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ORIGINAL

Clinical characterization and mortality predictors in a terminal hospital

Caracterización clínica y predictores de mortalidad del ictus en un hospital terminal

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ABSTRACT

Introduction: the stroke represents one of the main causes of morbidity and mortality globally, with a significant impact on public health. The identification of mortality predictors is essential for clinical decision making.
Objective: characterize patients diagnosed with stroke and determine mortality predictors.
Method: an observational, analytical and retrospective study was carried out at the Dr. Miguel Enriquez Surgical Clinical Hospital from January to December 2024. The qualitative variables were summarized in absolute frequencies and percentages. The quantitative variables in average and standard deviation. To evaluate the association between qualitative variables the JI square test was applied. To determine the factors associated with mortality, a multivariate binary regression model was adjusted.
Results: 883 patients were studied. The ischemic stroke was the most frecuent and within in the cerebral infarction of therotrombotic etiology prevailed (79,9 %). With respect to the age variable, for each additional year the probability of death increases by 5 %, OR 1,05 (IC 95 %: 1,02-1,08, p< 0,001). As for the Glasgow scale for each additional point, the probability of death decreases by 15 %, OR 0,85 (IC 95 %: 0,80- 0,90). On the other hand, patients with cerebral edema have 3,5 times higher risk of death OR 3,50 (IC 95 %: 2,40- 5,10).
Conclusions: the influence of clinical and demographic factors on ICTUS mortality provides tools to stratify the risk, contributing to optimize decisions in medical practice.

Keywords: Ictus; Mortality Predictors.

RESUMEN

Introducción: El ictus representa una de las principales causas de morbimortalidad a nivel global, con un impacto significativo en la salud pública. La identificación de predictores de mortalidad es fundamental para la toma de decisiones clínicas.
Objetivo: caracterizar a los pacientes diagnosticados con ictus y determinar los factores predictores de mortalidad.
Método: se realizó un estudio observacional, analítico y retrospectivo, en el Hospital Clínico Quirúrgico "Dr. Miguel Enríquez" de enero a diciembre de 2024. Las variables cualitativas fueron resumidas en frecuencias absolutas y porcentajes. Las variables cuantitativas en media y desviación estándar. Para evaluar la asociación entre variables cualitativas se aplicó el test estadístico de Ji Cuadrado. Para determinar los factores asociados a la mortalidad, se ajustó un modelo de regresión logística binaria multivariante.
Resultados: se estudiaron 883 pacientes El Ictus isquémico fue el más frecuente y dentro del mismo predominó el infarto cerebral de etiología aterotrombótico (79,9 %). Con respecto a la variable edad, por

cada año adicional la probabilidad de fallecer aumenta un 5 %, OR 1,05 (IC 95 %: 1,02-1,08, p< 0,001). En cuanto a la escala de Glasgow por cada punto adicional la probabilidad de muerte disminuye un 15 %, OR 0,85 (IC 95 %: 0,80- 0,90). Por otro lado, los pacientes con edema cerebral tienen 3,5 veces mayor riesgo de fallecer, OR 3,50 (IC 95 %: 2,40- 5,10).
Conclusiones: la influencia de factores clínicos y demográficos en la mortalidad por ictus proporciona herramientas para estratificar el riesgo, contribuyendo a optimizar la toma de decisiones en la práctica médica.

Palabras clave: Ictus; Predictores de Mortalidad

INTRODUCTION

Since ancient times, Stroke has been described as apoplexy by Hippocrates. The term refers to any disorder of cerebral circulation, which generally has an abrupt onset and occurs due to the interruption of blood flow to a part of the brain (cerebral ischemia) or the rupture of a cerebral artery or vein (cerebral hemorrhage).[1]

Stroke represents one of the leading causes of morbidity and mortality globally, with a significant impact on public health due to its high incidence, disabling sequelae, and costs associated with its care. Among the well-documented risk factors are advanced age, male sex, dyslipidemia, diabetes mellitus, arterial hypertension, obesity, heart disease, and asymptomatic carotid stenosis.[2]

According to the World Health Organization (WHO), stroke, as it is also known, is the second leading cause of death in the world and one of the leading causes of disability in adults.[3] In Europe, Russia, Australia, and the United States, it has been found that its incidence increases significantly above 35 years of age and triples in individuals over 85. In Cuba, it has been the third cause of death for several years, which underscores the need to study its clinical and epidemiological characteristics and the factors that influence its fatal outcome.[4]

The identification of mortality predictors is fundamental for clinical decision making. Among the non-modifiable factors, advanced age and a history of previous stroke stand out. On the other hand, modifiable variables such as hospital arrival time, lack of access to thrombolysis, and inadequate blood pressure control in the acute phase are associated with worse outcomes.[4] The appearance of complications such as cerebral edema, hemorrhagic transformation, or nosocomial infections increases the risk of mortality. In addition, stratification by etiological subtypes is crucial to understanding the differences in survival and therapeutic response.[5]

In terminal hospitals where complex and severe cases are treated, the analysis of these aspects acquires special relevance to optimize prevention, diagnosis, and treatment strategies.[5]

This article aims to characterize stroke patients and determine mortality predictors in a terminal hospital.

METHOD

An observational, analytical, and retrospective study was conducted at the Hospital Clínico Quirúrgico "Dr. Miguel Enríquez" from January to December 2024. The study universe corresponded to all patients diagnosed with stroke at the "Dr. Miguel Enriquez" hospital during the study period, and the sample consisted of those patients who met the inclusion criteria. Non-probabilistic convenience sampling was performed.

Inclusion criteria: Patients over 18 years of age with a computed tomography diagnosis of stroke were included.

Exclusion criteria: Incomplete medical history.

The following variables were considered: age, sex, skin color, Glasgow scale, risk factors, complications, and mortality.

With the information collected, an automated database was created using the Excel Microsoft Office XP version application, which was subsequently exported to the Jamovi 2.4.14 statistical program for data processing. Qualitative variables were summarized in absolute frequencies and percentages. Quantitative variables were summarized as mean and standard deviation. The Chi-square test was applied to evaluate the association between qualitative variables. A multivariate binary logistic regression model was fitted to determine the factors associated with mortality due to stroke complications. A significance level of 5 % was used. A significant difference was considered to exist when the test probability was less than 0,05.

The confidentiality of the patients' personal data included in the study was maintained, with due respect for their autonomy and privacy.

RESULTS

A total of 883 patients who presented with stroke during the study period were studied. The mean age was 69 years (SD= 13,5). Male sex predominated with 466 patients (52,8 %). Regarding skin color, white patients were more frequent (46,1 %), followed by mestizos (28,7 %).

Table 1 shows the distribution of patients according to type of stroke. Ischemic stroke was the most frequent, and within this type, cerebral infarction of atherothrombotic etiology predominated (79,9 %).

Table 1. Distribution of patients according to type of stroke

Type of stroke	Frequencies	% of Total	% Accumulated
Atherothrombotic cerebral infarction	706	79,9%	79,9%
HIP	109	12,4%	92,3%
Cerebral Infarction Cardioembolic	49	5,5%	97,8%
HSA	19	2,2%	100,0%

The most frequently observed complication was bacterial bronchopneumonia (35,9 %), followed by cerebral edema (21,2 %). Hemorrhagic conversion only occurred in 0,7 % of patients (table 2).

Table 2. Distribution of complications presented

Complications	Frequencies	% of Total
Cerebral Edema	187	21,2
Bacterial Bronchopneumonia	317	35,9
Deep Vein Thrombosis	35	4
Symptomatic Epilepsy	76	8,6
Hemorrhagic conversion	6	0,7
Urinary tract infection	162	18,3
Pressure ulcer	157	17,8

Of the 883 patients included in the study, 18,7 % (164) died during hospitalization. Figure 1 shows the distribution of mortality compared to survival (81,3 %).

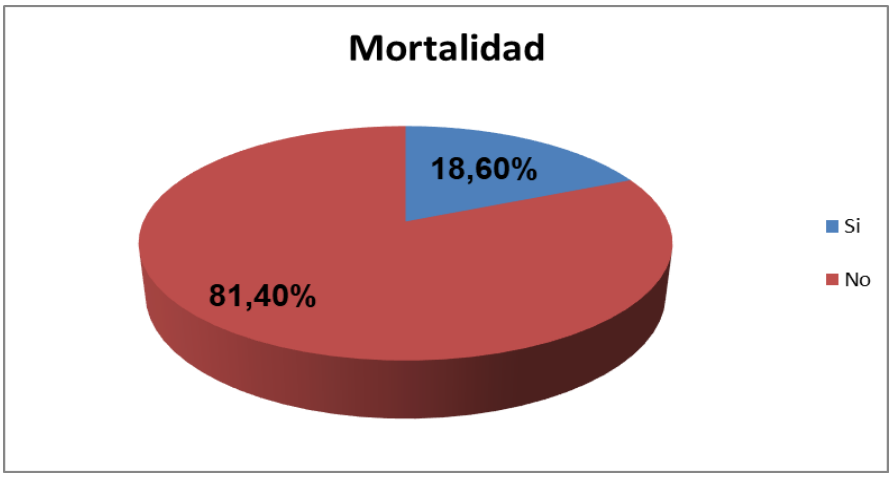

Figure 1. Distribution of patients according to mortality

In the sample studied, the most frequent vascular risk factor was arterial hypertension (HT) (91,3 %), followed by smoking (60,1 %) and, to a lesser extent, ischemic heart disease (2,6 %). These risk factors did not show a statistically significant association with mortality (table 3).

Table 3. Association between vascular risk factors and mortality

Risk Factor	Mortality				p- value
	Yes	%	No	%	
Diabetes Mellitus	38	22,2 %	133	77,8 %	0,172
HTA	150	18,6 %	656	81,4 %	0,926
Dyslipidemia	15	21,1 %	56	78,9 %	0,564
Smoking	105	19,8 %	426	80,2 %	0,260
Ischemic heart disease	4	17,4 %	19	82,6 %	0,883

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Table 4 shows the probability of death according to age, the Glasgow scale, and the neurological and non-neurological complications presented by the patients. Concerning the age variable, for each additional year, the probability of death increases by 5 %, OR 1,05 (95 % CI: 1,02- 1,08, p<0,001). Regarding the Glasgow scale, for each additional point, the probability of death decreases by 15 %, OR 0,85 (95 % CI: 0,80- 0,90). On the other hand, patients with cerebral edema have 3,5 times the risk of death, OR 3,50 (95 % CI: 2,40- 5,10).

Table 4. Analysis of predictors of mortality

Variable	OR (IC 95 %)	p
Age	1,05 (1,02; 1,024)	<0,001
Glasgow	0,85 (0,80; 0,90)	<0,001
Cerebral Edema	3,50 (2,40; 5,10)	<0,001
Bacterial Bronchopneumonia	0,7333 (0,4425; 1,215)	0,229
Deep Vein Thrombosis	0,2921(0,0951; 0,898)	0,032
Symptomatic Epilepsy	1,377 (0,5349; 2,864)	0,618
Hemorrhagic conversion	0,3721(0,0421; 3,291)	0,374

DISCUSSION

Stroke occurs with increasing frequency worldwide. In Cuba, it constitutes the third cause of death. The most recurrent is ischemic stroke, of the atherothrombotic type, in vessels of different caliber.[6]

Age and sex are non-modifiable risk factors for CVD. The study showed a higher prevalence in the male sex, with a mean age of 69 years. León et al.[7] report a predominance of the male sex, 55,74 %, while the mean age was 73,44 years. However, Sepúlveda et al.[8] reported 54,7 % female sex and 48,14 % over 70 years of age. Age is associated with a higher risk. Gamarra et al.[9] state that men are more prone to suffer from it as age increases, while women are more prone to suffer from it due to changes in the estrogen protective factor.

The risk factor with the highest incidence reported is AHT, which aggravates and accelerates arteriosclerosis and cardiovascular disease. It has also been documented in the literature. Ramos et al.[10] report that the risk of stroke in hypertensive patients is three to four times higher than in normotensive patients. Piloto et al.[11] reported high percentages for both ischemic and hemorrhagic stroke. This is followed by smoking, which is a modifiable and preventable risk factor that, according to Botero et al.[12], increases the risk two to four times higher than in non-smokers.

The development of complications affects the evolution of patients and prolongs hospital stay. Bosch et al.[13] reported hemorrhagic transformation as the predominant complication in their study. However, in this study, it only occurred in 6 patients. The most frequently documented complication was bacterial bronchopneumonia, which shows that the most frequent complications are extraneurological. Their high frequency demonstrated the need to take precautions to avoid, recognize, and treat them promptly.

Mortality due to hemorrhagic stroke shows higher figures than ischemic stroke. It is directly related to age, complications, and the Glasgow scale. The higher risk was determined for patients with cerebral edema and females, as is also reflected in the literature consulted, which estimates an estimated mortality of about 68 000 for the year 2050.[14]

CONCLUSIONS

This study confirms the influence of clinical and demographic factors on stroke mortality and provides tools for risk stratification, helping to optimize decision-making in medical practice.

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CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest.

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