

Avascular bone necrosis

Avascular bone necrosis (synonyms: aseptic bone necrosis, subchondral avascular necrosis^[1]) *is a term describing bone necrosis of a non-infectious origin (hence aseptic), accompanied by bone ischemia (hence avascular).* In Anglo-Saxon literature, the abbreviation AVN (AVascular Necrosis) is used.

Etiopathogenesis

In the pathogenesis of the disease, a disorder of the microcirculation of the bone marrow and bone is used. The causes of microcirculation disorders can be divided into:

1. Known causes
2. Probable causes
3. Idiopathic bone necrosis

Known causes

- Fracture (mechanical compression of blood vessels).
- decompression sickness (occlusion of blood vessels with bubbles).

Probable causes

- metabolic diseases and diseases that increase blood coagulation – sickle cell anemia (occlusion of blood vessels by rigid erythrocytes), diabetes mellitus, disorders of lipid metabolism. pancreatitis, tumors, gout,
- systemic lupus erythematosus,
- iatrogenic – as a complication of corticoid administration, forced reduction of fractures and dislocations, dialysis,
- alcoholism,
- smoking.

Idiopathic bone necrosis

These are often necrosis in very young boys.

The above list is far from complete, there are even several mnemonics for very long lists of causes - STARS, PLASTIC RAGS, ASEPTIC.^[2]

Avascular bone necrosis most often affects **convex articular surfaces** - in these places there is no collateralization and the terminal arteries are *fragile*. The **reduced vascularization** of the yellow (vs. red) bone marrow further contributes to susceptibility. In the case of idiopathic necrosis, the exact pathophysiology is not clear, usually neither thrombosis nor coagulopathy^[1] is demonstrated.

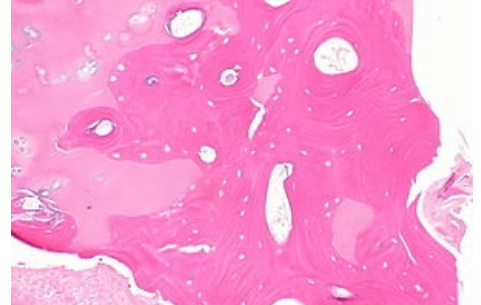
Eponyms

Below is a very abbreviated list of avascular necrosis eponyms ^[3].

- Morbus Legg-Calvé-Perthes – femoral head.
- Morbus **Osgood-Schlatter** – fragmentation of the tuberositas tibiae.
- Morbus **Friedrich** – medial edge of the clavicle.
- Morbus **Köhler I** – os naviculare pedis.
- Morbus **Kienböck** – os lunatum.
- Morbus **Sever** - calcaneus.
- Morbus **Freiberg** - 2nd, 3rd, and 4th. metatarsus.
- Morbus **Panner** - capitulum humeri.
- Morbus **Ahlback** - medial condyle of the femur.
- Morbus **Blount** - medial part of the proximal tibial metaphysis.
- Morbus **Sindig-Larsen-Johansson** – patella.
- Morbus **Pierson** – Symphysis (Pubic symphysis).
- Morbus **Haas** – humeral head.

Display

As a result of a blood supply disorder (ischemia), **bone resorption and calcification** can be recognized on a plain image within 6-8 weeks, manifesting as inhomogeneities in a bone infarction.



Avascular bone necrosis - microscopic specimen

Links

Related Articles

- Morbus Perthes

Used Literature

- SOSNA, A – VAVŘÍK, P – KRBEC, M. *Základy ortopedie*. 1. edition. Triton, 2001. 175 pp. ISBN 80-7254-202-8.

Reference

1. CRISTINA, Fondi – FRANCHI, Alessandro. *Definition of bone necrosis by the pathologist* [online]. ©2007. [cit. 2016-11-19]. <<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2781178/>>.
2. GAILLARD, Frank. *Avascular necrosis causes (mnemonic)* [online]. [cit. 2016-11-19]. <<https://radiopaedia.org/articles/avascular-necrosis-causes-mnemonic>>.
3. GAILLARD, Frank. *Avascular necrosis* [online]. [cit. 2016-11-19]. <<https://radiopaedia.org/articles/avascular-necrosis>>.