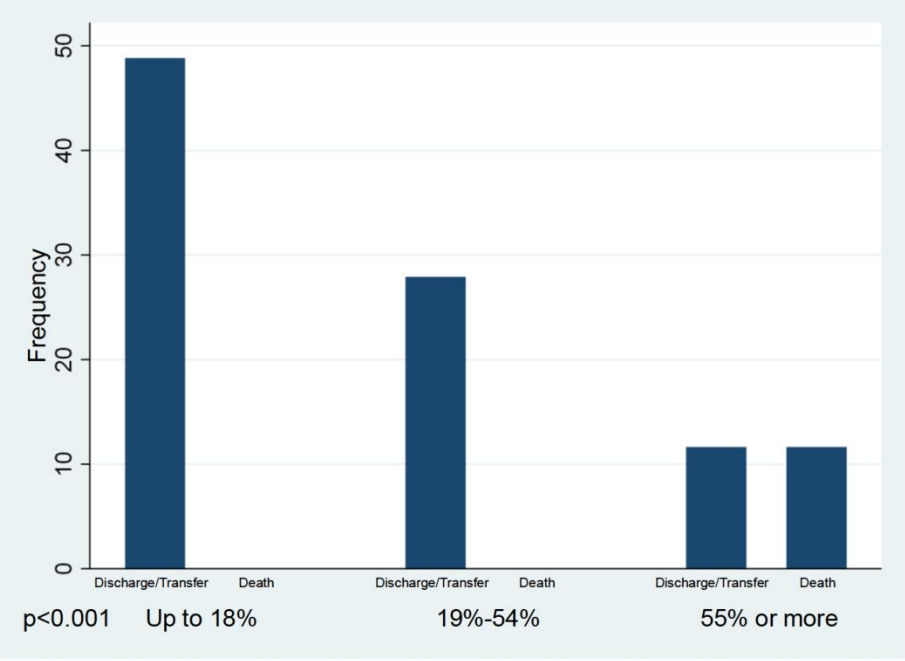

FIGURE 1: Bar graph representing the distribution of the outcome by percentage of burned body surface. Rio de Janeiro, RJ, Brazil, 2020.

One of the techniques employed to minimize contamination by microorganisms in burned patients is using balneotherapy, whose objectives are as follows: to avoid infection by removing impurities and keeping the skin clean; to facilitate healing; and to prevent sequelae from scar retraction. The procedure relies on the participation of a multidisciplinary team in an appropriate room, with continuous monitoring and medications for sedation and pain control[11,12]. During balneotherapy, the patient remains monitored, with a pain control and sedation protocol. However, when analyzing the outcome of sepsis with balneotherapy, there was no statistically representative category to assess the effectiveness of balneotherapy as a predictive measure for the prevention of sepsis.

When analyzing the death outcome (n=5), there was higher prevalence of females, in the age group of up to 40 years old. The largest factor related to death is in relation to the burned body surface, 100% had at least 55% BBS. The

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literature corroborates this, as the scoring systems for predicting mortality are related to %BBS and age, showing that the higher the score, the greater the mortality risk[13,14]. The causative agents were of physical origin (direct flame), with mostly second- and third-degree injuries. Such finding is similar to previous studies, which show that the physical agent is the main cause of burns, especially those involving domestic accidents[10,15].

Study limitations

This study had some limitations. For being a cross-sectional study, it was not possible to determine causality between some variables. In addition, the sample was reduced due to the possibility that the research was carried out in only one institution and data collection was interrupted during the COVID-19 Pandemic, as the participating institution did not receive burned patients from March 2020 to September 2021, for being a support center for critical COVID-19 patients. Thus, it is not possible to infer data generalization.

CONCLUSION

From the analysis of the data from patients admitted to the Burns Treatment Center of a Military Hospital in the municipality of Rio de Janeiro, it was possible to identify higher prevalence of male population, belonging to the age group of 39 years old. The main injuries were of second and third degree, mainly affecting the thorax due to contact with physical agents. The most frequent complications were associated with infections, and the cause of death was related to the highest Percentage of Burned Body Surface.

In view of this information, it is recommended to carry out new studies covering other reference centers to expand the profile mapping and thus add more accurate data to the Ministry of Health's registration system, including data such as the percentage of Burned Body Surface, the extent of the injuries and the related agents.

In this way, it is possible to encourage the elaboration of more targeted care protocols in non-specialized institutions and measures to map the main problems and, thus, propose preventive and effective intervention campaigns according to the identification of the weaknesses found in each location. In addition to that, data such as those in this study can contribute to the care practice, as they are tools for the management of human resources and inputs to local managers.

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