Folia Cardiologica 2017
tom 12, nr 2, strony 138–142
DOI: 10.5603/FC.2017.0021

ISSN 2353–7752

Recent history of syncope in patients with significant carotid stenosis

Niedawno przebyte omdlenia u pacjentów z istotnym zwężeniem tętnic szyjnych

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Abstract

Introduction. Syncope is a transient loss of consciousness due to a decrease in cerebral perfusion. The aim of the study is to evaluate the incidence of syncope within 2 years before the finding of significant carotid stenosis and to seek the relationship between syncope occurrence and clinical and ECG parameters.

Material and methods. The study group consisted of 78 patients (31 women and 47 men aged 65.4 ± 7.7 years) admitted to the Department of Vascular Surgery in order to perform the surgery because of significant carotid stenosis. The studied patients were interviewed for syncopal history and risk factors for cardiovascular diseases. Moreover, a 12-lead resting electrocardiogram was performed.

Results. In the study group 20 (25.6%) patients reported at least one faint, 7 (9%) patients reported a faint in the past 2 years. The subgroups distinguished in the basis of syncopal history in the past 2 years did not differ significantly in terms of the assessed demographic and clinical parameters. In the group of patients with syncope in the past 2 years, there was significantly more patients with QRS ≥ 120 ms than the other patients.

Logistic regression analysis showed that the only parameter associated with syncope in the past 2 years has been QRS width ≥ 120 ms odds ratio (OR): 18.9; 95% confidence interval (CI) 2.4–147.4 (p = 0.005).

Conclusions. 1. Syncope during the past 2 years occurs in almost 10% of patients qualified for carotid artery surgery. 2. The parameter associated with syncope in the past two years is widened QRS complex indicating a cardiac cause of syncope. 3. Gathering information about recent loss of consciousness in patients qualified for vascular surgery on the carotid arteries can have important implications for the planning further cardiological diagnostics.

Key words: syncope, carotid stenosis

Folia Cardiologica 2017; 12, 2: 138–142

Introduction

Syncope is a transient loss of consciousness due to a decrease in cerebral perfusion [1]. Currently, it is considered that the decrease in cardiac output and/or peripheral vasodilation or lack of expected vasoconstriction may be the basis for such an event. Atherosclerotic stenosis of the carotid artery does not lead to a transient decrease in blood

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flow in the brain, so it cannot lead to syncope [1]. Therefore, carotid ultrasound examination is not recommended in patients with syncope [2–5]. On the other hand, it cannot be ruled out that patients with carotid artery stenosis may be more likely to experience syncope due to the decrease in cardiac output.

Determining the mechanism of syncope in individual patients is a very challenging task because it may be caused by various coexisting factors [1]. However, typical circumstances and prodromal symptoms preceding syncopal episodes or the presence of electrocardiographic changes suggestive of structural heart disease may indicate the reflex or cardiogenic mechanism, respectively.

The aim of the study is to evaluate the incidence of syncope in the last 2 years in patients with carotid artery stenosis eligible for surgical treatment and to seek the relationship between syncope occurrence and clinical and ECG parameters.

Material and methods

Study group

The study group consisted of patients admitted to the Department of Vascular Surgery for the surgical treatment of 50–99% symptomatic carotid artery stenosis or 70–99% asymptomatic carotid artery stenosis according to NASCET [6]. In all patients medical history data were collected regarding previous syncopal episodes, tobacco smoking and coexisting diseases such as diabetes, a history of myocardial infarction or stroke, transient ischemic attack, myocardial revascularization and hypertension. Additionally, the patients' age and gender as well as basic electrocardiographic parameters, such as heart rhythm, ventricular rate, P-wave and QRS complex duration, P-R and Q-T intervals, were recorded. The patients in whom medical review data could not be obtained due to speech impairment following stroke were excluded from the study.

For patients with syncope, the age at which the first syncopal episode occurred and the circumstances immediately before syncope, the position of the body and the absence or presence of prodromal symptoms were recorded. Patients were divided into 2 subgroups: those who had syncopal episode in the past 2 years (Group 1) and those who had no syncope in the past 2 years (Group 2).

The study received the approval of the Bioethics Committee. All patients were informed about the purpose of the study and consent was obtained for their participation in the study.

Statistical analysis

Continuous variables were expressed as mean and standard deviation and compared using parametric or nonparametric tests, depending on the distribution of variables.

Discrete variables were presented as numbers and percentages and compared using Yates' χ^2 test, as indicated by the small number of subgroups.

The logistic regression analysis for the dependent variable of syncope over the last 2 years was performed using as independent variables the parameters that in the univariate analysis were different in the analyzed subgroups, with $p < 0.15$. Statistical significance was assumed at $p < 0.05$.

Results

Syncopal history

In the study group, 20 (25.6%) patients reported having a syncopal episode in their lives and 7 (9%) patients reported syncope in the past 2 years. In Group 1 the first syncope occurred at the age of 68.8 ± 12 years. These patients were significantly older at the time of first syncopal episode than patients with a history of loss of consciousness who had no syncope in the past 2 years (first syncope at 31 ± 20 years) ($p < 0.001$).

Patients with a history of syncope over the past 2 years reported unconsciousness in the following circumstances: 4 patients — suddenly in standing or sitting, without prodromal symptoms; 1 patient — while coughing; 1 patient — when suddenly getting up and 1 in lying position. None of patients in this group had syncope at the sight of blood, during injection or instrumentation, which in the group of patients without syncope in the last 2 years occurred in 7 out of a subgroup of 13 patients who had at least 1 syncope in life ($p = 0.055$).

Clinical data

Table 1 shows a comparison between patients with syncope in the past 2 years (Group 1) and patients who did not experience syncope (Group 2) over this time. Study groups did not differ significantly in terms of demographic and clinical parameters.

Table 2 shows the electrocardiographic parameters in the study groups. A QRS complex with duration of ≥ 120 ms was reported in 6 patients: in 1 patient as a result of ventricular pacing, in 1 patient due to right bundle branch block and 4 patients due to left bundle branch block. There was a significantly higher proportion of patients with a QRS duration ≥ 120 ms in a group of patients who experienced syncope in the past 2 years than in those without syncope during this time.

Logistic regression analysis

The logistic regression analysis showed that the only parameter associated with syncope over the past 2 years was a QRS complex ≥ 120 ms (odds ratio [OR]: 18.9; 95% confidence interval [CI] 2.4–147.4, $p = 0.005$).

Table 1. The demographic and clinical parameters of patients with a history of syncope in last two years (Group 1) and of patients who did not experience syncope during this time (Group 2)

Parameter	Group 1	Group 2	p-value
Age, n [%]	69.1 ± 12.3	65.1 ± 7.2	0.18
Male gender, n [%]	6 (86)	41 (57)	0.15
Syncope at the sight of blood, during injections or instrumentations, n [%]	0 (0)	7 (10)	0.39
Syncope ever in life, n [%]	7 (100)	13 (18)	< 0.001
Diabetes, n [%]	1 (14)	24 (34)	0.30
Myocardial infarction, n [%]	1 (14)	13 (18)	0.79
Stroke, n [%]	4 (57)	35 (49)	0.71
TIA, n [%]	1 (14)	11 (15)	0.93
Myocardial revascularization, n [%]	1 (14)	11 (15)	0.93
Smoking, n [%]	7 (100)	66 (93)	0.49
Hypertension, n [%]	7 (100)	59 (83)	0.24
Atrial fibrillation, n [%]	1 (14)	12 (17)	0.86
Peacemaker, n [%]	1 (14)	1 (1)	0.42
Stenosis of both carotid arteries or stenosis of one carotid artery and total occlusion in the second one, n [%]	2 (29)	20 (28)	0.98

TIA — transient ischemic attack

Table 2. Comparison of electrocardiographic parameters in the group of patients with a history of syncope in the past two years (Group 1) compared to those who did not experience syncope during this time (Group 2)

Parameter	Group 1 n = 7	Group 2 n = 71	p-value
Sinus rhythm, n [%]	6 (86)	68 (96)	0.25
Paced rhythm, n [%]	1 (14)	0 (0)	0.15
Atrial fibrillation, n [%]	0 (0)	3 (4)	0.63
P wave [ms]	111 ± 11	103 ± 15	0.21
QRS width [ms]	106 ± 30	90 ± 19	0.036
P-R interval [ms]	159 ± 20	164 ± 27	0.66
Q-T interval [ms]	376 ± 44	385 ± 49	0.66
R-R interval [ms]	853 ± 156	905 ± 172	0.45
QRS ≥ 120 ms, n [%]	3 (43)	3 (4)	0.004

Discussion

The first observation of the study is that nearly 10% of patients who are qualified to vascular surgery for extracranial carotid artery stenosis have had syncope during the past 2 years.

In the Framingham study, the incidence of syncope was 0.6% per 1000 inhabitants per year. In the analyzed population, the proportion of patients who had syncope in the past 2 years is significantly higher, which may be due to the fact that the study population is significantly more affected by factors that may cause syncope than the general population [7]. Another important factor may be the clinical practice of referring patients after syncopal episode for carotid ultrasound imaging that may reveal significant severe carotid artery stenosis coexisting with other cause of syncope and lead to an increased rate of syncope among those referred for vascular surgery [2–5].

Studies on the incidence of carotid artery stenosis in a population of patients referred for carotid ultrasound have shown that it is very rare in this population and therefore is not cost-effective [2–5].

The multivariate analysis revealed that among studied variables the only parameter associated with syncope over the past 2 years was a QRS complex ≥ 120 ms.

The relationship between prolongation of QRS duration and syncope over the past 2 years with no link to syncope occurrence throughout life indicates the cardiac origin of these episodes. Abnormal ECG, including widened QRS complex, is a commonly accepted indicator of cardiac syncope [8–15].

The results are consistent with the findings of other authors indicating an increased incidence of cardiac syncope in elderly patients. Reflex syncope may be associated with prolonged hypotension [16], which in turn may lead to severe neurological complications in patients with significant carotid artery stenosis; therefore, these patients may be less numerous among those referred for surgical treatment of carotid artery stenosis.

In the study group, a block of one of the bundles was found in 5 (6.4%) patients and the left bundle branch block was more prevalent. In the general population, the rate of bundle branch blocks is lower and more frequent is the right bundle branch block [17]. In the case of syncope in a patient with a left bundle branch block, it is likely that the syncope may result from the paroxysmal atrioventricular block [18]. The results of this study indicate the need for careful examination of patients with syncope and significant carotid artery stenosis so as not to miss the cardiac origin of syncope.

A detailed interview and its critical analysis is particularly important for the treatment of patients with "symptomatic" internal carotid artery stenosis of 50–69% in whom syncope is the only symptom. They should be subjected to imaging and neurological diagnostics, because no focal lesion is indicative of asymptomatic stenosis, and therefore indications for angiosurgery are lacking.

Conclusions

1. Syncope during the past 2 years occurs in almost 10% of patients qualified for carotid artery surgery. 2. The parameter associated with syncope in the past two years is widened QRS complex, which indicates the cardiac cause of syncope. 3. Gathering information about previous episodes of loss of consciousness in patients qualified for carotid artery surgery may have important implications for the planning of further cardiological diagnostics.

Conflict of interest(s)

None declared.

Streszczenie

Wstęp. Omdlenie jest to krótkotrwała utrata przytomności spowodowana spadkiem perfuzji mózgu. Celem badania jest ocena częstości występowania omdleń w okresie 2 lat przed zakwalifikowaniem pacjenta do zabiegowego leczenia zwężenia tętnic szyjnych oraz poszukiwanie parametrów klinicznych i elektrokardiograficznych powiązanych z wystąpieniem omdlenia.

Materiał i metody. Grupę badaną stanowiło 78 pacjentów (31 kobiet i 47 mężczyzn w wieku 65,4 ± 7,7 roku) kliniki chirurgii naczyniowej przyjętych w celu leczenia zabiegowego istotnego zwężenia tętnic szyjnych. Od badanych pacjentów zebrano wywiad dotyczący występowania omdleń i czynników ryzyka chorób układu sercowo-naczyniowego oraz analizowano u nich zapis 12-odprowadzeniowego spoczynkowego elektrokardiogramu.

Wyniki. W badanej grupie omdlenie kiedykolwiek w życiu podało w wywiadzie 20 (25,6%) pacjentów, 7 (9%) pacjentów podało przebycie utraty przytomności w ostatnich 2 latach. Badane grupy, wyodrębnione na podstawie wywiadu omdleniowego w ciągu ostatnich 2 lat, nie różniły się istotnie pod względem badanych parametrów demograficznych i klinicznych. Wśród pacjentów z omdleniem w ciągu ostatnich 2 lat był istotnie większy odsetek osób, u których czas trwania zespołu QRS dłuższy lub równy 120 ms niż wśród pacjentów bez omdleń w ostatnich 2 latach. Analiza regresji logistycznej wykazała, że jedynym parametrem powiązanym z wystąpieniem omdlenia w ciągu 2 ostatnich lat była szerokość zespołu QRS 120 ms lub więcej; iloraz szans (OR): 18,9; 95-procentowy przedział ufności CI 2,4–147,4 (p = 0,005).

Wnioski. 1. Omdlenie w okresie 2 ostatnich lat występuje u prawie 10% pacjentów zakwalifikowanych do zabiegu chirurgicznego na tętnicach szyjnych. 2. Parametrem powiązanym z wystąpieniem omdlenia w ostatnich 2 latach jest poszerzenie zespołu QRS, co wskazuje na sercową przyczynę tych omdleń. 3. Zebranie wywiadu dotyczącego przebytych omdleń u pacjentów kwalifikowanych do zabiegu naczyniowego na tętnicach szyjnych może mieć ważne znaczenie dla planowania u tych pacjentów dalszej diagnostyki kardiologicznej.

Słowa kluczowe: omdlenie, zwężenie tętnicy szyjnej

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References

1. Moya A, Sutton R, Ammirati F, et al. Task Force for the Diagnosis and Management of Syncope, European Society of Cardiology (ESC), European Heart Rhythm Association (EHRA), Heart Failure Association (HFA), Heart Rhythm Society (HRS). Guidelines for the diagnosis and management of syncope (version 2009). Eur Heart J. 2009; 30(21): 2631–2671, doi: 10.1093/eurheartj/ehp298, indexed in Pubmed: 19713422.
2. Kadian-Dodov D, Papolos A, Olin JW. Diagnostic utility of carotid artery duplex ultrasonography in the evaluation of syncope: a good test ordered for the wrong reason. Eur Heart J Cardiovasc Imaging. 2015; 16(6): 621–625, doi: 10.1093/ehjci/jeu315, indexed in Pubmed: 25669837.
3. Barvalia M, Silber D, DiVita M, et al. Utility of carotid duplex ultrasonography in a general inner-city hospital. Cardiovasc Ultrasound. 2014; 12: 48, doi: 10.1186/1476-7120-12-48, indexed in Pubmed: 25422167.
4. Johnson PC, Ammar H, Zohdy W, et al. Yield of diagnostic tests and its impact on cost in adult patients with syncope presenting to a community hospital. South Med J. 2014; 107(11): 707–714, doi: 10.14423/SMJ.0000000000000184, indexed in Pubmed: 25365440.
5. Scott JW, Schwartz AL, Gates JD, et al. Choosing wisely for syncope: low-value carotid ultrasound use. J Am Heart Assoc. 2014; 3(4), doi: 10.1161/JAHA.114.001063, indexed in Pubmed: 25122665.
6. Liapis CD, Bell PR, Mikhailidis D, et al. ESVS Guidelines Collaborators. ESVS guidelines. Invasive treatment for carotid stenosis: indications, techniques. Eur J Vasc Endovasc Surg. 2009; 37(4 (Suppl)): 1–19, doi: 10.1016/j.ejvs.2008.11.006, indexed in Pubmed: 19286127.
7. Soteriades ES, Evans JC, Larson MG, et al. Incidence and prognosis of syncope. N Engl J Med. 2002; 347(12): 878–885, doi: 10.1056/NEJMoa012407, indexed in Pubmed: 12239256.
8. Goyal P, Maurer MS. Syncope in older adults. J Geriatr Cardiol. 2016; 13(5): 380–386, doi: 10.11909/j.issn.1671-5411.2016.05.002, indexed in Pubmed: 27594863.
9. Junttila MJ, Brugada P, Hong K, et al. Differences in 12-lead electrocardiogram between symptomatic and asymptomatic Brugada syndrome patients. J Cardiovasc Electrophysiol. 2008; 19(4): 380–383, doi: 10.1111/j.1540-8167.2007.01050.x, indexed in Pubmed: 18081770.
10. Pu JI, Wang Ht, Liu Tk, et al. [Clinical and ECG features of arrhythmogenic right ventricular cardiomyopathy: a retrospective analysis of 31 cases]. Zhonghua Xin Xue Guan Bing Za Zhi. 2007; 35(1): 24–27, indexed in Pubmed: 17386159.
11. Dao DT, Hollander SA, Rosenthal DN, et al. QRS prolongation is strongly associated with life-threatening ventricular arrhythmias in children with dilated cardiomyopathy. J Heart Lung Transplant. 2013; 32(10): 1013–1019, doi: 10.1016/j.healun.2013.06.007, indexed in Pubmed: 23932443.
12. Guttigoli AB, Wilner BF, Stein KM, et al. Usefulness of prolonged QRS duration to identify high-risk ischemic cardiomyopathy patients with syncope and inducible ventricular tachycardia. Am J Cardiol. 2005; 95(3): 391–394, doi: 10.1016/j.amjcard.2004.09.040, indexed in Pubmed: 15670551.
13. Kalahasti V, Nambi V, Martin DO, et al. QRS duration and prediction of mortality in patients undergoing risk stratification for ventricular arrhythmias. Am J Cardiol. 2003; 92(7): 798–803, indexed in Pubmed: 14516879.
14. Dovgalyuk J, Holstege C, Mattu A, et al. The electrocardiogram in the patient with syncope. Am J Emerg Med. 2007; 25(6): 688–701, doi: 10.1016/j.ajem.2006.12.016, indexed in Pubmed: 17606095.
15. Marine JE. ECG Features that suggest a potentially life-threatening arrhythmia as the cause for syncope. J Electrocardiol. 2013; 46(6): 561–568, doi: 10.1016/j.jelectrocard.2013.07.008, indexed in Pubmed: 23973090.
16. Ungar A, Rivasi G, Rafanelli M, et al. Safety and tolerability of Tilt Testing and Carotid Sinus Massage in the octogenarians. Age Ageing. 2016; 45(2): 242–248, doi: 10.1093/ageing/afw004, indexed in Pubmed: 26833302.
17. Monin J, Bisconte S, Nicaise A, et al. Prevalence of Intraventricular Conduction Disturbances in a Large French Population. Ann Noninvasive Electrocardiol. 2016; 21(5): 479–485, doi: 10.1111/anec.12331, indexed in Pubmed: 26681126.
18. Assadian Rad M, Farahani M, Emkanjoo Z, et al. Predicting the outcome in patients with unexplained syncope and suspected cardiac cause: role of electrophysiologic studies. Anatol J Cardiol. 2015; 15(3): 213–217, doi: 10.5152/akd.2014.5306, indexed in Pubmed: 25333981.