

<http://dx.doi.org/10.1590/0104-070720180001930016>

EVALUATION OF DEATH INDICATORS AND DISABILITY OF PATIENTS ATTENDED IN A STROKE UNIT

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¹ Paper extracted from the thesis - Quality care to user stricken by stroke, before and after the establishment of a Unit AVC, presented to the *Programa de Pós-Graduação em Enfermagem da Faculdade de Medicina de Botucatu (FMB), Universidade Estadual Paulista (UNESP)*, in 2014.

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ABSTRACT

Objective: to evaluate result indicators for mortality and degree of disability of discharged patients before and after the establishment of the stroke unit care.

Method: this is a quantitative, retrospective and cross-sectional study. It was conducted in a public hospital, which had the stroke unit care established in 2011. A total of 245 medical records of admitted patients were analyzed from January 29, 2011 to January 28, 2012. An amount of 63 patients were analyzed six months before the establishment of the stroke unit and 182 patients in the subsequent six months. The Modified Rankin Scale was used in medical records of hospital discharge. It has seven scores (0 to 6), which measure the functional impairment, ranging from “no symptoms at all” to “dead”. For data analysis, it was used a statistical analysis software (SAS for Windows®, version 9.3).

Results: adding the indicators 0 and 1 (“no symptoms at all” and “no significant disability”) of the Modified Rankin Scale, we found 6.72% before and 42.86% after the establishment, indicating lower disability condition in discharge after establishment. Mortality was 20.69% before establishment and 12.73% after.

Conclusion: there was a reduction of the patient’s degree of disability and mortality after establishment of the stroke unit.

DESCRIPTORS: Stroke. Health evaluation. Indicators. Nursing. Health Services Administration.

AVALIAÇÃO DOS INDICADORES DE ÓBITO E INCAPACIDADE DOS PACIENTES ATENDIDOS EM UMA UNIDADE DE ACIDENTE VASCULAR CEREBRAL

RESUMO

Objetivo: avaliar indicadores de resultado para mortalidade e grau de incapacidade dos pacientes na alta antes e após implantação da unidade de acidente vascular cerebral.

Método: estudo quantitativo, retrospectivo e transversal, realizado em um hospital público, que teve a unidade de acidente vascular cerebral implantada em 2011. Foram analisados 245 prontuários de pacientes admitidos de 29 de janeiro de 2011 a 28 de janeiro de 2012. Foram 63 pacientes nos seis meses antes da implantação da unidade de acidente vascular cerebral e 182 pacientes nos seis meses após. Utilizou-se na alta hospitalar pelos registros no prontuário a escala de Rankin modificada, possui sete graus (0 a 6) que mensura o comprometimento funcional, variando de “sem incapacidade” até “óbito”. Para análise dos dados foi utilizado um software de análise estatística (SAS para Windows®, versão 9.3).

Resultados: somando os indicadores 0 e 1 (sem incapacidade e ausência de incapacidade significativa) da escala de Rankin modificada, encontramos 6,72% antes e 42,86% depois da implantação, indicando condição de menor incapacidade na alta após a implantação. A mortalidade foi de 20,69% antes da implantação e 12,73% depois.

Conclusão: houve redução do grau de incapacidade dos pacientes e da mortalidade após implantação da unidade de acidente vascular cerebral.

DESCRIPTORIOS: Acidente vascular cerebral. Avaliação em saúde. Indicadores. Enfermagem. Administração de serviços de saúde.

EVALUACIÓN DE LOS INDICADORES DE ÓBITO E INCAPACIDAD DE LOS PACIENTES ATENDIDOS EN UNA UNIDAD DE ACCIDENTE VASCULAR CEREBRAL

RESUMEN

Objetivo: evaluar indicadores de resultado para mortalidad y grado de incapacidad de los pacientes en la alta antes y después de la implantación de la unidad de accidente vascular cerebral.

Método: estudio cuantitativo, retrospectivo y transversal, realizado en un hospital público, que tuvo la unidad de accidente vascular cerebral implantada en 2011. Se analizaron 245 prontuarios de pacientes admitidos del 29 de enero de 2011 al 28 de enero de 2012. Fueron 63 pacientes en los seis meses antes de la implantación de la unidad de accidente vascular cerebral y 182 pacientes en los seis meses después. Se utilizó en el alta hospitalaria por los registros en el prontuario la escala de Rankin modificada, posee siete grados (0 a 6) que mide el compromiso funcional, variando de "sin incapacidad" hasta "muerte". Para el análisis de los datos se utilizó un software de análisis estadístico (SAS para Windows®, versión 9.3).

Resultados: sumando los indicadores 0 y 1 (sin discapacidad y ausencia de incapacidad significativa) de la escala de Rankin modificada, encontramos el 6,72% antes y el 42,86% después de la implantación, indicando condición de menor incapacidad en la alta después de la implantación. La mortalidad fue del 20,69% antes de la implantación y el 12,73% después.

Conclusión: hubo reducción del grado de incapacidad de los pacientes y de la mortalidad después de la implantación de la unidad de accidente vascular cerebral.

DESCRIPTORES: Accidente cerebrovascular. Evaluación en salud. Indicadores. Enfermería. Administración de los servicios de salud.

INTRODUCTION

Chronic diseases are in the center of attention. They are important for the resource mobilization regarding the health care needs to a population in the aging process. Among these diseases we have cerebrovascular accident (CVA).

It is a fact that nowadays there is the search for improvement in the quality of health services inside organizations.¹ The competition in health organizations has increased due to more demanding users.² The Brazilian Unified Health System (SUS) has been organizing specialized healthcare for this disease, as is the case of stroke treatment units (from the Portuguese acronym, UAVC). This process is part of the confrontation of the problem in the organization of the lines of care, to ensure this rearguard of higher complexity with quality.

According to the Directiva no. 800/2015, UAVC is defined as a unit of multi-professional clinical care for patients affected by stroke. Its function is to offer continuity to the acute phase treatment, early rehabilitation and complete etiological investigation.³ The establishment of these units is recent in SUS, with no significant studies in the literature pointing out their outcomes, being a knowledge gap.

The cause of ischemic stroke is due to arterial obstruction by thrombosis or embolism, with a decrease in the cerebral blood flow.⁴ This failure in the cerebral blood circulation causes injuries on the brain. It is a disease that has family and individual impact.⁴ Therefore, preventive measures must be established to reduce the sequelae and improve the quality of life.⁵

In Brazil, according to data from the Ministry of Health (DATASUS), 160,621 hospitalizations due

to cerebrovascular diseases were registered in 2009. Mortality rate was 51.8 to every group of 100,000 inhabitants.⁶

CVA is the leading cause of deaths recorded in the country.⁷ The Ministry of Health predicted to invest 437 million reais until 2014 to increase healthcare to victims in hospital beds.⁷

The disease generates sequelae and disabilities. In 2013, the Brazilian National Survey of Health conducted an epidemiological study in the country that calculated the number of patients with post-stroke disabilities. The estimate was 2,231,000 people with stroke and, from these, 568,000 with severe disability.

We used the Modified Rankin Scale as an instrument to evaluate the patient's post-stroke functional impairment because it allowed us to evaluate the patient's condition. This tool emerged from a randomized controlled trial on the use of aspirin in patients with CVA in 1988 (updated in 1991).⁹⁻¹⁰

The *Directive no. 800/2015*,³ classifies the Ambulatory Care Facilities for patients with CVA in three types (Type I, II and III). Type I uses thrombolytics and must: provide daily healthcare and computed tomography examinations for 24h; have trained nursing staff orientated by a neurologist; have clinical and care protocols; provide neurological service up to 30 minutes after admission (personal or long-distance after-hours care, or telemedicine); have monitored beds; have intensive care unit and laboratory tests; and conduct treatment through hemotherapy.

Type II³ must add to Type I and: include the acute stroke unit and the Color Doppler Ultrasound;

conduct service until 72 hours of hospitalization, physiotherapy and speech-language-hearing therapy; conduct electrocardiograms, radiology tests, magnetic resonance, magnetic resonance angiography, transcranial echo-doppler, interventional neurology, echocardiogram and angiography; must have a minimum of five beds and with human and material resources. These must be: hospital beds; stethoscope *per* bed; two infusion pumps for each bed; gauze points; aspiration equipment; emergency medical kit with medicines, respiratory resuscitation equipment, laryngoscope, intubation and guedel cannulae and sterile guide wires; one defibrillator/ cardioverter *per* unit; one electrocardiograph; one device to measure capillary blood glucose; transport stretcher with oxygen tank; one oxygen tank; one facial mask with several concentrations every three beds; one complete monitor for each bed.

Type III³ contains the items of Type II, including: Full UAVC with ten beds. The treatment starts in the acute phase and lasts until the early rehabilitation and full investigation. It has specialized outpatient clinics and treatment until 15 hospitalization days. It includes occupational therapist, social worker and psychologist.

With these centers there is an interaction between federal, state and municipal governments. The objective is to strengthen healthcare to stroke victims, ensure a excellent hospitals, highlighting the importance of the effective treatment.

In addition to the importance of chronic diseases nowadays, the evaluation of quality of healthcare and services assumes great relevance. In Brazil, studies on health indicators and CVA are scarce. Directive 800 from June 2015 cites the integral UAVC must monitor and record the assistance and process indicators. In a survey conducted in Brazil with the Hospital Information System (HIS), the crude death rate by stroke was 34.3%, for a period of one year and eight months.⁴ The quality indicates the success of the service provided, as well as the satisfaction of the customer's needs.¹¹

For the effective development of the evaluation of health services management, we used indicators for comparison with internal and external references.¹² Donabedian¹³ presents the evaluation of services, which carries out the analysis within the classical triad: structure, process and outcome.

The structure comprises attributes in which the care happens, regarding physical, material resources and equipment.¹³ The process involves the activities of health professionals and patients, how the healthcare is developed, its protocols and

implementation of treatment. The outcome is related to the effectiveness of the patients' treatment, the consequence of the service conducted, reflecting the changes observed in their health, and involves the satisfaction degree of patients and families.¹³

Given the importance of this context, the questions for this study were: is there a difference in outcome indicators with the UAVC establishment? Was there an improvement in the patient's leaving condition in the moment of discharge after establishing the unit?

The justification of our study is given by the high morbidity and mortality, individual and social hospital costs, in addition to the relevance and need of the UAVC evaluation after its establishment. Our purpose was to observe if there was an effective service and reduction of sequelae and deaths due to this disease as a way to improve the quality of life for patients and their families.

The objectives of our study were to evaluate the mortality outcome indicators and the degree of functional impairment of patients in hospital discharge before and after establishing UAVC through the Modified Rankin Scale.

METHOD

This is a quantitative, retrospective and cross-sectional study. The study location was the Clinics Hospital in Botucatu (São Paulo/Brazil). The hospital is a regional reference for high complexity in urgency and emergency. It is the largest public institution linked to the SUS in the Regional Health Department VI, covering a population of about 1.5 million people from 68 municipalities.¹⁴

This study compared two periods of healthcare provided to patients affected by stroke, before and after the creation of the UAVC.

In the emergency room, in July 28, 2011, a UAVC type II was installed with four beds. Before the inauguration, patients were admitted to the emergency room by spontaneous demand, availability of hospital beds, rescue, intra-hospital transfer (adult emergency room, located in the center of the city and inaugurated in April 2011) and by the Emergency Medical Services (from the Portuguese acronym, SAMU), which began to operate at the same time.

Previously, doctors on call saw patients in the emergency room. After diagnosing the stroke, they called the neurology team that started the service protocol. However, the team was not exclusive to these cases. The nursing staff had a nurse who as-

sisted three emergency rooms, in addition to the medication and observation rooms. There was a nursing assistant or technician that assisted these patients. It was used a rotating shift schedule in working hours during the month and in emergency rooms. Due to the demand, there were extra beds with several pathologies. The staff was not exclusive for stroke patients.

With the UAVC inauguration, the admission of patients still happened in the emergency room, but with referral to a specific unit. It had a neurologist in charge, who remained in the unit for 24 hours. The neurologist was immediately called in the patient's admission and the care protocol was carried out. The nursing staff had a nurse who assisted emergency rooms, UAVC and two hospital wards, with two or three nursing assistants or technicians. This service happened for 24 hours. Employees received annual training and whenever necessary training on the pathology and stroke signs and symptoms, and on the nursing cares required for these patients. All beds had multi-parameter monitors.

The studied population comprised 344 patients, based on a database provided by the doctors who conducted neurology research. To supplement data, there were used nursing records in the moment of patients' admission to the unit and it was requested a list to the Department of Academic Activities Management regarding patients with stroke diagnosis admitted in the period established.

Every medical record was analyzed and the inclusion criteria were established: adult patients over 18 years old and to have a stroke diagnosis. Exclusion criteria were: incomplete or not found medical records. A total of 99 patients were excluded from the initial sample, resulting in a sample of 245 patients.

Data collection was carried out in the first semester of 2014 and divided into two steps: before the establishment of the unit, from January 26, 2011 to July 28, 2011 (six months before UAVC inauguration) and after the establishment, from July 29, 2011 to January 28, 2012 (six months after inauguration).

Required data were transferred to an instrument developed for this research, organized into an Excel® spreadsheet to meet the objectives of this study. The variables analyzed before or after establishment were: age, disability degree in discharge and death.

The sample had 245 patients admitted to the emergency room for one year: 63 patients, six months before the inauguration of the unit; and 182 patients, six months after inauguration. The differ-

ence of patients in both periods can be attributed to the fact that before establishment there were no records concentrated in a specific unit, since patients could be hospitalized in other hospital locations, complicating the data location. For some data, the number of patients was 29 before establishment and 110 after, because the outcome records for the Modified Rankin Scale were found in 139 medical records.

The disability degree is measured to evaluate post-stroke functional impairment. It was used the Modified Rankin Scale, in the moment of discharge, where 0 = no symptoms at all, no disability; 1 = no significant disability; 2 = slight disability; 3 = moderate disability; 4 = moderately severe disability; 5 = severe disability and 6 = death. This scale was also used to calculate the number of deaths.

The study was approved by the Research Ethics Committee of the School of Medicine of Botucatu (Opinion no. 477.648, December 02, 2013 and CAAE: 24188813.6.0000.5411). In accord with the Resolution CONEP 466/2012, the application of the informed consent form was dismissed, since it dealt with secondary data.

For the analysis of results, it was used the statistical analysis software SAS for Windows®, version 9.3. Initial descriptive analysis was conducted with: median calculation; standard deviation; median; quartiles for quantitative variables; frequencies and percentages for categorized variables. Comparisons between quantitative variables were carried out using the Wilcoxon signed-rank test, in case the distribution was symmetric or not. Regarding associations between categorized variables, we used the chi-squared for trend and the Mantel-Haenszel test. The significance level of 5% or corresponding p-value was applied in every test.

RESULTS

When we compared the age medians (Table 1), patients younger than 70 years old had more strokes if compared to patients older than 70 years old ($p=0.0008$). There was no statistical difference between age groups and the periods studied.

Concerning the median in the Rankin Scale, there was no statistical difference before or after the UAVC establishment, with $p = 0.1247$, as shown in Table 1. The difference will be evident when analyzed by degrees of disability, as stated in Table 2.

Table 1 - Distribution of the variables age, Rankin on the day of discharge, according to medians and periods. Botucatu, SP, Brazil, 2014 (n=245)

Variables	Before establishment of UAVC Median	After establishment of UAVC Median	p-value
Age (in years)	69	67	0.6213
Rankin* on discharge day	2	2	0.1247

*Rankin: 0 = no symptoms at all, no disability; 1 = no significant disability; 2 = slight disability; 3 = moderate disability; 4 = moderately severe disability; 5 = severe disability; 6 = dead.

When we compared the degree of after-stroke functional impairment - Modified Rankin Scale (Table 2), in the discharge day between periods, the results showed a predominance of patients with slight disability (5.88%) before the establishment of the unit. On the other hand, after establishment, the

discharge of patients with no significant disability predominated (25.21%). In addition, there was statistical significance for moderately severe disability, as stated by $p = 0.045$, indicating improvement after establishment regarding patients who leave with moderately severe disability.

Table 2: Distribution of patients, according to functional impairment degree caused by the stroke - Modified Rankin Scale in discharge and periods. Botucatu, SP, Brazil, 2014 (n=139)

Rankin on discharge day *	Before establishment of UAVC		After Establishment the UAVC		TOTAL		p-value
	n	%	n	%	n	%	
0	4	3.36	21	17.65	25	21.01	0.6972
1	4	3.36	30	25.21	34	28.57	0.2079
2	7	5.88	21	17.65	28	23.53	0.7319
3	1	0.84	14	11.76	15	12.61	0.2730
4	6	5.04	7	5.88	13	10.92	0.045
5	1	0.84	3	2.52	4	3.36	1.0
6	6	20.69	14	12.73	20	14.39	0.4299
TOTAL	29	19.33	110	80.67	139	100.00	-

*Rankin: 0 = no symptoms at all, no disability; 1 = no significant disability; 2 = slight disability; 3 = moderate disability; 4 = moderately severe disability; 5 = severe disability; 6 = dead.

According to Table 3, regarding the 20 deaths in the period, the highest percentage happened before establishment of the unit, with statistical significance ($p=0.003$).

Table 3 – Numeric distribution of deaths that occurred in the period by age group, Botucatu, SP, Brazil, 2014 (n=20)

Variables	Before establishment the UAVC		After establishment of UAVC	
	n=6	%	n=14	%
<40 years old	-	-	2	14.29
41 to 50 years old	-	-	2	14.29
51 to 60 years old	1	16.67	2	14.29
61 to 70 years old	-	-	2	14.29
71 to 80 years old	2	33.33	5	35.70
>81 years old	2	33.33	1	7.14
No information	1	16.67	-	-
TOTAL	6	100	14	100

It is worth mentioning that the six deaths in the first period took place in a total of 29 patients, representing 20.68%. In the subsequent period, the 14 deaths from a total of 110 patients corresponded to 12.72% after the unit was created.

DISCUSSION

We noticed that the profile of the studied population did not differ in both periods. In the literature consulted, we did not find similar studies that compared two different moments after structural change for this type of health care.

The Modified Rankin Scale was designed to assess the degree of independence in household chores, in addition to the performance of daily activities independently or with help.¹⁵ In our study, the degree of post-stroke functional impairment in the moment of discharge showed major disability in patients prior to the establishment. In a study with 438 patients conducted in Netherlands, within six months after the disease, 62% of patients scored moderate disability; 7%, severe disabilities; and the remaining were distributed into moderate disability and moderately severe disability.¹⁶ On the other hand, in our study, patients were discharged in better conditions both before and after the establishment. These results showed that the care organized in UAVC improved the discharge conditions of patients.

Regarding mortality, it was higher before the creation of the unit. This fact reflects that the unit

brought benefits to patients, contributing to decrease the mortality rate. In a study with 250 patients conducted in Bahia/Brazil, a total of 37 (14.8%) patients of a conventional intensive care unit was compared to 213 (85.2%) patients of a neurological intensive care unit. The number of deaths in the conventional unit was 10.8% of patients, and in the neurological, 14.5%. There was no statistical difference in deaths in the study carried out in Bahia.¹⁷ In a research conducted in Berlin/Germany, with 14 UAVC for a period of three years and with 20,677 patients, the mortality was 5.4%.¹⁸

A study conducted in Joinville (Santa Catarina/Brazil), compared general nursing with UAVC: there was no significant benefits, but a decrease in lethality after 30 days of the disease.¹⁹

A research, carried out in a public hospital, compared patients hospitalized in a neurology unit with the ones in a UAVC. It concluded that there was a reduction in mortality rate.¹⁷ The results (14.7% for the unit against 6.9% for UAVC) were similar to our results.

This research²⁰, if related to our study, demonstrated that UAVCs reduce mortality rates because they are an appropriate location for the proper treatment and care organization. The German study¹⁸, although not considering the before-after process, had a large number of UAVC evaluated with low mortality. Thus, despite the scarce literature in Brazil on UAVCs, our research showed that patients were discharged with slight disability and inde-

pendence to carry out daily activities. This reduces the social impact when returning home and to the society. Considering the aforementioned studies, the improvement of health care in units specialized for stroke treatment is stated.

According to the Modified Rankin Scale, the risk of functional impairment of discharged patients, with moderately severe disability and severe disability, before establishment of the unit was 24.13%, and after, 9.09%. This is an indicator of the quality of care provided. After the creation of the unit, due to cares received, patients left with less disabilities.

Currently, healthcare organizations are increasingly seeking the quality of care provided to users. To improve the quality, it is required a continuous evaluation of the service and care provided to the patient, through analysis of the organizational structure, work process and outcomes achieved.²¹ The hospital accreditation is responsible for managing the quality through a systematic analysis, which benefits organizations.²²

In Europe, it was carried out a quality audit to evaluate care of acute stroke patients in the following countries: Germany; Scotland; Sweden; England; Wales; and Northern Ireland. A total of 123 indicators for stroke care were identified. The outcome indicators are scarce, except for death.²³

In Germany, a standardized process has started to implement evidence-based indicators for the quality of care to stroke patients in hospitals. Twenty-four indicators were developed to reduce mortality and morbidity. The Donabedian concepts were used based on the triad structure, process and outcomes.²³

In Spain, the mortality due to stroke in 30 days was investigated. The lethality rate was 11.4%, index that is similar to our research in the findings of the stage after establishment.²⁴

The American Heart Association and American Stroke Association developed a strategy to improve the quality of care of stroke. This strategy includes guidelines for professionals on evidence-based care through performance measures. The improvement of care reduces the impact in health of the patient with stroke.²⁵

CONCLUSIONS

Based on the experience of the team in the service, in addition to the indicators studied, we can affirm that the existence of a specific unit for the care of patients with stroke added a differentiated physical structure and equipment. In addition, a

specialized team leads to a more effective, fast and specialized service, if compared to the previous situation, when the services were conducted in the emergency room.

As limitation of our study, we can highlight the lack of record of part of medical records and the loss of some, reducing the number to some analysis.

Regarding the outcome indicators, there was a statistically significant difference in the outcome of patient care with establishment of the unit concerning the degree of disability in discharge and mortality, which decreased after the establishment of the service.

We conclude that the service in the unit specialized to the stroke user has brought benefits to patients and better conditions on discharge. The organization of networks with specialized care is essential to offer the best possible quality to the user of the health system.

We observed that a UAVC with a capable multidisciplinary team implies the improvement of the quality of care to users due to significant reduction of the sequelae generated by the disease and mortality. Our study refers to others aiming to improve the service, such as continuous evaluation after reclassification of the UAVC for the Type III, more recently and may still be carried out research related to the satisfaction of the users.

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Received: May 26, 2016

Approved: May 22, 2017

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