

Clinical, sociodemographic and functional profile of individuals with cerebral aneurysm interned in a reference hospital in Salvador, Bahia, Brazil

Perfil clínico, sociodemográfico e funcional de indivíduos com aneurisma cerebral internados em um hospital de referência em Salvador/BA

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ABSTRACT | INTRODUCTION: Cerebral aneurysm (AC) is the abnormal dilation of an artery that irrigates the brain. About 3.2% of the world population has some CA with a potential risk of developing subarachnoid hemorrhage (SAH). **OBJECTIVE:** To describe the clinical, sociodemographic and functional profile of individuals with a clinical diagnosis of CA treated in Salvador / BA. **METHODS:** Observational and cross-sectional study, carried out in a reference hospital in Salvador / BA. Individuals over 18 years of age diagnosed with CA (N = 25) ruptured or not, the sociodemographic profile (age, sex, education and occupation), clinical (comorbidities, lifestyle and level of consciousness through ECG, Scale Glasgow Coma) and functional (MRC, Medical Research Council; ECT, Trunk Compromise Scale and Modified Rankin). Qualitative variables were presented by relative frequencies and quantitative variables by means of means, standard deviation or medians and minimum and maximum intervals. **RESULTS:** 13 individuals diagnosed with CA were included, with a median age of 51, 84.6% of whom were female, 30.8% were active in the labor market. 61.5% of the population had a diagnosis of non-ruptured AC and ECG 15. We observed SAH in 53.8% and obesity in 7.7%. About 61.5% were sedentary, 15.4% drinkers and 30.8% smokers. In the evaluation of functionality, the median MRC score was 54, Rankin the median was 4 and in ECT it was 19.5. **CONCLUSION:** The findings demonstrate a predominance of CA in women and functional decline of individuals during hospitalization, making interventions necessary to minimize possible functional losses in this population.

KEYWORDS: Intracranial aneurysm. International Classification of Functionality. Disability and Health. Health Profile.

RESUMO | INTRODUÇÃO: Aneurisma cerebral (AC) é a dilatação anormal de uma artéria que irriga o cérebro. Cerca de 3,2% da população mundial apresenta algum AC com potencial risco de evoluir para hemorragia subaracnóidea (HSA). **OBJETIVO:** Descrever o perfil clínico, sociodemográfico e funcional de indivíduos com diagnóstico clínico de AC atendidos em Salvador/BA. **MÉTODO:** Estudo observacional e transversal, realizado em um hospital de referência em Salvador/BA. Indivíduos maiores de 18 anos com diagnóstico de AC (N=25) roto ou não roto, foram avaliados o perfil sociodemográfico (idade, sexo, escolaridade e ocupação), clínico (comorbidades, hábitos de vida e nível de consciência através da ECG, Escala de Coma de Glasgow) e funcional (MRC, *Medical Research Council*; ECT, Escala de Comprometimento de Tronco e Rankin Modificada). Variáveis qualitativas foram apresentadas por frequências relativas e as variáveis quantitativas por meio de médias, desvio-padrão ou medianas e intervalo mínimo e máximo. **RESULTADOS:** Foram incluídos 13 indivíduos diagnosticados com AC, idade mediana de 51, sendo 84,6% do sexo feminino, 30,8% ativos no mercado de trabalho. 61,5% da população apresentou AC não roto e ECG 15. Observamos HAS em 53,8% e obesidade em 7,7%. Cerca de 61,5% eram sedentários, 15,4% etilistas e 30,8% tabagistas. Na avaliação da funcionalidade, o escore MRC mediano foi de 54, Rankin a mediana foi 4 e na ECT de 19,5. **CONCLUSÃO:** Os achados demonstram uma predominância dos AC em mulheres e declínio funcional dos indivíduos durante o internamento, tornando-se necessário intervenções que visem minimizar possíveis perdas funcionais nesta população.

PALAVRAS-CHAVE: Aneurisma intracraniano. Classificação Internacional de Funcionalidade. Incapacidade e Saúde. Perfil de Saúde.

Introduction

Cerebral aneurysm (CA) is a pathological condition described as an anatomical change in the vessel wall reaching the bloodstream. About 3.2% of the world population has some type of cerebral aneurysm with a potential risk of progressing to subarachnoid hemorrhage (SAH) or hemorrhagic stroke (HCVA)¹. In Brazil, rupture of aneurysms and SAH are the most frequent causes of death in the adult population with great potential for morbidity and mortality and hospitalization, being considered a public health problem^{1,2}. The treatment in specialized centers is the main responsible for the reduction of these rates³.

Considered as a multifactorial event, the appearance of intracranial aneurysms has family components, intrinsic and extrinsic to the individual. Evidence points out that people who have a family history of CA have a high risk of developing them, when compared to the general population. The other risk factors point to age, female gender, systemic arterial hypertension (SAH), smoking, drinking, dyslipidemia and diabetes mellitus (DM) as potential aggravating factors for the appearance of CA^{4,5}.

According to Tiensoli et al.⁶, the characterization of the population served by a given service is an available way to establish priorities and be able to carry out strategic planning that produces satisfactory results, being considered essential. It is already known that individuals with CA can present significant neurological changes that can cause important functional dysfunctions and disabilities⁷. However, there are few studies that analyzed the functional profile of individuals with CA in a hospital inpatient unit. In this context, the objective of the study was to describe the clinical, sociodemographic and functional profile of individuals admitted to a large public hospital, with a clinical diagnosis of CA.

Materials and methods

This is a cross-sectional study of a descriptive character, with consecutive convenience sampling, in which the participants were recruited in an inpatient unit of a Reference Hospital in Salvador- BA. The data were collected from a database of a larger study, entitled "Functional assessment of individuals after neurological injury in a large hospital in Salvador-BA" and was carried out from August 2017 to June 2018.

The inclusion criteria were to present a diagnosis of ruptured or non-ruptured AC (by a neurosurgeon), confirmed by image examination (computed tomography and / or magnetic resonance imaging of the skull), and over 18 years of age. Exclusion criteria were other neurological condition than AC, association of intracerebral mass lesion and / or hemorrhagic stroke or who had undergone surgery for aneurysm repair.

The study was approved by the Ethics and Research Committee (CAAE 59587316.1.0000.5028) and all participants signed the Free and Informed Consent Form (FICT) agreeing with their participation in the research.

To analyze the sociodemographic data, an interview was prepared by the authors containing information necessary to outline the profile of patients such as: age, gender, education, occupation and comorbidities (arterial hypertension, diabetes mellitus, renal failure, obesity and heart diseases) .

The Glasgow Coma Scale w (ECG) was used to test the level of consciousness. ECG is a valid, reliable and sensitive test commonly used after brain injury. The evaluated sessions are: eye opening (none, painful stimulus, to verbal stimulus, spontaneous), motor response (none, extension, abnormal flexion, withdrawal, pain location, obedience to commands), verbal response (none, incomprehensible, improper, confused, oriented)⁸.

The patient's functional profile was drawn from the collection of important data to measure the patient's level of mobility and functionality. We used the Medical Council Research (MCR) score to assess individuals' muscle strength, separated into 12 muscle groups, a total score below 48/60 designates significant weakness, and a total MCR score below 36/48 indicates severe weakness⁹.

The modified Rankin scale was used to quantify the degree of disability and functional dependence of individuals when performing activities of daily life. It is divided into six degrees, where degree zero corresponds to individuals without residual symptoms or disability and degree five to individuals with severe disability, restricted to the bed or chair and degree six, which corresponds to death¹⁰.

The presence of a deficit in trunk control was measured using the Trunk Impairment Scale (TIS). This consists of seven items that assess the verticality and abdominal strength of the individual. The score for each item ranges from 0-3, with 21 points being the maximum score. The higher the score, the less impairment trunk control¹¹.

The statistical analysis of the data was processed using the SPSS (Statistical Package for Social Sciences) software for Windows , version 16.0. A descriptive analysis of the studied variables was performed, where the qualitative variables were presented by means of relative frequencies (percentages) and the quantitative / numerical variables by means of averages, standard deviation or medians and minimum or maximum interval.

Results and discussion

The initial sample included 25 potentially eligible individuals, being examined according to inclusion criteria, where 12 individuals were excluded for having undergone AC repair surgery, which could generate bias in the results. The final sample includes data from 13 individuals actually eligible for this study . The research has limitations regarding the number of the sample and data lost in some variables investigated. The median age among the population studied was 51 (37.25 - 61.25) , with a minimum of 25 years and a maximum of 74 years. As for the prevalence between genders, 11 were female, corresponding to 84.6% of the sample. Only 4 patients (30.8%) encontravam- is active in the labor market as inconclusive as ho uveram losses. The average schooling in years was 8 (4.5000 - 9.5000), which suggests that some of the individuals did not finish high school, data described in table 1.

Table 1. Sociodemographic data

Variables	N: 13
Median Age (IQ) *	51.00 (37.25 - 61.25)
Minimum age	25
Maximum Age	74
Gender n (%)	
Male	2 (15.4)
Feminine	11 (84.6)
Median Education (IQ) *	8.0000 (4.5000 - 9.5000)
Minimum Education	3.00
Maximum schooling	12.00
Occupation n (%) *	
Retired	2 (15.4)
In activity	4 (30.8)
Unemployed	3 (23.1)

IQ, Interquartile range. Source: Prepared by the authors.

* Percentages not total due to missing data.

Analyzing the prevalence between genders, Isafías et al.¹² evaluated 51 patients from the public hospital network in Teresina, with a predominance of females with a percentage of 74.51% of the total participants in the research, where individuals aged 51 and 60 years old were most likely to develop a CA, representing 35.30% of the sample. Steinkirch et al.¹³ evaluated sociodemographic data of individuals treated at the Institute of Neurology of Curitiba (INC) with a total number of 254 patients, of whom 73.7% were women, with more prevalent ages between 50 and 59 years, corroborating the results current research.

In contrast, Faleiro et al.¹⁴ published a study of 824 individuals with a clinical diagnosis of CA admitted to the neurosurgery service in Belo Horizonte, where the prevalence was 59% male and the age group between 41 and 60 years old. A study¹⁵ suggests that females have some people factor pre-disposed to the development of aneurysms, due to its higher prevalence in the aforementioned genre.

Most of the studied population had a diagnosis of non-ruptured aneurysm N = 8 (61.5%) and preserved level of consciousness, according to an ECG assessment with a score of 15, however there were losses of this variable with a potential risk of bias. Among the investigated comorbidities, the most prevalent were SAH N = 7 (53.8%) followed by obesity N = 1 (7.7%). With regard to lifestyle, N = 8 (61.5%) were sedentary, N = 2 (15.4%) drinkers and N = 4 (30.8%) smokers, as shown in Table 2.

Table 2. Características Clínicas

Variables		N: 13
Diagnosis n (%)	Non-ruptured aneurysm	8 (61.5)
	Ruptured aneurysm	5 (38.5)
Comorbidities n (%)	SAH	
	Yes	7 (53.8)
	Not	6 (46.2)
	DM	
	Yes	-
	Not	13 (100)
	IRPA	
	Yes	-
	Not	13 (100)
	Obesity	
	Yes	1 (7.7)
	Not	12 (92.3)
Heart disease		
Yes	-	
Not	13 (100)	
Life habits n (%)	Ethics	
	Yes	2 (15.4)
	Not	11 (84.6)
	Smoking	
	Yes	4 (30.8)
	Not	9 (69.2)
	Sedentary lifestyle	
	Yes	8 (61.5)
Not	5 (38.5)	
Glasgow Median (IQ) *		15.00 (15.00 - 15.00)
Glasgow Minimum		15.00
Glasgow Maximum		15.00

SAH, Systemic arterial hypertension; DM, Diabetes Mellitus; IRPA, Acute Respiratory Insufficiency; Source: Elaborated by the authors

* Percentages not total due to missing data.

As seen in Table 2, there is a prevalence of non- ruptured aneurysms (61.5%), corroborating with Steinkirch¹³ where about 75.9% of the sample were individuals with non- ruptured aneurysms. Of the total number of the sample, 53.8% of individuals had previous SAH, reinforcing data from a study¹⁵ where SAH was mentioned in 38.21% of cases and DM in 5.69%, with no other comorbidities associated with CA . In contrast, a study demonstrated the association of CA with SAH (44%), smoking (12.4%) and dyslipidemia in (11.3%). These findings confirm a hypothesis in research associated with the etiology of aneurysms, where the initial cause for the formation of an aneurysm is still uncertain, but there is evidence¹³ that genetic and hemodynamic factors are involved. Secondly, they can be developed by atherosclerosis, vasculopathies and arteriovenous malformations (AVM), associated with risk factors such as SAH, smoking, and DM in the development and rupture of AC¹³.

Regarding the level of consciousness, literature data confirm that most individuals are admitted without significant changes punctuated by the ECG, as in a study¹² where 90.2% of the individuals had a maximum ECG score. However, the initial ECG does not predict the clinical outcome due to instability of the picture and possible t el break at the slightest effort, depending on the size and location of the CA.

In the quantitative assessment of functionality, the median of the Medical Research Council (MRC) was 54 (41 - 60) indicating that most individuals had their muscle strength preserved at the time of assessment. On the Modified Rankin Scale (ERM), the median found was 4.00 (1.00 - 5.00), suggesting that most individuals had moderate disability during hospitalization. The trunk evaluation performed by ECT , obtained a median of 19.50 (0.00 - 21.00), however there was a loss of these data, with a risk of bias.

Table 3. Functional profile

Variables	N: 13	
MRC Median (IQ) *	54.00 (41.00 - 60.00)	
Minimum MRC	13	
Maximum MRC	60	
MRC n (%) *		
	13	1 (7.7)
	38	1 (7.7)
	50	1 (7.7)
	54	2 (15.4)
	60	3 (23.1)
RANKIN Median (IQ)	4.00 (1.00 - 5.00)	
Minimum RANKIN	0	
Maximum RANKIN	5	
RANKIN n (%)		
	Asymptomatic	2 (15.4)
	Symptomatic without disability	4 (30.8)
	Moderate to severe disability	1 (7.7)
	Severe disability	6 (46.2)
Median ECT (IQ) *	19.50 (0.00 - 21.00)	
Minimum ECT	0	
Maximum ECT	21	
ECT n (%) *		
	16	1
	18	1
	21	5

MRC, Medical Research Council ; ECT, Trunk Compromise Scale. Source: Elaborated by the authors

* Percentages not total due to missing data.

There are few studies that relate the profile and functional outcome of patients with AC. It is known that the main consequence of an aneurysm rupture is subarachnoid hemorrhage (SAH) that can be quantified according to severity using the Fisher scale and tomographic findings using the Hunt-Hess scale.

Mocco et al.¹⁶ called the motor deficits associated with CA in hemiplegia and hemiparesis, secondary to rupture or vasospasm. The exact motor deficits depend on the location of the aneurysm, the subsequent bleeding and the intensity of the bleeding. One study¹⁷ found deficits pre-engines loved in 31.1% of hospitalized individuals by CA corroborating another study¹² which was observed the increase in the number of non-walkers at discharge, expressed the missing gear score 15.69% individuals at admission and 27.45% at hospital discharge.

On the other hand, a study¹⁸ with 13 individuals evaluated data from the Functional Independence Measure (FIM) in the cognitive and motor domains, with improvement of these domains being observed during hospitalization, expressed by an average score of 33.23 at admission and 60.85 points at discharge. The justification for the improvement of motor deficits is the outcome in the postoperative period of clipping or embolization of the CA¹².

Final considerations

According to the data contained here, we observed a predominance of cerebral aneurysms in women, containing variables that need to be better studied to determine the possible causes of this finding. Another important point is to stress the functional decline of patients in the in-hospital environment in individuals with CA, which can be explained by aneurysmal rupture, vasospasm, or immobility. This functional decline can be progressive and / or persist over months and years in cases of individuals with SAH, longitudinal studies are needed to investigate this fact in individuals with non-ruptured CA, and possible physiotherapeutic measures to minimize these functional damages.

Author contributions

Oliveira VCS participated in the design, search, statistical analysis of the research data, interpretation of results and writing of the scientific article. Santos AP participated in the design, search, interpretation of results and writing of the scientific article. Castro IPR participated in the design, collection of research data, interpretation of data, design and writing of the scientific article. Anjos JLM participated in the design, collection of research data and interpretation of the data.

Competing interests

No financial, legal or political conflicts involving third parties (government, companies and private foundations, etc.) have been declared for any aspect of the submitted work (including, but not limited to, grants and funding, participation in advisory council, study design, preparation of manuscript, statistical analysis, etc.).

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