ORIGINALES

Infection related to Health Care in an adult Intensive Care Unit

Infecção relacionada à Assistência à Saúde em Unidade de Terapia Intensiva Adulto
Infection related to Health Care in an adult Intensive Care Unit

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ABSTRACT:

The present study aims to characterize the cases of Infections related to health care Occurred in an adult ICU. A descriptive, exploratory, documental and quantitative tipe. The sample consisted of medical records and files Of infection control of the CCIH of all cases of infections occurred in the ICU of Hospital Universitário Getúlio Vargas in Manaus - Amazonas from January 2013 to December 2014. Seventy-five patients were selected, Being the majority belonging to the female sex (60%), With predominance of the elderly (36.5%). They were classified as surgical (45.3%) and had ICU stay of 16 or more days (42.7%). Regarding the profile of infections, there were predominant respiratory tract infections (46.2%) and blood flow (26.6%), calling attention to associated pneumonia with Mechanical Ventilation (35.2%). The study also showed that there is a predominance of clinical, laboratory and imaging diagnosis in the identification of IRAS, adding up to 62.4%, neglecting to perform cultures 37.5%. Among the identified microorganisms there is a predominance of gram-negative 28.1%. The highest occurrence of infection by invasive devices occurred in the use of the orotracheal tube 48%. There was a strong and significant correlation between the death outcome and the amount of infections present (p=0,02) and the number of pathogens isolated in each patient (p=0,03). The correct investigation of IRAS cases is essential, considering the different factors associated with its occurrence, evidencing the need for greater epidemiological surveillance of infections in the Intensive Care Unit.

Keywords: Intensive Care Unit; Health Care Related Infection; Invasive Devices.

RESUMO:

O presente estudo tem como objetivo caracterizar os casos de infecções relacionadas à assistência à saúde ocorridas em uma UTI adulto. Estudo do tipo descritivo, exploratório, documental e com abordagem quantitativa. A amostra foi constituída por prontuários e fichas de controle de infecção

hospitalar da CCIH de todos os casos de infecções ocorridas na UTI do Hospital Universitário Getúlio Vargas em Manaus – Amazonas no período de janeiro de 2013 a dezembro de 2014. Foram selecionados 75 pacientes, sendo a maioria pertencentes ao sexo feminino (60%), com predomínio de idosos (36,5%). Foram classificados como cirúrgicos (45,3%) e tiveram permanência na UTI de 16 ou mais dias (42,7%). Quanto ao perfil das infecções, houve predomínio das relacionadas ao trato respiratório (46,2%) e corrente sanguínea (26,6%), chamando atenção para a Pneumonia Associada à Ventilação Mecânica (35,2%). O estudo mostrou ainda que há predomínio do diagnóstico clínico, laboratorial e de imagem na identificação das IRAS, somando (62,4%), negligenciando a realização de culturas (37,5%). Dentre os microorganismos identificados existe o predomínio dos gram-negativos (28,1%). A maior ocorrência de infecção por dispositivos invasivos ocorreu no uso do tubo orotraqueal (48%). Houve correlação forte e significativa entre o desfecho óbito e a quantidade de infecções presentes (p=0,02) e quanto ao número de patógenos isolados em cada paciente (p=0,03). Torna-se imprescindível a correta investigação dos casos de IRAS, tendo em vista os diferentes fatores associados a sua ocorrência, ficando evidente a necessidade de maior vigilância epidemiológica das infecções em Unidade de Terapia Intensiva.

Palavras chave: Unidade de Terapia Intensiva; Infecção Relacionada à Assistência à Saúde; Dispositivos Invasivos.

RESUMEN:
El presente estudio tiene como objetivo caracterizar los casos de infecciones relacionadas a la asistencia a la salud ocurridas en una UCI adulto. Estudio del tipo descriptivo, exploratorio, documental y con abordaje cuantitativo. La muestra fue constituida por archivos y fichas de control de infección hospitalaria de la CCIH de todos los casos de infecciones ocurridas en la UCI del Hospital Universitario Getúlio Vargas en Manaus – Amazonas en el periodo de enero del 2013 a diciembre del 2014. Fueron seleccionados 75 pacientes, siendo la mayoría pertenecientes al sexo femenino (60%), con predominio de ancianos (36,5%). Fueron clasificados como quirúrgicos (45,3%) y tuvieron permanencia en la UCI de 16 o más días (42,7%). En cuanto al perfil de las infecciones, hubo predominio de las relacionadas al tracto respiratorio (46,2%) y corriente sanguínea (26,6%), llamando atención para la Neumonía Asociada a la Ventilación Mecánica (35,2%). El estudio mostró que hay predominio del diagnóstico clínico, de laboratorio y de imagen en la identificación de las IRAS, sumando (62,4%), descuidando la realización de cultivos (37,5%). Entre los microorganismos identificados existe el predominio de los gram negativos (28,1%). La mayor ocurrencia de infección por dispositivos invasivos ocurrió en el uso del tubo orotraqueal (48%). Hubo correlación fuerte y significativa entre el resultado muerto y la cantidad de infecciones presentes (p=0,02) y cuanto al número de patógenos aislados en cada paciente (p=0,03). Se vuelve imprescindible la correcta investigación de los casos de IRAS, atendiendo a los diferentes factores asociados a su ocurrencia, resultando evidente la necesidad de mayor vigilancia epidemiológica de las infecciones en la Unidad de Cuidadps Intensivos.

Palabras clave: Unidad de Terapia Intensiva; Infección Relacionada a la Asistencia a la Salud; Dispositivos Invasivos.

INTRODUCTION

The understanding of the term Hospital Infections (IH) has been replaced in the last years by the Ministry of Health and National Agency of Sanitary Surveillance for the term Health Care Related Infection (IRAS) both from the perspective of prevention and control of infections, since these are considered as an event that can occur not only in the hospital environment, but also in all environments that provide health care [1].

The Health Care Related Infections, for the longevity that they present can be considered as one of the oldest injuries and that generate concern for the humanity, since they threaten the quality and the evolution of the services of attention to the health, mainly in the hospitals. The World Health Organization (WHO) recognizes that IRAS are a public health problem and that strategic actions are needed to reduce or even eliminate this problem, which must be developed at all levels of government and in a coordinated way [2].

In the hospital environment, more specifically, IRAS are infections that occur after admission to hospital and can develop during hospitalization or after discharge, as long as they are related to hospitalization or procedures performed during hospitalization [2].

Because of the ICU's invasive care environment, necessary to meet the critical conditions of the disease process, patients are more likely to acquire infections, and their occurrence leads to numerous problems both in the patient's side and to the prolongation of their stay in the hospital , delay in its recovery and worsening of the existing clinical condition, as well as for the institution and the state, considering that the incidence of IRAS is one of the criteria for evaluating the quality of hospital services, in addition to greatly increasing the financial costs of the state with the health sector [3].

Thus, IRAS is a serious public health problem that needs to be solved, and epidemiological surveillance constitutes the main tool for their knowledge, since it allows the active, continuous and systematic observation of the occurrence and distribution of these infections among institutionalized patients , as well as the events and conditions that are related to the risk of their occurrence and behavior, in order to execute timely actions for control [2,3].

Despite the remarkable advances that have been observed in recent decades in the sense of eliminating or controlling IRAS, many challenges remain for the effective implementation of strategies to address this problem, among them the knowledge gaps on the occurrence and distribution of IRAS in the different regions of the country and the deficiencies in the collection of information that allow the directing of actions and control of their effectiveness from the national level, to the hospitalization units, such as ICUs, which are considered critical areas for these infections [4].

In view of the above, the present study aimed to characterize the cases of infections related to health care, occurring in the ICU of a University Hospital.

MATERIAL AND METHODS

The study is descriptive, exploratory, documental and with a quantitative approach.

The research was carried out at the Hospital Universitário Getúlio Vargas (HUGV), located in the municipality of Manaus, state of Amazonas. The hospital is linked to the Federal University of Amazonas (UFAM) and currently managed by the Brazilian Company for Hospital Services (EBSERH), is located at Afonso Pena Street, s / n, neighborhood January 14th square.

The population of this study refers to the cases of patients hospitalized the HUGV ICU who developed healthcare-related infections. The sample consisted of records and records of control of hospital infection of the CCIH of all cases of infections that occurred in the ICU of said hospital from January 2013 to December 2014.

Data collection was performed in three months, from July to September 2015. A structured instrument, prepared by the researcher responsible, was used as a data collection tool, with variables related to the epidemiological and clinical characteristics of the patients to which it refers this study.

The data were quantified, tabulated and statistically analyzed using the Microsoft Office Excel spreadsheet software, version 2010 for the construction of the tables that expressed the study variables. The collected data were submitted to descriptive statistical analysis, using as software R, version 3.2.2.

The logistic regression model was applied with the objective of studying the effect of variables, gender, age, and invasive devices, among others, regarding the outcome (discharge and death) of patients who developed infection in the Intensive Care Unit.

The hypotheses for the Logistic Regression were:

- H0: The variables influenced the outcome.
- H1: The variables did not influence the outcome.

The p-value being lower than the significance level of 5% does not reject H0, that is, the variables influenced the outcome.

For the execution of the investigation, the Data Use Commitment Term (TCUD) was used due to the impossibility of obtaining the Informed Consent of all patients and analyzing medical records, and the researcher is responsible for the confidentiality of the data obtained.

The Term of Exemption from the Informed Consent Term was used because the collection was done only by secondary data, obtained from the study of medical records with the information regarding the care given to the patients.

The project was submitted to the Research Ethics Committee (CEP) of the Federal University of Amazonas (UFAM) in Manaus-AM for analysis and subsequent opinion.

RESULTS

A total of 277 patients were admitted to the Intensive Care Unit in 2013, 222 were discharged from the unit and 55 died, of which 51 died in patients with IRAS and 19 deaths related to IRAS. In 2014, 272 patients were admitted, 219 were discharged and 53 died, of which 24 died in patients with IRAS and 02 deaths related to IRAS. The total sample of cases identified during the study of patients who developed infections related to invasive devices was 75.

Table 1 - Socio-demographic and hospitalization profile and its relation with the high outcome / death in patients hospitalized in the ICU, Manaus-AM, 2016.

Variables	Outcome		Total n(%)	P
	Discharge from hospital n (%)	Death n(%)		
Sex				
Female	29(59,2)	16(61,5)	45(60)	0,62
Male	20(40,8)	10(38,5)	30(40)	
Age Group *				
13 to 19 years	3(6,2)	0(0)	3(4,)	1,00

20 to 39 years	17(35,4)	8(30,8)	25(33,8)	
40 to 59 years	14(29,2)	5(19,2)	19(25,7)	
60 years and over	14(29,2)	13(50)	27(36,5)	
Days of ICU stay				
Up to 7 days	13(26,5)	4(15,4)	17(22,7)	0,58
8 to 15 days	19(38,8)	7(26,9)	26(34,7)	
16 days or more	17(34,7)	15(57,7)	32(42,7)	
Days to enter the ICU				
Up to 1 day	13(24,5)	6(23,1)	19(25,3)	0,60
2 to 7 days	16(32,7)	11(42,3)	27(36)	
8 days or more	20(40,8)	9(18,4)	29(38,7)	
ranking				
Surgical	26(53,1)	8(30,8)	34(45,3)	0,60
Clinical	15(30,6)	11(42,3)	26(34,7)	
Clinical and Surgical	8(16,3)	7(26,9)	15(20)	

*The analysis of the variable "Age" was performed only with N of 74.

With regard to sociodemographic and hospitalization characteristics, there is a higher prevalence of infections in female patients (45; 60%) and elderly (27; 36.5%). The highest percentage of patients remained in the ICU for more than 15 days (32; 42.7%), with mean and SD of (26.5 ± 35.8), minimum stay time of 03 and maximum of 192 days. The time of entry into intensive care since admission to any other sector of the hospital was greater than 07 days (29; 38.7%), with mean and SD of (09.4 ± 19.4), time minimum of 01 and maximum of 60 days. There was no statistical significance with the association between the variables presented in table 1 with the high outcome and death (p> 0.05).

Table 2: Clinical and diagnostic characteristics of infections in patients hospitalized in the ICU, Manaus-AM, 2016.

Variables	n (%)
Type of Infection	
Skin Infection	3(2,4)
Soft tissues (eyes)	3(2,3)
Surgical site	4(3,1)
Central Nervous System	5(3,9)
Respiratory Tract (Clinical PNM)	14(11)
Urinary Tract	20(15,6)
Bloodstream Infection	34(26,6)
Respiratory Tract (VAP)	45(35,2)
Type of Infection Diagnosis	
Diag. Clinical	9(7)
Diag. Clinical and Laboratorial	30(23,4)
Diag. Clinical and Radiological	41(32)
Culture	48(37,5)
Isolated Microorganisms	
Gram-negative	36(28,1)
Gram-Positive	10(7,8)

Fungi		2(1,6)
Without Cultures		80(62,5)
Outcome		
Discharge from hospital		49(65,4)
Death		26(34,6)
Infection Confirmation Time		
Up to 7 days		58(50,9)
8 to 15 days		26(22,8)
16 to 30 days		19(16,7)
More than 30 days		11(9,6)

Table 2 shows the clinical and diagnostic characteristics of cases of infections. The most frequent infection was respiratory tract infection, pneumonia associated with mechanical ventilation (45; 35.2%), with orotracheal or tracheostome tube, as an invasive device for pulmonary ventilation. Diagnostic confirmation of infections occurred mostly through clinical, radiological and laboratory criteria, essentially (80; 62.5%), with the exception of diagnoses performed by cultures 48 (37,5).

The microorganisms found frequently in the cultures were gram negative (36; 28.1%), among them Acinetobacter baumannii haemolyticus (1; 0.8%), Cedecea davisae (1; 0.8%), Citrobacter diversus (0.8%), Stenotrophomonas maltophilia (1; 0.8%), Serratia marcescens (2; 1.6%), Enterobacter aerogenes (2; 1.6%), Enterobacter agglomerans , Klebsiella oxytoca (3; 2.3%), Klebsiella pneumoniae (6; 4.7%), Escherichia coli (6; 4.7%), Pseudomonas sp. (1, 0.8%) and Pseudomonas aeruginosa (10, 7.8%). Gram-positive (10; 7.8%) were Enterococcus casseliflavus (1; 0.8%), Streptococcus sp. (1, 0.8%), Staphylococcus xylosus (1, 0.8%), Staphylococcus sp. (1, 0.8%), coagulase negative Staphylococcus (2; 1.6%) and Staphylococcus aureus (4.1%). The fungi present in the cultures were represented only by Candida sp. (2: 1.6%).

Table 3: Occurrence of invasive device infection and its relation to the high outcome / death in patients hospitalized at the ICU, Manaus-AM, 2016.

	Outcome			
Devices	**Discharge from hospital**	**Death**	**Total**	*P*
	n (%)	**n(%)**	**n(%)**	
Orotraqueal tube				
Yes	23(46,9)	13(50)	36(48)	0,99
Not	26(53,1)	13(50)	39(52)	
Tracheostomy				
Yes	8(16,3)	4(15,4)	12(16)	1,00
Not	41(83,7)	22(84,6)	63(84)	
External Ventricular Derivation				
Yes	2(4,1)	2(7,7)	4(5,3)	0,99
Not	47(95,9)	24(92,3)	71(94,7)	
Peripheral Venous Catheter				
Yes	3(6,1)	2(7,7)	5(6,7)	1,00
Not	46(93,9)	24(92,3)	70(93,3)	

Central Venous Catheter				
Yes	7(14,3)	9(34,6)	16(21,3)	0,99
Not	42(85,7)	17(65,4)	59(78,7)	
Vesical Delay Probe				1,00
Yes	10(20,4)	4(15,4)	14(18,7)	
Not	39(79,6)	22(84,6)	61(81,3)	

Table 3 shows the occurrence of infection in each invasive device during intensive care and its relation with discharge and deaths in patients. The use of the Orotraqueal Tube as the most used device within the ICU (36; 48%) related to the presence of IRAS and the Central Venous Catheter with the highest number of deaths (9; 34.6%) was noted in comparison the highs (7; 14.3%). The presence of infection in any of the presented devices did not show statistical significance in the association with the outcome (p> 0.05).

Table 4: Infections and their relation to the high outcome / death in patients hospitalized in the ICU, Manaus-AM, 2016.

Variables	Average ± DP	Minimum	Maximum	P
Number of Isolated Microorganisms	0,64 ± 0,98	0	5	0,02
N ° of infections	1,70 ± 1,62	1	9	0,03

The statistical relationship between the infection variables and their outcome is shown in table 4, with these associations being significant ($p < 0.05$), that is, when the number of microorganisms isolated and the number of infections in a patient is higher, will be the chance of death in intensive care, according to the logistic regression model applied.

DISCUSSION

The ICU is an environment characterized by receiving seriously ill patients and, due to the highly invasive care performed in this environment and the client's own critical condition, the hospital units are considered, in which the highest IH or IRAS which makes the ICU a priority environment for actions to prevent and control infections. The high prevalence of these infections becomes a factor that often implies an unfavorable outcome of these patients in the ICU. In addition, IRAS are associated with prolonged hospitalization, mortality and morbidity, and high costs with therapy [5].

Regarding the gender, this study showed a higher prevalence of IRAS in the female sex (60%), this variable when compared to other studies show the occurrence of higher rates of IRAS in males, although this tendency is discrete, not exceeding 60% [6-10]. These findings reflect that there is a predominance of IRAS in the male gender, showing it as more vulnerable. However, this finding may be happening at random, since in none of the aforementioned studies was there statistical significance for the gender variable.

Regarding the age variable, the data from the present study show a predominance of IRAS in patients over 40 years of age, a fact evidenced in other studies where the mean age was found between 53; 57.3; 57 and 54 respectively [6.8-10]. In addition, it is

possible to perceive a considerable rate (36.5%) of patients affected by IRAS over 60 years of age, as was also found in other studies carried out in this area [6-7]. Numerous factors contribute to the occurrence of IRAS in all hospital settings, including those intrinsic to the patient, with advanced age being an important factor already proven in the literature[11].

Regarding the days of ICU stay, it was observed that the majority of the patients (82.4%) had their stay in that sector for more than 7 days. Similar results were found by studies developed in other regions of Brazil, where the mean hospitalization of patients who developed IRAS was 19.3; 21 and 21.2 days respectively[7,10,12]. Prolonged ICU stay is associated with a higher risk of colonization by multiresistant pathogens, a fact that favors the acquisition of IRAS[13].

It is consolidated in the literature that the permanence of the patient in the critical environment is a major risk factor for the acquisition of infections, since it suffers from a high environmental exposure in the ICU, increases the chances of colonization by multiresistant microorganisms and also cross infection[14].

The data referring to ICU days after admission to the hospital reveal that an expressive percentage of patients (38.7%) who had a hospitalization time of more than 8 days, a fact that constitutes an increased risk factor for the precipitation of IRAS for the same reasons for the long stay in the ICU[13]. In addition, these data are corroborated by a study developed in a university hospital that detected a mean stay of 36 days among patients who developed infection. This outcome may be related to the underlying diseases of the patients who developed IRAS, since the hospital where this study was performed is a reference for serious diseases and large surgical procedures. These underlying events tend to destabilize the body's defense mechanisms, cause malnutrition and confer deficiencies in immune defenses, which, together with prolonged institutional stay, become serious risk factors for IRAS[6,13].

Regarding the patient's classification, this study showed a higher prevalence of surgical patients (45.3%), a similar result also found in another study on the subject (7). However, these findings are not standard in the literature, since a more recent study on IRAS in the ICU showed an inverse finding in this study, where 83.2% of the sample was classified as clinical[8]. Thus, it is not possible to establish an exact relation on the occurrence of IRAS and the classification of the patient, since both can be configured as a risk factor.

When statistical association was made between the sociodemographic characteristics of the patients with IRAS with high and death outcomes, there was not enough significance to effectively relate such data to these two outcomes, as observed in Table 1.

When investigating the type of infection present in the unit, a higher incidence of ventilator-associated respiratory tract infection (VAP) was observed, followed by infection of the bloodstream and urinary tract. Similar prevalence in relation to URI IRAS topographies occurred in another study[12], which showed the same sequence of events in descending order, with a prevalence of respiratory infection of 48.1% and ICS 32.1%. Another study has also shown that respiratory, bloodstream and urinary infections are the most prevalent topographies in ICU[15]. A study carried out at an ICU in Rio Grande do Sul identified that respiratory infections accounted for 57% of the total in that ICU[16]. Still supporting the findings of this trial, the Ministry of Health states

that respiratory tract infections correspond to approximately 25% of all infections acquired in ICUs, with patients on invasive ventilation being in an increased risk group for pneumonia due to three The main factors were: decreased patient defenses; elevated risk of having airways inoculated with large amounts of contaminated material; and presence of more aggressive and antimicrobial resistant microorganisms in the environment, nearby surfaces, materials and colonization of the patient[17]. It is important to emphasize that pneumonia is the main cause of IRAS in ICU, and its incidence increases by up to 21 times in patients submitted to mechanical ventilation, making it the main cause of death due to infections in this context[18,19].

With regard to the diagnosis of infections, there was a predominance of manifested clinical symptoms, associated with laboratory and radiological examinations, and culture diagnosis was performed in less than half the cases. These findings diverge from recent studies that characterize IRAS in ICUs where culture diagnosis was present at rates that reached up to 90% of the cases studied[10]. Regarding this, the Ministry of Health, through its official documents, states that the diagnostic criteria of IRAS are specific for each topography studied, taking into account clinical and laboratory aspects, but must have the isolation of the associated microorganism, for a better targeting of therapy[17,20].

As far as the types of microorganisms isolated in the cultures were concerned, gram-negative bacteria predominated. This finding is corroborated by other studies, in which incidences of this group of bacteria were recorded in 81.1%, 82% and 72.9% respectively[12,16,21]. Infections caused by gram-negative bacteria are linked to extremely high resistance profiles, which makes it difficult to establish initial therapy and has a strong impact on the prognosis of critically ill patients, being responsible for the high mortality rates associated with IRAS in ICU[22].

Regarding the outcomes of patients with IRAS investigated in this study, the majority were discharged from the unit (67.4%). This finding is corroborated by a study carried out in a UTI in Paraná, where the high outcome was 61.6%[23]. Other international studies have reported results in which the percentage of discharge was 83.2%, 89% and 87.2%, respectively[11,24,25]. These outcomes are directly associated with factors related to the patient's ICU entry, the number of invasive devices installed and the presence of IRAS in these patients[12].

Regarding the time to diagnosis of IRAS after ICU admission, this study showed early detection in about half of the cases and more than 70% in up to 15 days. These findings are similar to those found in another study with mean time to the diagnosis of IRAS of 11.7 days[12]. In the study carried out in an ICU of Minas Gerais, it showed an average time of 5.6 days for the diagnosis of IRAS, a finding that also corroborates that brought in this study[8].

Regarding the occurrence of IRAS according to the invasive devices used, and its relationship with the high outcome and death, it is noticed that the orotracheal tube, tracheostomy, central venous catheter and bladder catheter were the devices that were most associated with the presence of IRAS, being highlighted in this study the orotracheal tube. These findings are similar to other studies, where the same devices were associated with the presence of IRAS in ICU, and mechanical ventilation devices were responsible for supporting the higher death outcome among patients with IRAS[10,12].

It is evident the correlation of the use of invasive devices and the presence of IRAS. Studies that have already been carried out confirm the statistical relationship between the use of central venous catheter and bloodstream infections and the use of the late bladder catheter with urinary tract infections[26]. Another study showed that 90% of patients who developed nosocomial pneumonia in ICU were submitted to tracheal intubation and mechanical ventilation[14].

This study showed strong evidence, through logistic regression, of the close relationship with the death outcome and two important aspects: number of infections and numbers of associated pathogens. These findings only reinforce this assertion already consolidated in many studies carried out in Brazil and in other countries, as well as what is said in the gray literature, because, these factors significantly increase the difficulty in the therapeutic management and the risk of the institutionalized evolve to a framework of sepsis and septic shock[12,22].

CONCLUSIONS

Just as important is the application of new sophisticated technologies in critical patient care, it is essential to know the clinical and epidemiological aspects of IRAS in this care environment, since their presence makes the service extremely costly and reduces the effectiveness of the role to which the ICU is intended.

Thus, it can be concluded from this study that the patients affected by IRAS in the context investigated belonged to the female sex, aged 60 years or over, most of them were classified as surgical and had a long stay in the ICU. Regarding the profile of infections, there were predominance of those related to the respiratory tract, bloodstream and urinary tract, calling attention to PAV and its association with a higher death outcome among patients. The study also showed that there is a predominance of the clinic associated with laboratory and imaging exams in the diagnosis of IRAS, and that cultures are neglected. Among the identified microorganisms there is a predominance of gram-negative, which presents a great challenge for the correct and effective therapeutic management of patients. The most used devices that were associated with the presence of IRAS were the orotracheal tube and tracheostome, central venous catheter and the bladder catheter of delay. There was a strong and significant correlation between the death outcome and the number of infections present and the number of pathogens isolated in each patient.

In the light of the analysis carried out in this study, it is important to carry out further investigations for a longer period and sample, in order to obtain more concrete results and that can support the practice of care, since the IRAS are responsible for excessive burden of critical care, negatively impacting the state budget, contributing to a reduction of investments in other areas, such as basic care, in addition to increasing mortality rates in these settings.

It is imperative to correctly investigate and monitor IRAS cases, considering the different factors associated with this condition, such as: increased susceptibility of the patient, emergence of multiresistant bacteria due to inappropriate and indiscriminate use of antibiotics, lack of systematized work by the health team and assistance procedures without proper aseptic technique. It is therefore a matter of extreme complexity, requiring a great effort to solve such problem, making evident the need for epidemiological surveillance of IRAS in patients hospitalized in the Intensive Care Unit.

The control of IRAS is a laborious task that increasingly demands multiprofessional effort and work within the ICU, in order to minimize the impacts brought by these complications, making the service more efficient and effective. Such actions may be focused on strengthening health education actions of professionals for the prevention of IRAS, hand hygiene at all times of care, strict control of procedures in the critical environment, implementation of bundles to prevent major types of infection , monitoring and appropriate therapeutic management of the cases of IRAS, dissemination of epidemiological data to the team, incentive for the use of personal protective equipment, among others.

In this sense, it is essential to strengthen the CCHI of the research institution, so that it can act as a beacon and articulator of the actions and services that meet the problem, in order to qualify care for the critical patient.

Among the limitations of the research, the relatively short period of the analyzed cases and the number of cases evaluated in the study that do not allow the generalization of the findings to the general population stand out.

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