Acute arterial occlusions

Definition

- Sudden limb perfusion disorder leading (unless quickly removed) to irreversible changes distal to the arterial occlusion,
- can lead to limb loss, a life threatening condition.

Causes

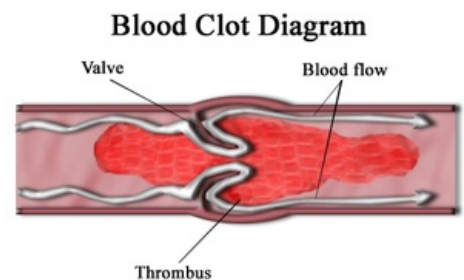The most common causes of acute arterial occlusions are:

- **embolism** in 70% (atrial fibrillation, myocardial infarction, cardiomyopathy, endocarditis, valve defects, artificial valve failure, myxoma, left ventricular aneurysm, paradoxical embolization),
- **thrombosis** in 20% (prosthesis failure, atherosclerosis, aneurysm thrombosis, entrapment syndrome, prothrombotic state, dehydration, hypotension, atherosclerotic ulcer),
- **trauma** (iatrogenic injury, exogenous trauma, bleeding).

Other less common causes may be:

- artery wall dissection,
- external wall compression,
- hemodynamic changes (phlegmasia coerulea dolens, shock),
- compartment syndrome.

Pathogenesis

- Sudden closure leads to the formation of an attached thrombus , which propagates proximally and distally.
- The degree of ischemia depends on collateral circulation, which is formed especially in chronic ischemia due to the growing demand of tissues for oxygen.
- Ischemia is best tolerated by the skin and subcutaneous tissue (up to 12 hours), muscles and bone are necrotic after 6-8 hours, nerves after 2-4 hours.
- **Effects of ischemia on cells:** lactate production , xanthine oxidase expression , reperfusion injury, cell edema (may be caused by compartment syndrome after circulatory restoration).
- **Myonephropathic metabolic syndrome** is a systemic consequence of reperfusion. Flooding the body with acidic products and potassium or myoglobin leads to renal and respiratory insufficiency with high mortality.
- **Sources of embolization**: most often heart (after transmural MI), atrial fibrillation , aneurysm , valve defects , rarely myxoma , iatrogenic, paradoxical embolization .
- The embolus is most often attached at the bifurcation of the arteries. On lower limb in the distance of the artery profunda femoris, in the branching of the popliteal artery.

Scheme of thrombus formation in the vein of the lower limb

Clinical picture

- Sudden pain, lack of peripheral pulsations, paleness and coldness of the skin, impaired sensitivity and mobility.
- The symptoms have a hosiery or glove character.

Differential diagnosis

Embolus in the bifurcation of the iliac arteries

- Differential diagnosis between embolism and thrombosis can be difficult.
- We suggest embolic closure when patient has a negative history of claudication, normal pulsation on the other limb, arrhythmia .
- Thrombosis is manifested by claudications, pulse deficit and the other limb.
- This is not absolutely true (even the sclerotic artery can be embulated,...).
- In case of clinically clear embolism, no further examination is usually necessary, in case of thrombosis arteriography is performed

Therapy

We distinguish between general and local therapy.

General therapy

- Always immediate administration of **heparin** - bolus 10,000 j iv (prevents the progression of the attached thrombus, which could close the collateral bloodstream).
- We pay maximum attention to the overall condition of the patient (especially cardiac).
- Prevention of myonephropathic syndrome - glucose infusion with insulin (support of potassium deposition in cells), improvement of diuresis by hydration and administration of mannitol , PGE 1 .

Local therapy

- The most effective surgery is **embolectomy with Fogarty catheter** ;
    - it can be performed under local anesthesia , from the incision we insert a catheter into the artery distal to the occlusion with an inflatable balloon at the end and release the embolus;
    - exceptionally, direct embolectomy is required (eg in bifurcation of the popliteal artery);
    - after a perfect embolectomy, we can interrupt heparinization (unless required by the underlying disease).

- In thrombosis, the removal of the thrombus is usually not enough for a long time, it is possible to use other methods - thrombectomy supplemented by revascularization, TEA or bypass , possibly. PTA .

Pharmacologic thrombolysis (fibrinolysis)

- Targeted application

- either orthogradely in peripheral thrombosis or, on the other hand, in femoral or pelvic artery thrombosis;
- we start with the instillation of a high dose, which we reduce after the initial recanalization;
- the procedure is monitored by repeated angiographies every 6–12 hours;
- duration of infusion according to the effect (not more than 72 h);
- we monitor coagulation values.

Used substances

- streptokinase ;
- urokinase ;
- tPA (tissue plasminogen activator).

Absolute contraindication

- critical ischemia (it is not possible to wait hours for the effect);
- Florida ulcer disease;
- CMP less than 3 months ago;
- intracranial tumor ;
- vascular malformations;
- bacterial endocarditis .

Relative contraindications

- recent operations;
- trauma ;
- hypertension ;
- heart defects ;
- coagulopathy ;
- pregnancy;
- liver disease;
- streptokinase allergy

Complications

- bleeding at the injection site and elsewhere (GIT, intracranially).

Sources

Related articles

- Angioinvasive treatment of arterial occlusions and stenoses

References

- ZEMAN, Miroslav, et al. *Speciální chirurgie.* 2. vydání. Praha : Galén, 2006. 575 s. ISBN 80-7262-260-9.

Source

- BENEŠ, Jiří. Studijní materiály [online]. [cit. 14.5.2010]. <http://jirben.wz.cz>.