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Research Article

The Relationship between Hemifacial Spasm and Systemic Arterial Hypertension

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Abstract

Introduction: Hemifacial spasm (HFS) is a movement disorder characterized by abnormal and involuntary movements of the face. The primary or idiopathic (HFSp) has no established cause. Systemic arterial hypertension (HY) is referred to as a risk factor related to the development of HFS. Nevertheless, there is a more recent tendency to deny the cause and effect relationship between hypertension and HFS. This trend was reported by case-control studies conducted in 2016.

Objective: To assess the frequency of systemic arterial hypertension in people with idiopathic HFS.

Method: We analyzed, retrospectively, 60 charts of all patients diagnosed with HFS who were treated with botulinum toxin in a university hospital.

Results: We found that the proportion of hypertensive patients was statistically higher in the HFSp group compared to the control group, without HFS (p = 0.012). This trend was significant among men (p = 0.023) and in the age group from 30 to 59 years (p = 0.016).

Conclusion: In our sample, HY more frequently and significantly impaired in people with HFSp.

Keywords: *Hemifacial Spasm; Primary Hemifacial Spasm; Idiopathic Hemifacial Spasm; Secondary Hemifacial Spasm; Systemic Arterial Hypertension*

Abbreviations

HFS: Hemifacial Spasm; HFSp: Primary Hemifacial Spasm; HUAP: Antônio Pedro University Hospital; HY: Systemic Arterial Hypertension; UFF: Fluminense Federal University

Introduction

Hemifacial spasm (HFS) is a movement disorder characterized by abnormal and involuntary movements of the face, of recurrent and irregular type, manifested by clonic tremors and tonic contractions. The movements affect the muscles innervated by the facial nerve, on one side of the face only (exceptionally bilateral) and, in most cases, persist during sleep. There is the other Babinski sign, in which the orbicularis muscles of the eye and frontal (inner portion) contract at the same time resulting in the concomitant movement of eye closure and eyebrow lift. It predominates after 40 years of age [1,2]. It has an average worldwide prevalence of 11/100,000 and affects twice as

more women than men [3]. It is classified as primary (HFSp) and secondary. The primary or idiopathic has no established cause or arises from compression of the facial nerve by a vessel of the vertebrobasilar system. The secondary can be a complication of peripheral facial paralysis or be caused by nerve damage, from its pontine nucleus to its outer portion to the central nervous system, for various reasons (e.g. trauma, tumor compression, and ischemia). In the rare mode may be hereditary [4]. The neuromuscular blockade of the musculature involved with botulinum toxin type A of the involved musculature is the gold standard of symptomatic treatment of HFS [5]. Among the risk factors related to the development of HFS is systemic arterial hypertension (HY) [6]. Among other theories, it is suggested that the dolichoectasia of arteries of the vertebrobasilar system caused by HY may cause compression of the facial nerve and consecutively the HFS [7]. However, this correlation between HY, neural compression, and HFS has been questioned [8]. There are descriptions of cases in which HY precedes HFS [9]. Nevertheless, there is a more recent tendency to deny the cause and effect relationship between hypertension and HFS. This trend was reported by case-control studies conducted in 2016 [8,10].

The clinical manifestation of HFS occurs on the patient's face and, therefore, is easily seen by the physician. In addition, it is probably associated with HY. However, none of the 73 Pubmed articles (1963 to 2018) correlating HFS with HY originated from journals related to cardiology or nephrology, medical specialties traditionally linked to the HFS study. Almost all studies have been published in journals of neurology, neurosurgery or neuroradiology [11]. Also, medical and lay-oriented articles do not link the HFS as a possible complication of HFS [12].

The HY affects approximately 32.5% of the Brazilian population and 28% of the inhabitants of the State of Rio de Janeiro and, in both cases, is more common starting at the fifth decade of life [13]. According to the conclusions of numerous studies, it is related to serious diseases, such as acute myocardial infarction and stroke, the predominant causes of death in this region [14].

Objective

To assess the frequency of systemic arterial hypertension in people with idiopathic HFS.

Methods

We retrospectively evaluated 60 charts of all patients with a diagnosis of HFS who were treated between January 2000 and December 2014 in the neuromuscular block area of the ambulatory of the movement disorder (neurology service of the Antônio Pedro University Hospital (HUAP), Fluminense Federal University (UFF), Niterói, Rio de Janeiro, Brazil). The data (age, gender, and the existence of HY) were obtained according to a questionnaire developed by the researchers. We considered as hypertensive the individual who had the following information in the medical record: medical diagnosis of hypertension or information by the patient suffering from HY together with proof of medical treatment for both. In order to determine the diagnosis of hemifacial spasm, we used the concept mentioned earlier in the introduction.

Inclusion criteria: All records referring to those with a diagnosis of HFS treated in the neuromuscular block area (cases) without alterations of the facial nerve, or of the pathways that give rise to the image examination (Computerized axial tomography, magnetic resonance imaging or cerebral angiography) of any cause except those in which facial nerve compression, occurred by increasing the vascular volume of some vessel of the vertebrobasilar system. For the controls, the charts were obtained from other sectors of neurology (with the exception of the outpatient clinic of cerebrovascular diseases and patients with vascular dementia attended in the outpatient clinic of cognitive neurology).

Exclusion criteria: Absence of information on age and/or gender in the medical record and injury or dysfunction of the facial nerve on the same side n which manifested the HFS. We opted to exclude those with alteration of the facial nerve, or of the pathways that originate it, from any cause, described in the clinical examination. We carried out the pairing of cases, those who formed the group of people with HFSp, after application of the exclusion criteria, with the controls with respect to gender and age.

We divided the ages into age groups of 18 to 29, 30 to 59, 60 to 64, 65 to 74 and 75 years, according to the National Health Survey (PNS 2013), carried out by the Brazilian Ministry of Health together with the Brazilian Institute of Geography and Statistics, a Brazilian (national) population study on prevalence and assistance to chronic diseases, among them the HY [15].

We used Chi-square tests (categorical variables - hypertension and gender) and student T (ordinary-age variable). We considered significant $p < 0.05$.

The study was approved by the research ethics committee of the Antonio Pedro University Hospital of the Fluminense Federal University, Niterói, Rio de Janeiro, Brazil (CAAE - 73671817.3.0000.5243, number: 2.362.451).

Results

We evaluated a total of 60 medical records. Fourteen (23.33%) were excluded: two the age was unknown and 12 manifested peripheral facial paralysis (PFP).Only two of the fourteen (16.6%) had HY. Nine of those with PFP manifested in the idiopathic form. In another three, there was a cause for paralysis. One showed Ramsay-Hunt syndrome, another post-surgical lesion of the facial nerve (abscess drainage), and a third due to a vascular lesion of uncertain topography. Therefore, our sample consisted of records of 46 individuals with HFSp. The control group consisted of 46 cases: 1 case of optic neuromyelitis, 1 of idiopathic optic neuritis, 7 of migraine, 1 post-traumatic headache, 5 of multiple sclerosis, 3 of specific task dystonia (cramp of the scrivener), 7 of Parkinson's disease, 1 of spinal cord cerebellar degeneration of type 3, 1 of essential tremor, 1 of progressive supranuclear palsy, 1 of cortico-basal degeneration, 3 of blepharospasm, 1 of Whipple's disease, 2 of severe myasthenia, 6 of epilepsy, 1 of motor neuropathy with multifocal conduction block, 1 of diabetic neuropathy, 1 multiple cranial neuropathy, 1 myopathy per inclusion corpuscle, 1 of polymyositis (Figure 1).

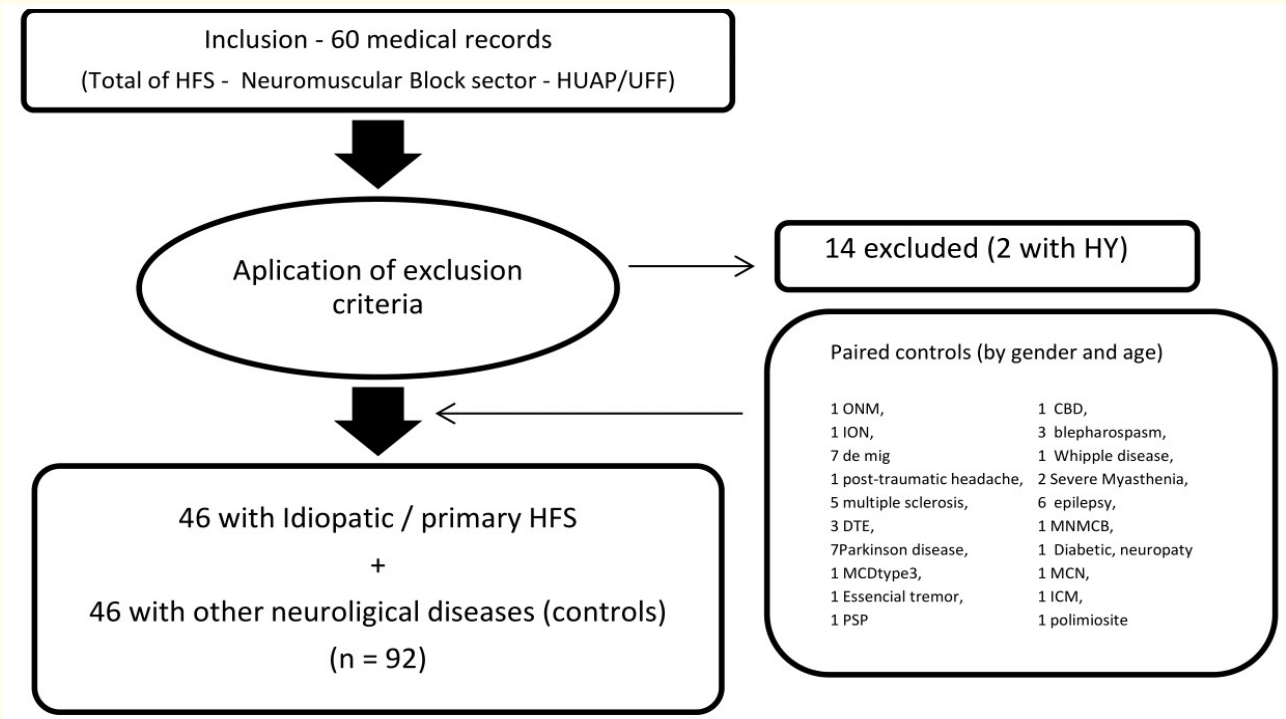

Figure 1: *Sample studied (n = 92).*

HFS: Hemifacial Spasm; HUAP: Universitary Antônio Pedro Universitary Hospital; UFF: Fluminense Federal University; HY: Systemic Arterial Hypertension; ONM: Optic Neuromyelitis; ION: Idiopathic Optic Neuritis; STD: Specific Task Dystonia (Scrivener's Cramp); MCD: Medullary Cerebellar Degeneration; PSP: Progressive Supranuclear Palsy; CBD: Cortico-Basal Degeneration; MNMCB: Motor Neuropathy with Multifocal Conduction Block; MCN: Multiple Cranial Neuropathy; ICM: Inclusion Corpuscle Myopathy.

The pairing of age and gender in 92 medical records that were evaluated (46 with HFSp and 46 without HFS) was ideal since there is no statistically significant difference of these variables. The proportion of females (n = 64) with and without HFSp was 69.57% (p = 1) and in the male gender (n = 28) with HFSp and without HFS 30.43% (p = 1). Among those with HFSp, there were 32 women for 14 men (ratio of 2.28 women for 1 man).

Age ranged from 30 to 75 years and their mean age with and without HFS was 52.9 years (dp = 10 and p = 1). However, there was a concentration in most of the individuals in the age group of 30 to 59 years (36 cases with HFSp and 36 without HFS) and few between 60 and 64 (2 cases with HFSp and 2 cases with HFS), 65 to 74 (7 cases with HFSp and 7 without HFS) and ≥ 75 years (1 case with HFSp and 1 case without HFS).

The comparison between the occurrence or not of hypertension in the groups with and without HFSp (general form, age, and gender) is shown in table 1. We found that the proportion of hypertensive patients was statistically higher in the HFSp group compared to the control group, without HFS (p = 0.012). This trend was significant among men (p = 0.023) and in the age group from 30 to 59 years (p = 0.016).

Hypertensive	With HFSp (cases) (n= 46) (absolute number and percentage of those with HY)	Without HFS (controls) (n = 4) (absolute number and percentage of those with HY)	p value
Total of individuals	27 (58,70%)	15 (32,61%)	0,012
Age group (years)			
18 - 29	0 (0%)	0 (0%)	nr
30 - 59	19 (52,78%)	9 (25%)	0,016
60 - 64	1 (50%)	2 (100%)	0,248
65 - 74	6 (85,71%)	4 (57,14%)	0,237
≥ 75	1 (100%)	0 (0%)	0,157
Gender			
Female	17 (53,13%)	11 (34,38%)	0,131
Male	10 (71,43%)	4 (28,57%)	0,023

Table 1: *Sample analysis of 92 cases (46 with idiopathy/primary Hemifacial Spasm and 46 without Hemifacial Spasm). HFSp: Idiopathic/Primary Hemifacial Spasm; HY: Systemic Arterial Hypertension; nr: Not Rated*

Five of those with HFSp manifested complications from HY - two had acute myocardial infarction; one, stable angina; one, unspecified angina and one, three aneurysms in the aorta/common iliac artery. An excluded medical record referred to a patient with lacunar infarction and HY.

Discussion

Our study found a high frequency of HY in patients with HFS in its primary form, or idiopathic (58.70%), being significantly higher than in those without HFS (p = 0.012). Our excluded group seems to corroborate this result. Of the fourteen, twelve manifested secondary HFS and only two manifested HY. These results are similar to those observed in the last meta-analysis on the subject [6]. However, the work referred to by that refers to a doctor's visit between 2000 and 2014, as well as the demographic studies it evaluates, correspond to the HFSp or the HFS without distinction, that is, they jointly analyze the primary and secondary forms. When we look at the most recent case-control studies published in 2016, we find results that are opposite to ours. A study conducted by Ohta., et al. compared the prevalence of risk factors for atherosclerosis among 111 Japanese with HFS and controls without HFS, with no significant differences. Specifically on HY, it prevailed proportionately more in people who did not manifest HFS, rather than among those with HFS [16]. Several studies conducted between 2000 and 2016, case-control types [17-19], have different conclusions. Among the most recent, Edmond and his colleagues evaluated 40 individuals with HFS and did not find a significant difference between them and the controls regarding the

frequency of HY [8]. Rudzińska., *et al*. observed similarities in the prevalence of HY in individuals with primary HFS (n = 60) and controls without HFS [10]. In Brazil, a series of retrospective analyzes of 145 HFS cases failed to demonstrate the difference between primary and secondary HFS (post-facial paralysis) in association with HY [19].

Limitations of the Study

Our study is retrospective and was conducted on a small sample size. It was performed at a specialized university hospital service, rather than a population assessment. People attended in specialized centers tend to be more serious, with more morbidities, than those accompanied by basic health services. Consequently, they suffer more from chronic diseases, such as HY. Therefore, there may have been an overestimation of the cases with HY. There was a lack of homogeneity in the age distribution of our sample.

Conclusion

The proportion of hypertensive individuals was higher in the HFSp group than in the control group, with no HFS ($p = 0.012$), and this tendency was significant among males ($p = 0.023$) and in the 30 - 59 age group ($p = 0.016$).

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