

# Arterial reconstruction

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## Types of arterial procedures

- suture (simple, with venous or artificial patch – plastic)
- endarterectomy (opened, semi-closed)
- direct compensation – aneurysm (bulge)
- shortening – folding of long blood-vessels (kinking carotid)
- implantation
- embolectomy, thrombectomy – Fogarty's catheter
- bypass (bypass)

## Types of vascular replacements

1. Biological (artery or vein) – autologous, allogeneous, xenogeneous (bovine);
  - a. thoracica interna – artery of elastic type, which is resistant to atherosclerosis;
2. artificial – knitted (polyester);
  - porous wall (must be pre-coagulated);
  - well accomplished, however is often infected (*Staphylococcus epidermidis*);
  1. tissues
  2. ferociously (PTFE) – microporous wall
  3. combined

## Principles of surgery

- We prepare and suture the blood vessels **subadventitially** and during the procedure we use fine **atraumatic non-absorbable fibers** (např. Prolene®). Before reconstruction we administer heparin (1–2 mg/kg) and before resuming of the blood flow we neutralised it with protamine (1,5 mg protamine / 1 mg heparin). The flow then resumes slowly from the periphery, we control the restoration of the flow and stop any bleeding.

## Postoperative complications

- early – bleeding, seal, infection, thrombosis, postoperative peripheral embolisation, postperfusion syndrome (leaching of metabolites from previously ischemized tissues), compartment syndrome (a sudden increase in the tissue pressure in the compartment)
- late – seal (lock), pseudoaneurysm, right aneurysm

There are three basic surgical methods used for the reconstruction of the passage – **desobliteration, patch** or **bypass**.

## Thrombendarterectomy, desobliteration (TEA)

\_\_ Trombendarterektomie

## Patch

- extension of the lumen by sewing a patch from an autologous vein or from an artificial material
- can be combined with TEA

## Bypass

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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:Akutně

### Related articles

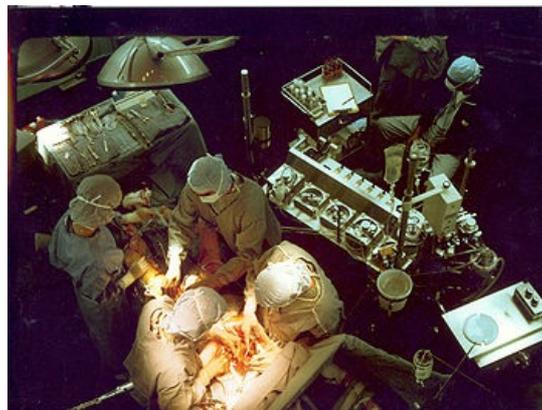
- Ischemic heart disease
- Chronic ischemic disease of the lower limbs
- Occlusion of large veins
- Acute arterial occlusions

### References

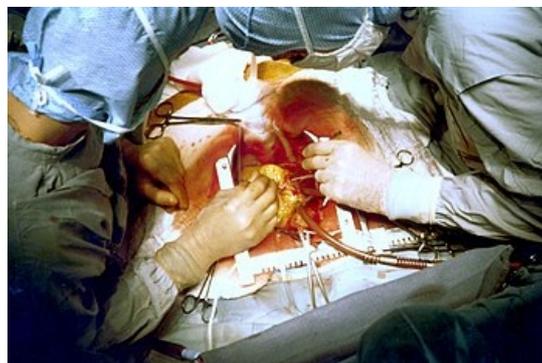
1. VANĚK, Ivan, et al. *Cardiovascular surgery*. 1. edition. Prague : Karolinum, 2003. 236 pp. ISBN 8024605236.

### Used literature

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Cardiac surgery reconstruction of the coronary artery 1



Cardiac surgery reconstruction of the coronary artery 2

## Zdroj

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Kategorie:Chirurgie Kategorie:Kardiologie