

# Medicine for Managers

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## Gangrene

The Diarist John Evelyn (1620-1706) wrote graphically about Gangrene. “. . . my Chirurgeon cut off a poore creatures leg, a little under the knee, first cutting the living and untainted flesh above the Gangrene with a sharp knife, and then sawing off the bone in an instant, then with searing and stoo pes stanching the blood, which issued abundantly. . .” Despite the surgery, disease “..cost the poor creature his life, to my very great sorrow.’

**G**angrene occurs when the blood supply to an area is lost resulting in death of the dependent tissues. Most commonly it affects the periphery, typically the hands and feet.

Interference with the blood supply may be the result of injury or infection or any cause of disease or damage to blood vessels which impairs blood flow.

The disease may develop slowly or rapidly depending on the aetiology. Early features include reddening and swelling, severe pain or loss of sensation and the development of sores which leak evil-smelling fluid. The area may turn purple and then black over time and the surface becomes parchment-like before the dead area separates and falls away.



If the area becomes infected the typical features develop: high temperature, rapid breathing, loss of appetite, shivering, dizziness and disorientation.

The disease is serious but much more so if infection enters the bloodstream resulting in septicaemia. The patient develops septic shock with collapse, high fever, rigors, confusion, vomiting and feeling cold and clammy.

Gangrene can occur after traumatic injury, a burn or trauma with a penetrating wound. It may also occur more insidiously as a result of any disease which compromises blood flow.

Atherosclerosis (the build-up of plaques of fatty material in arteries) or any other cause of

peripheral arterial disease, such as diabetes, smoking or high cholesterol, may be significant.

Frostbite is a significant cause of gangrene. During Captain Scott's ill-fated expedition to the South Pole, severe frostbite occurred and Laurence Oates, stricken with frostbite and gangrene, left his tent to die in a blizzard with the words "I'm just going outside and I may be some time", according to Scott's diary.

Other groups at risk of gangrene are those with weakened immune systems as a result of HIV or chemotherapy, drug users, the obese, those with kidney failure and the malnourished.

Gangrene is classified according to the cause:

- **Dry Gangrene**, which occurs following complete obstruction to blood flow in an area
- **Wet gangrene**, usually due to injury complicated by infection and may spread swiftly round the body
- **Internal gangrene** usually associated with an infected organ such as the appendix, colon or gall bladder
- **Gas Gangrene**. Very rare but especially dangerous. Bacteria release toxins together with gas in the tissues. Without treatment it can be deadly within hours
- **Other rare forms** which may affect the genitalia or the skin

Data suggests that in excess of 40,000 people a year are admitted to hospitals in the United Kingdom with gangrene.

### Diagnosis of Gangrene

It is often easy to diagnose from the history, the appearance and the smell. Investigations such as blood tests, including blood cultures, and imaging, such as radiography and MRI or CT scanning, will confirm the nature and spread of the gangrene.



### Treatment of Gangrene

The key principles of treatment are:

- To remove all dead tissue
- To treat any existing infection

The cause of the disease should also be evaluated to identify any further treatment required to prevent recurrence as a result of, for example,

obstruction of further blood vessels.

**Surgery** is commonly used to excise the dead tissue. The procedure is known as **debridement**. In some cases the dead and the healthy tissues are sharply demarcated and can be left to separate naturally.

**Amputation** may be the surgical treatment of choice in areas affected by gangrene to remove, not only the diseased area but also some healthy tissue as well to ensure that there is no risk of further gangrenous development. Such a circumstance might occur, for example, in a leg

where a foot has become gangrenous and the lower leg is also surgically removed to eliminate the risk of more dead tissue or spread of infection. In addition, it may be necessary to repair damaged blood vessels to improve flow or to carry out skin grafting to facilitate any necessary reconstruction of the area.

**Prevention** of gangrene is of course very important, particularly in patients who are at risk of the disease. Diabetic patients should try to ensure the maintenance of controlled blood sugar levels and also to check the feet, legs and hands for any signs of injury, infection, slow wound healing or other skin problems.

Regular podiatry is valuable to identify any foot problems.

Smoking should be discouraged vigorously because it may lead to narrowing and, ultimately, blockage of arteries. High cholesterol diets should be avoided because raised cholesterol is associated with atherosclerosis. Raised blood pressure may also damage arteries.



Gangrene is a horrible disease. It has been the source of writings and paintings for many centuries.

The word itself is derived from the ancient Latin word “gangraena” which in turn comes from an ancient Greek word “gangraina” meaning “an eating or gnawing sore”.

The French King Louis XIV died of gangrene on September 1<sup>st</sup> 1715, as did Louis XVIII. Other famous people who succumbed to the disease include Edouard Manet, US President William McKinley and Peter the Great of Russia.

Now, it is not the scourge it once was because of better physical health, quicker diagnosis and effective antibiotics.

However, it is important that damage and infection at the extremities, especially in vulnerable groups, should be treated promptly and appropriately to avoid tissue death and the risk of spreading infection.

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