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A NEW WAY OF CAROTID-SUBCLAVIAN BYPASS: EXPERIMENTAL - MORPHOLOGICAL STUDY

Zavaruev A.V., Yanovoi V.V., Tseluyko S.S., Zinov'ev S.V.

Amur State Medical Academy, Blagoveshchensk, Russia, Amur Regional Clinical Hospital, Blagoveshchensk, Russia

Abstract The article presents the results of experimental-morphological study on the development of a new method of carotid-subclavian bypass grafting (patent number 2551945 on 11/19/2013). Research was conducted on 15 corpses of $62,4 \pm 5,2$ years, of both sexes. Study was carried out on the great saphenous vein and the external jugular vein, taking each corpse material in sizes up to 7 cm, fixed in 10% of formalin solution. Great saphenous vein was at the level of the upper third of the leg, external jugular vein was all over from the site to the confluence of the deep venous system supraclavicular access. The first step studied the anatomical and morphological features of external jugular vein, then the macro and microscopic morphological characteristics of external jugular vein and great saphenous vein were determined.

The essential differences between the wall thickness of the two veins have been identified. The third stage was simulated surgery with carotid-subclavian bypass of the external jugular vein as a shunt. The study has proven the ability to use reverse external jugular vein as bypass for revascularization of vertebral-subclavian arterial zones by modeling operations with carotid-subclavian bypass.

Key words: external jugular vein (EJV), great saphenous vein (GSV), carotid-subclavian bypass.

Introduction. The main indication for surgery carotid-subclavian bypass occlusion is the first segment of the subclavian artery. Currently used as a vascular graft prosthesis of PTFE or Dacron. Constant use of synthetic materials during operations carotid-subclavian bypass and development in 30% of cases of various complications associated with it explants, pushed for an experimental morphological study and the search for new plastic resource. The use of artificial materials leads to a greater number of thrombosis, is short-lived, as well as very expensive. Universal and "deserved" autograft in operations on any blood pool is a large subcutaneous Vienna. Its use as a bypass during coronary artery, femoropopliteal, and some other kinds of "extended" bypass undeniable. However, the use of the GSV during operations on brachiocephalic arteries leads to a lengthening of the time of the operation, an additional surgical trauma and cosmetic defects, but most importantly - lost her reserve in possible future restoration of coronary blood flow and infrainguinal.

In the study and comparison of the morphology of the basin of the superior vena cava and the pool V.N. Vankova inferior vena cava (1974) highlighted a number of unique features. The thickness of the GSV is highly variable, it has a powerful muscle layer, but the small amount of collagen fibers. The superior vena cava system contain considerably fewer muscle fibers, but they are well developed and adventitia collagen fibers. When performing operations carotid-subclavian bypass surgery during mobilization of the second segment of the subclavian artery us was marked by recurring need to cross the external jugular vein. The refusal of many practitioners from using the tributaries of the internal or external jugular vein as a graft is motivated by the possibility of it breaking or formation of aneurysms in the long term. In the A.A. Mazurenko (2003) is a refutation of the possibility of complications associated with the use of facial vein as the plastic material for operations of carotid endarterectomy. These facts have led to explore the possibility of using EJV as a shunt during operations on the vertebral-subclavian arterial zone.

The aim of our research - to prove the possibility of using external jugular vein as autoshunta at reconstructive operations on the vertebral-subclavian arterial zone on the basis of experimental and morphological studies. Thus, to improve the results of treatment of occlusive-stenotic lesions of the first segment of the subclavian artery.

It developed a new method for the reconstruction of the vertebral-subclavian arterial zone in order to improve the results of treatment of occlusive and stenotic lesions of the first segments of the subclavian and vertebral arteries (patent number 2551945 on 19/11/2013).

Materials and methods. On the basis of pathology department of the Amur Regional Clinical Hospital studied 15 cadavers aged $62,4 \pm 5,2$ years old male and female ratio of 3: 1, respectively.

It defined three research objectives: to study the anatomical and topographical features EJV compare macro and microscopic morphological characteristics EJV and GSV, modeling operations carotid-subclavian bypass with EJV as a shunt.

Given that the most common cause of lesions of brachiocephalic arteries is atherosclerosis that develops in older adults, the study underwent corpses, dead as a result of various complications of multifocal atherosclerosis.

Study plots were subjected to the GSV and EJV, taking each corpse sizes up to 7 cm, fixed in 10% formalin solution. GSV stood at the level of the upper third of the leg, EJV all over from the site to the confluence of the deep venous system supraclavicular access.

For microscopic examination of biopsy specimens was performed excision of tissue biopsy 1-2 mm². Slices were excised from the edge area of the vein. Each piece was placed in a separate bottle filled with a solution of 2/3 10% neutral formalin solution, the fill was performed in paraffin. Paraffin sections were 5-7 microns thick using a sledge microtome. For a review of histological studies were stained with hematoxylin-eosin Boehmer. Shooting was conducted on paraffin microscope «Microphot FXA» (Nikon, Japan) at a magnification of 350 times. The morphometric measurements were performed using OptikaVision 3.8 program.

Results and discussion. In the study of anatomical and morphological features EJV identified a number of unique features, regardless of gender and age. External jugular vein to 93.3% has a permanent tributaries 5: v.auricularis post, v.retromandibularis, v.suprascapularis, v.jugularis ant, v.transversae cervicis. In 53.3% EJV fell into the subclavian vein, 40% of the venous angle (the confluence of the subclavian and internal jugular veins), 6.7% in the internal jugular vein.

The criteria for comparison of macroscopic signs EJV and GSV were: number of valves, the number of tributaries, the length and width of the "empty" vein). In all cases EJV had no more than one valve, while at the selected site GSV had 2 to 3 valves. The results of a comparative analysis of selected areas of the macroscopic EJV and GSV are given in the table 1.

EJV microscopic comparison criteria and GSV were: entire wall thickness, the thickness of the outer layer and the average thickness of the complex internal layer. The essential difference between the two, we have not identified vein wall thickness (table 2). The wall was dominated by GSV muscular elements, and in the wall EJV collagen fibers.

Tab.1. The results of a comparative analysis of selected areas of the macroscopic EJV and GSV

	EJV	GSV
Valves	0,53±0,49	1,26±0,39
Tributaries	4,93±0,12	3,42±0,65
Width, cm	0,41±0,88	0,50±0,88
Lenght, cm	6,60±0,26	7

Tab. 2. The results of the comparative microscopic analysis identified areas EJV and GSV

	EJV	GSV
The thickness of the entire wall, mcm	342,41±45,12	348,06±54,38
The thickness of the outer layer, mcm	218,56±34,05	121,31±44,87
The thickness of the middle and inner layer, mcm	108,91±60,97	181,11±89,35

Given the possibility of varicose transformation cadaver GSV, in the table 3 shows the normal morphometric characteristics of the GSV according to the survey on the basis of the Novosibirsk Scientific Research Institute of Pathology circulation named after Academician E.N. Meshalkin.

Tab. 3. Normal morphometric characteristics GSV

Wall thickness, mcm	The thickness of the inner layer, mcm	The thickness of the middle layer, mcm
268,28±14,97	7,45±2,85	237,86±8,15

The next stage of the operation was carried out modeling of carotid-subclavian bypass. Given the fact that the left subclavian artery suffer 2-3 times more often than the right, the operation performed on the left. The optimal access to the vertebral-subclavian area with 2 sides was chosen supraclavicular crossing the clavicular portion of the sternocleidomastoid muscle. Inflows EJV and bandaging the trunk itself and intersect. Cleave all areas adventitious adhesions. Common carotid artery was isolated and a second segment of the subclavian artery. Next simulated surgery carotid-subclavian bypass autovenous reverse EJV. First performed anastomosis with the common carotid artery and then to the second segment of the subclavian artery on the type of "end to side". As the suture material used polypropylene yarn 5/0. The tightness of anastomoses was tested gidronagnetaniem. The lengths of the selected EJV in all cases enough to bypass without tension.

Conclusions. Conducted macroscopic study of cadaver veins have proven the possibility of using reverse EJV as autoshunta for revascularization of vertebral-subclavian arterial zones by modeling operations carotid-subclavian bypass. The efficiency of the operation phase of the experiment is largely determined by the technical simplicity of the implementation of a supraclavicular access and lack of need for the use of explants. The advantages of using this type of shunt, one access, preservation of the GSV for possible coronary artery bypass grafting and other forms, the cheapness and availability of the method.

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PECULIARITIES OF HEMODYNAMICS IN PREGNANT WOMEN WITH BRONCHIAL ASTHMA

Zenkina A.S.,¹ Prikhodko O.B.,¹ Kostrova I.V.,¹ Avdeeva N.A.,² Goryacheva S.A.¹

Amur State Medical Academy, Blagoveshchensk, Russia¹

Far Eastern Scientific Center of Physiology and Pathology of Respiration, Blagoveshchensk, Russia²

Abstract The incidence of bronchial asthma (BA) in the world is from 4 to 10% of the population; in the Russian Federation, the prevalence among adult's ranges from 2.2 to 5.7%. BA is the most common disease of the pulmonary system in pregnant women, the frequency of diagnosis in the world ranges from 1 to 4%, in Russia – from 0.4 to 13.8%. The aim of this work was to determine the hemodynamic features of the BA course during pregnancy. Clinical and functional features of the course, the outcomes of pregnancy, labor and neonatal status in 35 patients with bronchial asthma were analyzed. Clinical and anamnestic data, the integrated monitoring of clinical syndromes, assessment of diastolic function of the right heart using tissue Doppler imaging, the study of blood flow in the renal vessels and utero-placental hemodynamics were used.

Key words: bronchial asthma, pregnancy, tissue Doppler

The incidence of bronchial asthma (BA) in the world is from 4 to 10% of the population; in the Russian Federation, the prevalence among adult's ranges from 2.2 to 5.7%. In pregnant women BA is the most common disease of the pulmonary system, the frequency of diagnosis in the world which ranged from 1 to 4%, in Russia – from 0.4 to 13.8%. Pregnancy has different effects on the course of BA. Change the course of the disease ranged within wide limits: the improvement in 18-69% of women, a decline from 22-44%, there was is no effect of pregnancy on the course of BA detected in 27-43% of cases. This is due, on the one hand, multi-directional dynamics in patients with different BA severity (mild and moderate severity, aggravation of BA course occurs in 15-22%, improvement – in 12-22%), on the other hand, the lack of diagnosis and proper therapy. In practice, BA is quite often diagnosed only at late stages of the disease. Also, if its beginning coincides with the gestational period, the disease may remain undiagnosed, since observed while respiratory disorders are often attributed to changes caused by pregnancy.

Material and methods. Clinical and functional features of the course, the outcomes of pregnancy, labor and neonatal status in 35 patients with bronchial asthma is analyzed. The observed patients were mature childbearing age – the average age was 25±1.7 years. Hereditary of allergic disease was observed up in 8 (22.8%) of women with BA – in 3 (8,6%), all of them on mother's side. Mild BA (BALT) was observed in 24 (68,5%) patients, moderate (BAST) - 10 (28,8%), heavy (BUTT) - 1 (2.9 percent). According to clinical forms of the disease the patients are divided: in 23 (65,7%) patients with allergic form of BA, 2 patients (5,7%) had non-allergic and in 10 patients (28,8%) – combined. The duration of BA, the average was 9.5±1.3 years.

The dynamics course of BA in dynamics of pregnancy: 22 (62,9%) – were deteriorated from of the disease