Ischemia

Ischemia (local anemia) is a reduction to complete cessation of arterial blood flow to the tissue. Tissues then suffer from hypoxia to anoxia. It is actually the opposite of hyperemia. The highest degree of ischemia causes ischemic necrosis (coagulation or coliquation) of the supplied tissue - infarction.

Ischemia:

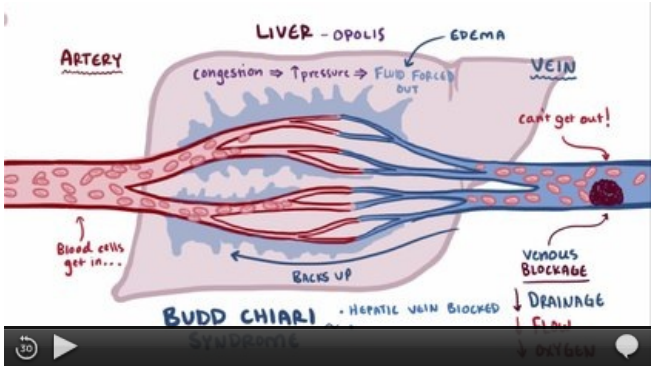
Ischemia 2:

Ischemia 3:

Causes of occlusion

Causes of inadequate blood supply to tissue include:

1. *compression* (squeezing of the artery) - tumor, constriction, ligation,
2. *obstruction* (blockage of the artery) - thrombosis, embolism, atherosclerotic plaque,
3. *spasm*.



video in english: definition, patogenesis, symptoms and complications, diagnostics, treatment

Factors affecting the severity of ischemia

- ***Anatomically definitive arteries*** - coronary and mesenteric arteries,
- ***speed of closure*** - sudden (embolism) x gradual (thrombosis),
- ***sensitivity of the organ to oxygen deprivation*** - large (brain) x small (skeletal muscle),
- ***momentary functional status*** - claudicatio intermittens, angina pectoris,
- ***total circulatory status*** - worse in cardiac patients.

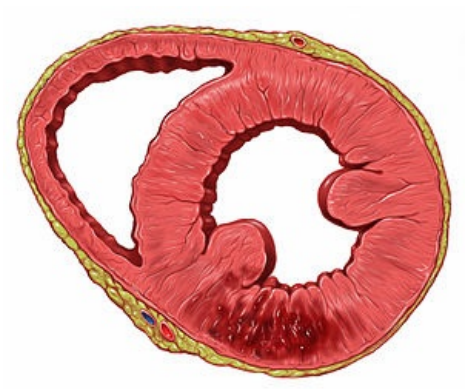
Appearance of the infarction

The appearance of the infarction depends on the nature of the affected tissue and the presence of vascular anastomoses. In general we distinguish:

1. *white* (anaemic) - in terminal arteries that have no anastomoses
2. *red* (haemorrhagic) - if capillary reflux from collaterals is possible or if venostasis is the cause
3. *mixed* - white infarction with extensive hemorrhagic rim


Ischemia of toes - the symptom is cyanosis of the tissue

- In infarctions resulting from blockage of the terminal artery, the necrotic deposit is wedge-shaped.
- If the artery is not terminal, the lesion is shaped like the area supplied by the artery.
- In organs covered by serosa (especially lungs), fibrin exudation to the surface occurs - reactive aseptic fibrinous pleuritis (in MI - pericarditis stenopericardiaca).


Myocardial infarction of the bottom heart wall

Another fate of infarction

- **Healing by granulation tissue** and later **by scar** (e.g., renal surface retraction, chronic aneurysm of the left ventricle of the heart).
- **Decolorization of red infarct** - breakdown of blood cells, with hemosiderin and bilirubin in the area (local icterus).
- **Formation of pseudocyst** - cavity filled with coagulated necrotic tissue (postencephalomalacia pseudocyst).
- **Bacterial infection of the infarction focus** - may be secondary or if the infarction arises directly from blockage of an artery by an infected thromboembolus (septic infarction) - purulent coliquation necrosis to gangrene.

Examples of infarctions

1. White infarctions - myocardium, kidneys, brain (occlusion of cerebral arteries), liver.
2. Red infarctions - spleen, lung, intestine, brain (thrombosis of the vessels).

- Kidney infarction - yellow wedge-shaped lesion (coagulation necrosis),
- myocardial infarction - clay-like deposit (coagulation necrosis),
- encephalomalacia - a mushy deposit (coliquation necrosis),
- pulmonary infarction - dark red, wedge-shaped lesion,
- liver infarction - yellow lesion,
- splenic infarction - dark red, then yellow lesion.

Ischemia and finger plethysmography

In severe ischemia, finger plethysmograph examination is not recommended because the disease may accelerate during the measurement. If the physician decides to perform this examination, he or she should still include a warning about ischemia in the referral form and instruct the patient to discontinue vasodilating medication.

🔎 *For more information see Finger plethysmograph.*

Links

Related articles

- Coronary artery disease
- Myocardial infarction
- Chronic ischaemic disease of the lower limbs
- Cerebral ischemia

Sources

- PASTOR, Jan. *Langenbeck's medical web page* [online]. [cit. 2009]. <https://langenbeck.webs.com/>.
- POVÝŠIL, Ctibor – ŠTEINER, Ivo. *Obecná patologie.* 1. edition. Galén, 2011. 290 pp. ISBN 978-80-7262-773-8.