World Bulletin of Public Health (WBPH)
Available Online at: https://www.scholarexpress.net
Volume-40, November 2024
ISSN: 2749-3644

THE IMPORTANCE OF ULTRASOUND RESEARCH METHODS IN THE DIAGNOSIS OF PATIENTS WITH PATHOLOGICAL DEFORMITIES OF THE INTERNAL SLEEP ARTERY

Tursunov Botir Qodirovich
Candidate of Medical Sciences, Associate Professor
Yakubov Nodirbek Ilhomjon o'g'li
Candidate of Medical Sciences,
Andijan State Medical Institute
Andijan, Uzbekistan

Article history:

Received: September 14th 2024
Accepted: October 10th 2024

Abstract:

In the structure of total mortality, cerebrovascular stroke ranks second and is the leading cause of disability in the population. Prevention of stroke and reduction of disability in this disease is possible as a result of work in two directions: the introduction of effective methods of prevention and improvement of the system of medical care for patients using new high-tech effective methods of treatment and diagnosis. The need for surgical intervention in patients with pathological deformity implies the presence of clear indications for surgical treatment, primarily on the basis of determining the hemodynamic significance of tortuosity. However, "unlike atherosclerotic lesions, which were the subject of extensive multicenter studies, and as a result of which clear generally accepted conclusions and recommendations were obtained, no such studies have been conducted on the problem of PD of the branches of the aortic arch, and indications for surgical treatment largely continue to depend on the personal opinion of the surgeon and neurologist on this problem."

Keywords: arterial hypertension, brachiocephalic arteries, vertebral-basilar insufficiency, internal carotid artery, posterior cerebral artery, linear blood flow velocity.

RELEVANCE. For a long time, pathological deformity of the carotid arteries was considered as a variant of normal development and described as an anatomical finding outside of connection with clinical data and changes in the brain (Rowlands R.P. et al., 1902; Brown G.E. et al., 1925, etc.). The first reports of the clinical manifestation of PD ICA appeared at the end of the XIX century. centuries. A.V. Kelly in 1898 in the Glasgow Medical Journal (quoted by Edington G.H., 1901) described 4 cases when during tonsillectomy and autopsy of a paratonsillar abscess, large pulsating vessels in the pharynx were observed and warned of the danger of bleeding due to damage to the abnormally convoluted carotid artery. Subsequently, numerous publications appeared in the literature on possible complications during operations in the paratonsillar region associated with pathological tortuosity of the brachiocephalic arteries (Edington G. N., 1901; Scillern R., 1913; Fisher A.G.,
1915; Schaeffer J.P., 1921; Connolly J.H, 1914; Jackson J.L., 1933; Herrmann A., 1968; Riemann D., 1971; Osguthorpe J.D., 1981; Ozgur Z., 2007, etc.). V. Tillmann (1995) based on the analysis of cases of artery ligation during bleeding from an injured ICA and often irreparable neurological deficits introduced the term "dangerous loop" ("dangerous loop"). The connection of pathological deformity with symptoms of cerebrovascular insufficiency was noted by M.M. Riser et al., who in 1951 He reported a patient with "carotid insufficiency" with attacks of dizziness, headache, sweating and nausea and her complete recovery after surgical correction of the "coiled" ICA by suturing the excess part of the artery to the sternocleidomastoid muscle.

Subsequently, the patient was observed for 4.5 months and similar attacks did not occur again. Attempts to study the prevalence of PD ICA date back to the 30-40s of the XX century on the basis of autopsy data from patients who died of various causes (Parcinson J. et al., 1939; Poly G.J. et al., 1940; Deineka I.Ya., 1940; Sherov A., 1950). According to these data, ICA deformities in adults and children ranged from 3.3 to 14.0% (Cairney J., 1924; Sherov A., 1950; Poll G., Lucha J., 1940; Deineka I.Ya., 1940). In the case of

World Bulletin of Public Health (WBPH)
Available Online at: https://www.scholarexpress.net
Volume-40, November 2024
ISSN: 2749-3644

death due to impaired cerebral circulation, the frequency of detection of tortuosity increased and ranged from 13.3 to 24.3% (Schmidt E.V., et al., 1962; Vereshchagin N.V. et al., 1972).

The introduction of the angiographic research method into practice made it possible to study the structure of the carotid arteries in life. After the cerebral angiography for subarachnoid hemorrhage, first performed by Portuguese Antonio Egas Moniz in 1927, this method remained for many years practically the only way to diagnose lesions of the brachiocephalic arteries, characterized by high sensitivity and specificity. One of the numerous angiographic studies was published by J. Weibel and W. Fields in 1965.

The authors described 2,453 cerebral angiograms performed in 1,438 patients. Loop-shaped deformity of the ICA was detected in 88 (6%), and inflection of the artery in 65 (5%) patients. Based on the analysis of more than 5,000 angiograms, N. Herrschaft (1969) revealed tortuosity of the ICA in 17.3%, and E.A. Dolmatov and A.A. Dyuzhikov (1989) - in 16.4% of patients. In patients with symptoms of cerebrovascular insufficiency, pathological deformity of the carotid arteries occurs in about 11-48% of all angiograms (Metz N., 1961; Zozulya Yu. A., 1968; Bezzubik S.D., 1970; Korovin A.M., 1980; Andziak R., 1994). In the 90s of the last century, angiography was replaced by ultrasound methods for diagnosing PD ICA. Conducting a comparative assessment of invasive and non-invasive vascular imaging methods, S.A. Dadvani et al. (1998) emphasize high resolution, low risk and the number of complications when using ultrasound techniques compared with radiopaque examination methods. The emergence of a non-invasive, in fact, screening method combining the possibilities of visualization and examination of blood flow through the vessel has allowed us to change the perception of the prevalence of PD ICA. There is a clear trend towards an increase in the number of identified patients with various forms of ICA deformities examined by color duplex scanning. If, in the general population, pathological deformity occurs in about 26% of cases (Macchi S. et al., 1997; Pellegrino L. et al., 1998), then from among all ultrasound examinations performed by patients with various manifestations of vascular cerebral insufficiency, pathological tortuosity is found in almost every third person examined (Lelyuk, V.G., Lelyuk S.E., 1995).

The targeted selection of patients for CDT allows to increase the detectability of various types of ICA deformities. So, A.A. Dridge et al. (1995) examined 207 patients with various manifestations of chronic cerebrovascular insufficiency and, according to their data, the incidence of pathological tortuosity was 67.6%. Almost similar results were obtained by G. Baggiani et al. (1995) - 64.4%, CO. Druzhinin et al. (1997) - 64%; L. Del Corso et al. (1998) - 58% . At the same time, NG. Khorev (2000) in his study found pathological tortuosity in only 12% (360) of 2,992 patients with cerebrovascular insufficiency; D.N. Bontsevich et al. (2010) - in 23% of 415 patients with symptoms of chronic CHF.

THE PURPOSE OF THE STUDY. To improve the criteria for comprehensive ultrasound examination of the carotid arteries in patients with pathological deformity of the internal carotid artery to develop indications for surgical treatment.

MATERIALS AND METHODS OF RESEARCH. The present work is based on the results of ultrasound examinations of 50 patients with pathological deformity of the internal carotid artery.

The ultrasound examination included: Dopplerography of the carotid artery, ultrasound will be examined at the ASMI clinic using VIVID-600 ultrasound machines.

THE RESULTS OF THE STUDY. As follows from the data in the table, the vast majority of patients with PD ICA were diagnosed with a statistically significant ($p<0.05$) decrease in the PD index, whose values were 6.2±3.1%, whereas in the control group its average values were -10.5±3.9%.

In 14 (21.2%) patients, the values of PD practically did not differ from the values of the control group: the figures of systolic blood pressure did not exceed 140 mmHg in 9 (64.3%); the maximum figures of systolic blood pressure were 180-200 mmHg in 5 (35.7%) patients with arterial hypertension.Comparing the values of the PD index with the estimated duration of the disease based on the history of existing cerebrovascular insufficiency, only a tendency to the existence of a correlation was noted ($g=0.20$; $p=0.084$).

Thus, in the overwhelming number of patients with pathological deformity of the ICA, a violation of the function of the brachial artery endothelium was diagnosed. At the same time, the level of dysfunction had a statistically significant weak inverse correlation with the level of blood pressure.As follows from the data in Table 12, the study of the elastic properties of the arterial wall in the vast majority of patients with PD ICA revealed a statistically significant ($p<0.05$) increase in the arterial wall stiffness index, the values of which were 1.31 ± 0.2, compared with the values of the control group (1.09±0.12). In addition, a decrease in the values of the tensile coefficient (3.91±1.93 Y-3 /kPa) and the coefficient of compliance (0.087±0.05 mm2/kPa) was diagnosed; in the norm group, these indicators were

World Bulletin of Public Health (WBPH)
Available Online at: https://www.scholarexpress.net
Volume-40, November 2024
ISSN: 2749-3644

7.28±2.43 10^ /kPa and 0.154±0.05 mm2/kPa ($p<0.05$), respectively.

The next step was a correlation analysis of the coefficient of extensibility, the coefficient of compliance and the index of stiffness of the OSA wall from the level of blood pressure and duration of the disease. Stiffness index - characterizes the degree of rigidity of the arterial wall to the tensile arterial pressure, and to a lesser extent than the coefficient of compliance and the coefficient of extensibility depends on the level of blood pressure. As shown in Figure 9, there was no statistically significant correlation between the OSA wall stiffness index and the level of systolic blood pressure ($p=0.09$; $g=-0.27$).

When comparing the level of systolic blood pressure with the values of the coefficient of extensibility and the coefficient of compliance, no correlation was also revealed ($g=-0.03$ and $g=-0.09$, respectively). Based on the history of existing cerebrovascular insufficiency, an assessment of the effect of the expected duration of the disease on the coefficient of extensibility, the coefficient of compliance and the stiffness index was not found to have a statistically significant correlation (Fig. 10). This can be explained by the fact that, most likely, the manifestation of complaints with PD ICA did not occur with the appearance of this deformity, but with the exhaustion of compensating functional reserves, which, among other things, is associated with the progression of arterial hypertension.

The patients were divided into 2 groups: before the age of 40, the number of this group was 22 (31.4%) people and after the age of 40 - 48 (68.6%) people.

The study showed that, in group 1, there was a tendency to decrease the values of the coefficient of extensibility, the coefficient of compliance and an increase in the values of the stiffness index in comparison with the control group. At the same time, in group 2, this difference acquires statistical significance ($p<0.05$). In the case of the PD index, in the group of patients with PD ICA under 40 years of age, its values averaged 7.4% ± 3.1%; in the group of patients over 40 years of age - 5.6% ± 2.9%. In both groups, the difference was statistically significant ($p<0.05$).

Taking into account the data obtained, a correlation analysis of the coefficient of extensibility, the coefficient of compliance and the index of wall stiffness depending on the age of patients was further carried out. A statistically significant inverse correlation of age with the coefficient of extensibility ($r=-0.73$) and the coefficient of compliance ($r=-0.7$) was revealed. In addition, a direct correlation between the stiffness index and age was diagnosed ($g=0.55$; $p<0.005$).

CONCLUSIONS. As the cerebrovascular reserve decreases, according to the hypercapnic test, an increase in clinical manifestations of the disease is noted. Insufficient reserve of cerebral circulation in patients with SMN I and SMI III allows them to be classified as a risk group for the development of focal neurological symptoms.

In patients without signs of focal neurological symptoms, indications for surgery should be considered the presence of any hemodynamically significant or loop-shaped pathological deformation of the ICA in combination with a decrease in the reserve of cerebral circulation.

LIST OF LITERATURE:

1. Adyrkhaev Z.A. Results of surgical treatment of pathological deformity of the internal carotid artery.: dis. ... candidate of Medical Sciences. Moscow. - 2011. - 136 p
2. Balakhonova T.V. Ultrasound examination of arteries in patients with cardiovascular diseases: abstract of the dissertation of the Doctor of Medical Sciences. Moscow. - 2002. - 40 p.
3. Barkhatov D.Yu. Djibladze D.N., Nikitin Yu. M. Functional assessment of cerebral hemodynamics by transcranial dopplerography using a nitroglycerin test for blockage of the internal carotid artery. Journal of Neurology and Psychiatry. - 1998. - Volume 98. - No. 1. - pp. 31-32.
4. Bezzubik S.D. Length, pathological tortuosity of the carotid and vertebral arteries and impaired cerebral circulation. Topical issues of neuropathology and neuroscience: collection of scientific tr. Minsk. - 1970. - pp. 13-17.
5. Beller A.V. Surgical treatment of pathological tortuosity of the internal carotid artery in children.: abstract of the dissertation of the Candidate of Medical Sciences. Altai State Medical University. un-T. — Barnaul. - 2003. — 22 p.
6. Belousov Yu.B., Namsaraev Zh.N. Endothelial dysfunction as a cause of atherosclerotic artery damage in hypertension: correction methods//Pharmateca. - 2004. - No.6. - pp. 62-72.
7. Bokeria L.A., Sukhanov S.G., Katkov A.I., Pirtskhalaishvili Z.K. Surgery of pathological tortuosity of brachiocephalic arteries. - Perm: Italics. - 2006. - 141 p.
8. Bondar L. V., Shcheglov V. I. "Surgical treatment of pathological elongations of the internal carotid artery as causes of ischemic

World Bulletin of Public Health (WBPH)
Available Online at: https://www.scholarexpress.net
Volume-40, November 2024
ISSN: 2749-3644

strokes". // Proceedings of the III Congress of Neurosurgeons of Russia. St. Petersburg. - 2002. - pp. 306-307.
9. Bondar L.V., Shcheglov V.I. A new principle of gradation of pathological elongations of the internal carotid artery according to angiography. // Proceedings of the III Congress of Neurosurgeons of Russia. St. Petersburg. - 2002. - pp. 305-306.
10. Bondar L. V., Shcheglov V. I. "Surgical treatment of pathological elongations of the internal carotid artery as causes of ischemic strokes." Materials of the III Congress of Neurosurgeons of Russia. St. Petersburg, 2002, pp. 306-307.
11. Bontsevich D.N., Velichko A.V., Kaplan M.L. Cerebral hemodynamics in pathological tortuosity of internal carotid arteries. //Topical issues of surgery. Materials of the XIV Congress of Surgeons of the Republic of Belarus. - 2010. - pp. 18-19.
12. Bulynin V.I., Martemyanov St., Laskarzhevskaya M.A. //Topical issues of cardiovascular surgery: collection of scientific tr. Diagnosis and surgical treatment of multiple variants of pathological tortuosity of internal carotid arteries. -St. Petersburg. -1993.-4.1.- pp. 34-35.
13. Burtseva E.A. The role of ultrasound research methods in the diagnosis and choice of treatment tactics for patients with systemic vasculitis (nonspecific aortoarteritis, obliterating thrombangiitis, systemic scleroderma).: dis. ... Doctor of Medical Sciences. Moscow. -2009.-213 p.
14. Valikov E.A. Diagnostics, indications and methods of surgical treatment of pathological deformities of internal carotid arteries.: dis. ... candidate of Medical Sciences. Moscow. -2003.- 103 p.
15. Vachev A.N., Golovin E. A., Dmitriev O. V. et al. Surgical treatment of patients with fibromuscular dysplasia of the internal carotid artery // Angiology and vascular surgery. - 2009. - No.2. - pp. 85-89.
16. Vereshchagin N.V., Levina G.Ya., Stepanova V.G. The role of kinks of the internal carotid and vertebral arteries in the occurrence of cerebral vascular thrombosis // Archive of Pathology. - 1972. - № 6. - Pp. 28-33.
17. Vereshchagin N.V., Borisenko V.V., Vlasenko A.G. In the book. Cerebral circulation. Modern research methods in clinical neurology.//M.Inter-Libra. - 1993. - p. 208.
18. Vereshchagin N.V. Deformations of the main arteries of the head and their significance in the development of cerebral circulatory disorders in old age / N. V. Vereshchagin // Bulletin of the Academy of Medical Sciences of the USSR. - 1980. - No. 10. - pp. 7-10.
19. Vlasova S.P., Ilchenko M.Yu., Kazakova E.B. et al. Endothelial dysfunction and hypertension//edited by Lebedev P.A.- Samara: LLC "Etching". - 2010. -192 p.
20. Voronin O.V., Pedachenko G.A. Indications and principles of surgical treatment of tortuosity and looping of the extracranial carotid artery. //In the collection. Neurosurgery. Issue4. Kiev. - 1971. - pp. 78-80.