

Gangrene

Gangrene is a necrosis modified by **secondary changes** (drying, infection).

Types of gangrene

Dry gangrene (mummification)

Necrosis **modified by desiccation** (physiologically – umbilical cord). It occurs mainly on the limbs during vascular occlusion. The breakdown of erythrocytes occurs. Hemoglobin changes to hematin (the color is first purple-red, later dark brown). Dry skin resembles parchment.

Wet gangrene sněť (*sphacelus*)

Necrosis **modified by an infection by putrefactive bacteria** (*fusospirilla*, genus *Proteus* etc.). It most often follows coagulation necrosis.

Necrotic tissue has a moist appearance, smells, and disintegrates in streaks. The color is **dirty green**. This coloration is due to the action of sulfane produced by the bacteria on the hemoglobin, which changes to green verdohemoglobin (as in pseudomelanosis). Percolation facilitates the penetration of decaying substances and bacterial toxins into the circulation, leading to fatal toxemia.

It primarily affects the lungs, intestines, tumours, feet of diabetics. Another example is **fusosporillosis** (synergistic action of *Borrelia Vincenti* and *Fusobacterium fusiforme*), which causes **Plaut-Vincent's angina**, **ulceromembranous Gingivitis** and **noma** (necrotic breakdown of the buccal mucosa in general collapse - especially in malnourished children in Africa). However, these diseases are rather classified as gangrenous inflammations (gangrene is a regressive change, not an inflammation).

Gas gangrene (*gangraena emphysematosa*)

Necrosis modified by infection by histotoxic gas-forming clostridia, eg *Clostridium perfringens* (Welchii). It occurs after trauma, when clostridia are embedded deep in the tissue (soil contamination in the wound), where they can multiply in an anaerobic environment.

With their toxins, they cause myonecrosis - the toxins penetrate into the circulation, the patient dies of toxemia. The alpha toxin is lecithinase - lipids can sometimes be detected in the blood. During their metabolism, clostridia convert glycogen into methane. The gas bubbles then penetrate the tissues, which **crackle** to the touch.

Macroscopically, edema, crepitation of gas during palpation, change in color - from dark redness, through dark bronze to black.



Gangrene of the fingers (plague)



Wet gangrene



Dry gangrene



Gas gangrene

Gangrene and risk factors

- *Diabetes mellitus*;
- atherosclerosis;
- Bürger's disease (*thrombangiitis obliterans*);
- gangrene after a burn;
- Blood vessel spasm caused gangrene (Raynaud's disease);
- gangrene in decubitus;
- *appendicitis gangraenosa* (inflammation of the wall affecting the vessels – ischemie – gangrene of the wall with perforation develops).

Links

Related articles

- Necrosis
- Complications of diabetes mellitus

Sources

- PASTOR, Jan. *Langenbeck's medical web page* [online]. [cit. 03.08.2009]. <<https://langenbeck.webs.com/>>.

Used literature

- POVÝŠIL, Ctibor – ŠTEINER, Ivo. *Obečná patologie*. 1. edition. Praha. 2011. 290 pp. ISBN 978-80-7262-773-8.