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SYMPATHECTOMY IN THE OBLITERATING DISEASES OF UPPER LIMB ARTERIES

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Abstract:

Aim. To improve the results of surgical treatment of distal ischemia of the upper extremities by developing indications for the application of various surgical treatment methods, as well as analyzing the results of surgical treatment of distal ischemia of the upper extremities.

Materials and methods. In the period from 2006 to 2016 the staff of the Department of General Surgery operated 64 patients with chronic ischemia of the distal upper extremities. Men - 44, women - 20. Age ranged from 26 to 92 years, the average age was 49.09 years. The criteria proposed by E. Allen et G. Brown were used. For the diagnosis of obliterating rombangiitis, we were based on the method of excluding other possible nosologies and using Shionoy's clinical criteria. All patients were subjected to clinical and laboratory and instrumental examination. The patients underwent the following surgical procedures: thoracoscopic sympathectomy in 21 cases (32.8%), thoracic sympathectomy in 12 (18.8%), digital periarterial sympathectomy in 31 (48.4%) cases. In 4 cases, open thoracic sympathectomy was supplemented by scalenotomy.

Results. In all patients who underwent intervention on the palmar arterial arch, the main blood flow was restored. The data of triplex scanning of the arterial arch of the hand and the finger arteries and transcutaneous oximetry indicate an increase in the linear velocity of blood flow and a decrease in the indices of peripheral vascular resistance in all cases. The linear blood flow rate in patients with thromboangiitis obliterans after performing digital periarterial sympathectomy increased on average by 64%, in patients with CP, by 100%, in patients with atherosclerosis obliterans, by 135%. Thus, we see that according to the parameters studied, the most effective sympathectomy turned out to be in Raynaud's syndrome and atherosclerosis obliterans. Less effective - with thromboangiitis obliterans. Moreover, it should be noted that digital periarterial sympathectomy has a number of advantages over breast.

Conclusions. Periarterial digital sympathectomy gives a pronounced long-lasting effect, which makes it possible to consider it as a method of choice in the treatment of acral ischemia of the hand. Direct intervention on the arterial arch of the hand in some cases allows to restore the main blood flow, which significantly improves the results of treatment. Digital periarterial sympathectomy in Raynaud's syndrome and atherosclerosis obliterans allows to achieve better results of treatment than thoracic sympatectomy. However, due to the fact that periarterial sympathectomy requires a highly qualified specialist and an operating microscope, in the absence of such, thoracic sympathectomy should be performed.

Key words: sympathectomy, obliteration of upper limb arteries.

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INTRODUCTION:

Despite the fact that chronic ischemia of the upper extremities is only 4.7-5% of all vascular diseases and, accordingly, only 4% of operations on the vessels of this localization are performed, this problem is one of the most urgent problems of modern medical science [1]. In the absence of the effect of conservative treatment and the impossibility of carrying out reconstructive surgery (in the case of acral forms of vascular lesion), the salvation of the affected limb is a big problem. Historically, the surgical treatment of ischemic conditions of the extremities developed in parallel in two directions: the development and implementation of direct (bypass) and indirect (palliative) methods of revascularization.

The first are various options for shunting operations using reversed autowens, veins in the "insitu" position or artificial (synthetic) vascular prostheses [2-4]. Since the late 80s of the last century, the arsenal of direct revascularization has been replenished with various options for arterialization of venous blood flow [5].

The latter include operations of mediated improvement of the peripheral blood flow — sympathectomy, revascularizing osteo-retanation, etc. [6]. At the same time, dissatisfaction with the results of surgical treatment (mainly in patients with distal forms of occlusive lesions) initiated surgeons to develop new methods for revascularization — autotransplantation of vascularized tissues from other parts of the body. For this purpose, used a large omentum and skin-muscle flaps.

Sympathectomy, which is palliative in nature, does not completely eliminate ischemia, and its effectiveness has been the subject of discussion so far [7]. In Raynaud's syndrome (RS), both proximal sympathectomy — thoracic (including chemical) and distal — periarterial digital sympathectomy (PDS) is performed.

Currently, there has been an active introduction of the video-assisted thoracoscopic method of sympathectomy in the treatment of lesions of the distal arterial bed of the upper limb [8-10]. Studies by domestic authors have shown that with video-assisted thoracoscopic sympathectomy in a long-term period, good results are recorded in 80% of patients [8, 11]. Despite the long history of treatment of RS, the choice of the method of sympathectomy in this pathology is still unsolved.

Some authors are supporters of upper thoracic sympathectomy [1, 4, 6, 11], others are of chemical desimpathization [11, 12], and others are of periarterial digital sympathectomy [14-17].

In the long-term, the vasodilating effect of thoracic sympathectomy persists in only 43.3% of cases [14]. The reason for the return of clinical signs of RS after upper thoracic sympathectomy is the reinnervation of the vessels of the upper limb [8, 15]. Such a mechanism of disease recurrence is explained as follows: in addition to the branches of the sympathetic trunk, the upper limb is also innervated by other sympathetic nerves (Kunz's nerve, brachial plexus, and sino-vertebral nerve), which do not intersect during thoracic sympathectomy [10]. The preservation of this type of sympathetic innervation leads to a recurrence of vasoconstriction.

Other authors consider the rapid regeneration of intersected nerve trunks, which are able to grow up to 1 mm in a day, as the causes of relapse [12]. According to D. M. Konunova et al. (2015), relapse of Raynaud's syndrome is due to progressive immune aggression [11]. A possible reason for the return of the clinical signs of the disease is the variability of the anatomy of the sympathetic nervous system. In this regard, when performing the operation, the main nerve fibers that go to the upper extremities do not intersect [10, 15].

In the light of the above, performing distal sympathectomy in RS is more reasonable and has a more positive effect in the long-term period, which is confirmed by our data.

In order to prevent recurrence of the syndrome Raynaud AD Aslanov et al. (2015) propose a regular spa treatment, which allowed the authors in all cases to preserve the limb of patients [16]. Due to the polyetiology of a RS, various factors can cause its recurrence, the determination and timely correction of which can improve both the treatment outcomes of patients and their quality of life. In this

direction, most researchers recommend regular physiotherapy and conservative anti-relapse therapy [19].

The aim is to improve the results of surgical treatment of distal ischemia of the upper extremities by developing indications for the application of various surgical treatment methods, as well as analyzing the results of surgical treatment of distal ischemia of the upper extremities.

Material and Methods

In the period from 2006 to 2016 the staff of the Department of General Surgery operated 64 patients with chronic ischemia of the distal upper extremities. Men - 44, women - 20. Age ranged from 26 to 92 years, the average age was 49.09 years. Patients entered the study due to the severity of ischemia and the lack of a positive effect from conservative therapy. When examining this category of patients, the criteria proposed by E. Allen et G. Brown were used [1, 6, 7]. For the diagnosis of obliterating trombangiitis, we were based on the method of excluding other possible nosologies and using Shionoy's clinical criteria.

The main criteria for the diagnosis of atherosclerosis were the patient's age (over 50 years), the absence of signs of diffuse connective tissue diseases, the presence of atherogenic risk factors.

Among the nosological forms, thromboangiitis obliterans in our group of patients was observed in 17 cases (26.6%), atherosclerosis obliterans - in 15 (23.4%), Raynaud's syndrome - in 32 (50%). The disease duration ranged from 3 weeks to 5 years, on average, it was 24 months. The disease of both hands was observed in 27 (42.2%) patients. Along with the vascular lesion of the hand, 10 (15.6%) patients had occlusive lesions of the lower limb arteries, in connection with which 8 (12.5%) people had previous lumbar sympathectomy, reconstruction of the arteries, amputations and other surgical interventions.

All patients were subjected to clinical and laboratory and instrumental examination.

In order to diagnose the severity of ischemia and monitor the results of treatment, laser doppler flow metering, oxygen tension testing in tissues, triplex ultrasound scanning of the arteries of the upper limbs, rheovasography, pulse oximetry and selective angiography (if necessary) were performed.

The patients underwent the following surgical procedures: thoracoscopic sympathectomy in 21 cases (32.8%), thoracic sympathectomy in 12 (18.8%), digital periarterial sympathectomy in 31 (48.4%) cases. In 4 cases, open thoracic sympathectomy was supplemented with a scolenotomy. In one case, digital periarterial sympathectomy was supplemented with autovenous radial artery prosthetics and in 7 cases thrombectomy from the arteries of the forearm, the arterial arch of the hand, or the digital arteries.

Results and discussion

Positive immediate results were obtained in practically all patients and were clinically manifested by the disappearance of pain, an increase in skin temperature, normalization of skin color, an increase in tolerance to hypothermia, and wound healing by primary tension.

The result of surgery was assessed as good with the disappearance of pain, increased skin temperature of the fingers, in the presence of trophic changes - epithelialization of wounds, rapid healing of wounds by primary intention after necroectomy or economical amputations. With Doppler ultrasound, an increase in the linear velocity of blood flow of more than 75% of the initial value and a decrease in the indices of peripheral vascular resistance were recorded; the growth of partial oxygen tension in the skin of the fingers of the hands with transcutaneous oximetry in the skin of the fingers of the hands - up to 55-60 mm Hg. Art. The results were considered satisfactory, in which the pain syndrome decreased, there was no progression of trophic disorders, linear blood flow rate increased by 30–80%, peripheral resistance indices decreased, transcutaneous oximetry showed values from 30 to 55 mmHg. Art.

The results were considered unsatisfactory in the absence of a positive effect after surgery, the return or progression of ischemia of the hand.

In all patients who underwent intervention on the palmar arterial arch, the main blood flow was restored. The data of triplex scanning of the arterial arch of the hand and the finger arteries and transcutaneous oximetry indicate an increase in the linear velocity of blood flow and a decrease in the indices of peripheral vascular resistance in all cases. The linear blood flow rate in patients with thromboangiitis obliterans after performing digital periarterial sympathectomy increased on average by 64%, in patients with RS, by 100%, in patients with atherosclerosis obliterans, by 135%. Thus, we see that according to the parameters studied, the most effective sympathectomy turned out to be in Raynaud's syndrome and atherosclerosis obliterans. Less effective - with thromboangiitis obliterans. Moreover, it should be noted that digital periarterial sympathectomy has a number of advantages over breast.

Patients with the presence of necrosis after the restoration of blood flow produced amputations of the fingers (distal phalanxes of the fingers) or necrotomy within healthy tissues. After the necrectomy, the wounds of the entire patient healed by primary intention, the sutures were removed 10-

12 days after the operation. Lethal outcomes were not.

Clinical case. Patient K., 42 years old, was admitted to the hospital at the place of residence with the syndrome of prolonged squeezing of the left hand, thrombosis of the ulnar, radial and median arteries, thrombosis of the palmar arch and arteries of the fingers of the left hand was established. Despite the conducted conservative treatment, ischemia of the hand was increasing, there appeared pronounced cyanosis of the hand, moist necrosis of fingers with progressive spread, pain in the hand, not stopped by narcotic analgesics. The patient was consulted by vascular surgeons and in view of his inoperability he was recommended to continue conservative treatment, as well as amputation along the line of demarcation and consultation in the clinic of the Department of General Surgery.

Figure. 1 (A,B). The condition of the fingers and hand of the left extremity in patient K. with a syndrome of prolonged compression before surgery.

In clinic K., surgical treatment was proposed in the form of thoracoscopic sympathectomy at the level of Th2-Th3 on the left. After preoperative preparation, an operation was performed, as a result of which the left hand and all fingers were preserved, dry necrosis formed on the nail phalanges (Fig. 1, 2).

Figure. 2 (A,B). The first day after thoracic

CONCLUSION:

Thus, we see that periarterial digital sympathectomy has a pronounced long-lasting effect, which makes it possible to consider it as the method of choice in the treatment of acral ischemia of the hand. Direct intervention on the arterial arch of the hand in some cases allows to restore the main blood flow, which significantly improves the results of treatment. Digital periarterial sympathectomy in Raynaud's syndrome and atherosclerosis obliterans allows to achieve better results of treatment than thoracic sympatectomy. However, due to the fact that periarterial sympathectomy requires a highly qualified specialist and an operating microscope, in the absence of such, thoracic sympathectomy should be performed. The use of thoracoscopic sympathectomy is also justified in the case of thrombotic occlusion of the arteries of the upper extremities (post-injection in drug-dependent

patients and in the syndrome of prolonged compression). We operated on 12 patients with this pathology, in 11 we managed to avoid amputation of the hand and forearm, in 1 3 fingers were amputated.

List of symbols and Abbreviations
RS - Raynaud's syndrome
PDS — periarterial digital sympathectomy

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