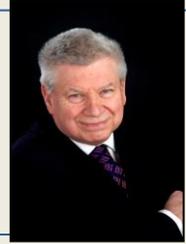


# Medicine for Managers

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## Gangrene

**The Galleon rolled in the temptuous sea, its billowing sails defining its magnificent form, its twenty-four guns delivering death and destruction to the French frigate. On their decks, the glistening sweating bodies of the sailors, below the surgeon in the half-light working on groaning dying men, removing the gangrenous limbs. Delay would mean inevitable, horrible death.**

Perhaps that is how most people think of gangrene; an eighteenth century condition suffered by military men wounded in battle, the heroic surgeon, armed only with whiskey as an anaesthetic, a stick to bite on and a sharp knife to remove the offending limb. It is said that the record for removal of a leg was seven seconds and the assistant lost two of his fingers in the process.

Of course, that is not really the true picture of gangrene, although many wounded soldiers and others did develop it. The disease is very serious and it occurs anywhere in the body where the blood supply to an area is lost resulting in the 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 quickly or more slowly 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 is infected the typical features develop; high temperature, rapid breathing, loss of appetite, shivering, sweating, dizziness and disorientation.

The disease is serious but is rapidly more so if infection enters the bloodstream and

septicaemia develops. The patient develops septic shock with collapse, very high fever, shivering and rigors, confusion, vomiting and feeling cold and clammy.

Gangrene can occur after any serious injury, such as a car accident or burn, or sudden infection, which may occur following trauma with a penetrating wound, but many people are at risk of developing gangrene more insidiously. Essentially any disease which may compromise the blood flow puts the patient at risk of the disease. 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.



Captain Scott's ill-fated expedition to the South Pole resulted in severe frostbite for the team. Indeed in a poignant and enduring moment in exploration history, Laurence Oates, stricken with gangrene and frostbite, walked out of his tent to die in a blizzard, with the words "I'm just going outside and I may be some time"

Other people 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 may be classified into several types, depending on the cause:

- **Dry gangrene.** Occurring as a result of complete obstruction to blood flow to an area
- **Wet gangrene.** Usually due to injury complicated by infection
- **Gas gangrene.** Infection normally within the body with bacteria which produce gas

Some people classify separately those circumstances where an internal organ becomes obstructed and dies. This is typically the gall bladder or the appendix.

Data suggests that between 35-40,000 people a year are admitted to hospitals in the United Kingdom with gangrene.



Diagnosis of gangrene is often easy from the history, the appearance and the smell.

Investigations such as blood tests, including blood cultures and imaging, such as radiography and scanning using MRI or CT will confirm the nature and spread of gangrene.

### **Treatment**

The key principles of treatment are to remove the dead tissue and to treat any existing infection. The cause of the gangrene should also be addressed and further treatment may be required to prevent a recurrence of the problem as a result, for example, of obstruction of further blood vessels.

### **Surgery**

Although surgery is commonly used to excise the dead tissue, a procedure known as *debridement*, in some cases where the dead and the healthy tissue are sharply demarcated, the gangrenous area can be left to separate naturally.

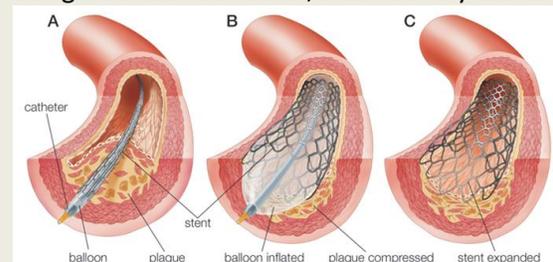
### **Maggot Therapy**

Fly maggots have been used to treat necrotic (dead) tissue since before the Battle of Hastings, because some species of maggots feed on dead tissue only. The technique became unfashionable with the advent of modern surgical and medical techniques but the approach has experienced a renaissance more recently. Laboratory-bred maggots are placed on the necrotic area and covered. The area is uncovered a few days later and is cleaned. The maggots have been shown in many cases to be more effective than surgery but the principal contraindication is patient reluctance.

### **Amputation**

It is sometimes appropriate in areas of gangrene to excise, not only the affected area but to remove healthy tissue as well to ensure that there is no risk of spread or development of more gangrenous tissue. Such a circumstance might occur, for example, in a leg where a foot has become gangrenous and a surgeon removes the lower leg to eliminate the risk of more dead tissue or spread of infection.

Gangrene is not the scourge that it was because of the advent of effective surgery and the variety of antibiotics now available. In addition, in areas where blood flow is compromised and tissues are vulnerable to developing gangrene, the possibility of vascular surgery provides the real prospect of preventing the disease. Bypass surgery can be used to create new channels which circumvent blocked or narrowed arteries to improve blood flow and maintain tissue viability. Alternatively angioplasty techniques can be used to achieve the same end. Narrowed arteries can be dilated using a balloon device or, alternatively stents.



Stents are used to keep open partially or completely blocked arteries. A collapsed balloon inside a collapsed stent is placed in the damaged artery. The balloon is then inflated

opening the stent. The balloon can then be withdrawn leaving the stent fully expanded.

Of course prevention is better than cure and, whatever the state of health, there are actions that can be taken to reduce the risk of gangrene. Good foot care is essential and it is for that reason that all diabetics are directed to regular podiatry to enable the recognition of any early foot changes. Smoking should be discouraged vigorously because it causes narrowing and, ultimately, blockage of arteries. Diets high in cholesterol should be avoided because raised cholesterol is associated with atherosclerosis. Raised blood pressure may also damage the arteries. So, as so many of these articles say, for least risk it is necessary to have a healthy lifestyle with a good diet, modest alcohol, no smoking, and with regular exercise.

Gangrene is a horrible complication to suffer. So it has been recognised for many centuries. Samuel Johnson wrote of it when trying to illustrate the seriousness of a characteristic, said  
“Contempt is a kind of gangrene, which if it seizes one part of a character corrupts all the rest.”

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