

Arterial Reconstruction

Types of interventions on arteries

- sutura (plain, with venous or artificial patch - plastics)
- endarterectomy (open, semi-closed)
- direct replacement - for aneurysms
- shortening - when a too long vessel is kinked (kinking of the carotid artery)
- implantation
- embolectomy, thrombectomy - Fogarty catheterem
- bridging (bypass)

Types of vascular replacements

1. Biological (artery or vein) - autologous, allogeneic, xenogeneic (bovine);
 - a. thoracica interna - artery of elastic type, resistant to atherosclerosis;
2. artificial - knitted (polyester);
 - porous wall (must be precipitated);
 - easy to reach but often infected (Staphylococcus epidermidis);
 1. woven
 2. cast (PTFE) - microporous wall
 3. combined

Principles of operation

- The vessels are prepared and sutured **subadventitially** and fine, **atraumatic, non-absorbable fibres** (např. Prolene®) are used as a rule. We administer heparin (1–2 mg/kg) before reconstruction and neutralize it with protamine (1,5 mg protaminu / 1 mg heparinu) before restoring flow. Flow is then slowly restored from the periphery, and we control the restoration and stop any bleeding.

Postoperative complications

- early - bleeding, closure, infection, thrombosis, peripheral embolization, postperfusion syndrom (leaching of metabolites from previously ischemic tissues), compartment syndrom (sudden increase in tissue pressure in the compartment)
- late - closure, pseudoaneurysm, right aneurysm

Three basic surgical methods of passage reconstruction are used - **desobliteration, patch** or **bypass**.

Thrombendarterectomy, disobliteration (TEA)

- The thickened inner layer of the artery (the intima and the part of the media on which the thrombus usually sits) is removed.
- **The aim** - to widen the lumen, to obtain a smooth area, to modify the transition from the disobliterated part to the untreated area.
- **Disadvantage:**
 - Large thrombogenic surface;
 - therefore used in short obliterations with high flow - a. carotis, aorta, a. iliaca comm.
- The main method is open TEA.

Patch

- widening of the lumen by sewing a patch made of autologous vein or artificial material
- can be combined with TEA

Bypass

In cardiovascular surgery, the term "**bypass**" refers to the bridging of a narrowed or closed section of an artery to improve / restore perfusion of the tissue behind the narrowing.

History

[1]

- 1953 - Murray performed the first experimental coronary artery bypass (without using extracorporeal circulation).
- 1953 - Gibbon used extracorporeal circulation.
- 1968 - Sones and Favarolo began operating coronary artery bypass grafting in extracorporeal circulation using

grafts from the saphenous vein in patients with CHD.

Bypass material: The following can be used to create a bypass:

- **venous graft** (v. saphena magna, v. saphena parva, superficial veins HK);
- **arterial graft** (a. thoracica (mammaria) interna, a. radialis from non-dominant HK, a. gastroepiploica dextra, a. epigastrica inferior);
- **vascular prosthesis** (vascular prostheses are used mainly in places with higher blood flow - aorta, aa. iliacae, aa. femorales; before loading vascular clamps it is necessary to fully heparin isolate the patient, heparinization is canceled after surgery);
 - porous prostheses - it is necessary to pre-coagulate the patient's own blood (strongly porous Dacron®, less porous Dacro®, Sauvage doublelevelour prosthesis);
 - non-porous prostheses - no need to pre-coagulate (Dacron® impregnated with collagen, expanded polytetrafluoroethylene, ePTFE);
- **xenograft** (bovine a. mammaria).

A vascular prosthesis or xenograft carries a higher risk of complications. They are therefore used only in cases where we do not have our own graft (ie for example in repeated reoperations).

Bypass management method:

- **Anatomically** - along the original vessel (aortofemoral bypass, femoropopliteal);
- **extraanatomically** - outside the course of the original vessel (axillofemoral, femorofemoral).

Vein use in situ vs. reverse graft.

- **Use of a vein in situ** (we tie larger branches; we remove the valves with a special deletion; we connect the proximal part of the vein to the proximal part of the artery, the distal part of the vein to the distal part of the artery);
- **Reverse graft** (extirpate the vein, ligate all branches, connect the proximal end of the vein to the distal end of the artery and the distal end of the vein to the proximal end of the artery - so that the venous valves do not impede blood flow).

Links

External links

- Template:Anaesthesia in carotid endarterectomy - an interactive algorithm + test

Related articles

- Ischemic heart disease
- Chronic ischaemic disease of the lower limbs
- Large vein occlusions
- Akute arterial occlusions

References

1. VANĚK, Ivan. *Kardiovaskulární chirurgie*. 1. edition. Karolinum, 2003. 236 pp. ISBN 8024605236.

Literature used

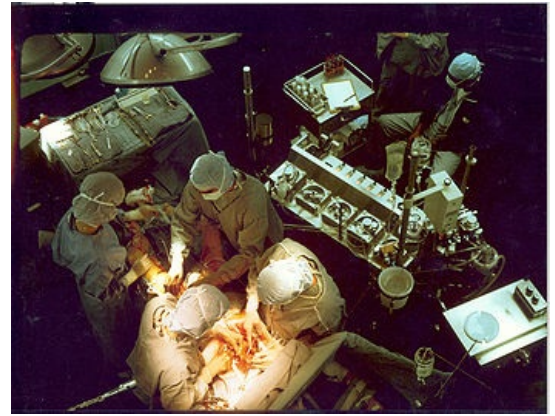
- ZEMAN, Miroslav. *Speciální chirurgie*. 2. edition. Galén, 2006. 575 pp. ISBN 80-7262-260-9.
- VANĚK, Ivan. *Kardiovaskulární chirurgie*. 1. edition. Karolinum, 2003. 236 pp. ISBN 8024605236.

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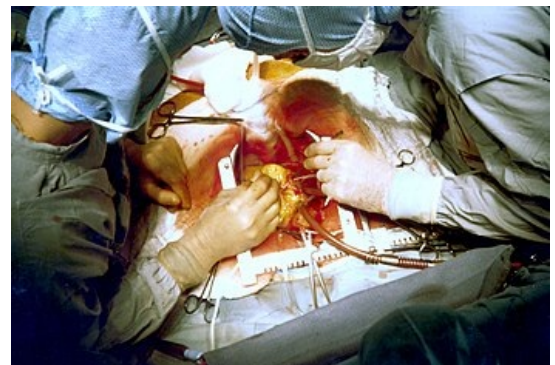
- BENEŠ, Jiří. *Otázky z chirurgie* [online]. ©2007. [cit. 2021-12-26]. <<http://jirben2.chytrak.cz/materialy/chira/cevni.doc>>.

Categories:Surgery Categories:Cardiology

1. VANĚK, Ivan, et al. *Cardiovascular surgery*. 1. edition. Prague : Karolinum, 2003. 236 pp. ISBN 8024605236.



Cardiac surgery reconstruction of the coronary artery 1



Cardiac surgery reconstruction of the coronary artery 2

