

THE ENIGMA OF LIMB ISCHAEMIA WITHOUT BLOCKED ARTERIES: IS THERE BLAME?

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⇒ I HAVE BEEN ASKED to advise in cases where gangrene of the limb occurred despite normal function being present in the peripheral arteries. The explanation is that the circulation collapsed and the claimants were supported by modern ITU care, which permitted preservation of blood flow to the heart, lungs, liver and kidneys; but that was at the expense of blood flow to the limbs. The severity of the loss of peripheral blood flow was so severe that amputation of toes, fingers or limbs was required.

Septicaemia may cause limb ischaemia

Sepsis, or septicaemia, is a condition on which there has been considerable focus in recent years. In this condition severe illness results from infection which may arise in the lungs, kidney or bile ducts in the liver. Other sources include meningitis and intra-abdominal infection. The clinical presentation may be insidious malaise in a patient who looks sick.

The signs of infection have to be carefully sought in order to make the correct diagnosis. There has been considerable emphasis on the subject reflected in training for medical and nursing staff.

The clinical features include a confusional state, low blood pressure, high heart rate, high respiratory rate, increasing oxygen requirement and a rash or mottled look to the skin. Left untreated or neglected, this condition leads to considerable mortality. Appropriate treatments include oxygen administration, intravenous fluids and antibiotics. Delays in commencing appropriate treatment may lead to collapse, with a high mortality rate.

Despite implementing appropriate treatment, some patients may remain in a poor condition and require management in ITU. The cause of the problem is toxins released by the bacteria giving rise to the infection. The circulation of the patient has to be supported by the infusion of fluids and with 'inotropic' drugs. These increase the blood pressure and ensure that blood continues to flow to the major organs at the expense of reducing blood flow to the extremities. Usually, the limb will tolerate the treatment for a limited period; but after several days in severely ill patients, peripheral gangrene may be the result.

A further complexity in patients with sepsis is that the platelets and clotting system may become generally activated. That is called disseminated intravascular coagulopathy (DIC). The platelets become stuck to the inside of blood vessels leading to deposition of thrombus on the wall of arteries and veins. Sometimes thrombosis blocks major arteries, leading to deterioration of limb ischaemia. The lack of platelets and clotting factors may lead to life-threatening haemorrhage simultaneously with thrombotic occlusion of blood vessels. Transfusion with platelets and plasma may be required to treat the problem.

A vascular surgeon confronted with the evolution of ischaemic toes or fingers, or more extensive limb ischaemia, may be able to offer little other than advice in such a situation. Assessment of the



Ischaemia of toes following an episode of sepsis

patency of peripheral arteries is essential to detect blocked major arteries. These can be reopened by standard vascular surgery techniques. Anticoagulant treatment may be appropriate, depending on the function of the platelets and clotting factors in the blood. The skin of the peripheries should be carefully protected by off-loading devices to avoid pressure ulcers developing.

Peripheral ischaemia after major haemorrhage

Peripheral ischaemia may develop after large volume haemorrhage following major injury, complex surgery or as the result of obstetric disasters. Large volume blood loss is another circumstance in which the body's response is to close down circulation to the limbs to maintain the blood flow to vital organs.

Urgent blood and fluid transfusion by medical staff is essential in order to maintain the blood flow; however, that may result in large volumes of blood being transfused. DIC may arise in that situation, again leading to thrombosis in arteries and veins. The response of the body to low blood pressure involves reducing blood flow to the peripheries and to the intestines. The intestines contain many bacteria which can cause sepsis. These release toxins as they travel through the intestines.

The toxins inside the intestines do not normally get absorbed with a healthy intestine. The lining of the bowel prevents the toxins crossing into the blood as it retrieves nutrients from the food. That mechanism may break down when the intestines are subjected to greatly reduced blood flow, allowing the toxins to enter the circulation, leading to a similar collapse to that seen in sepsis.

I have advised in cases where a range of complications arose from peripheral ischaemia in such cases. Residual problems have included amputation of limbs and digits, as well as persistent neuropathic pain.

Litigation arising from sepsis and haemorrhage cases

As a general statement, once the diagnosis of sepsis or major haemorrhage has been identified, the aftermath has been the management of the collapsed state of the patient by senior clinicians in a competent manner. ITU is usually managed by experienced clinicians who are familiar with the correct treatment for those conditions. The use of inotropic drugs is often the cause of worsening peripheral blood flow, but they are given with the aim of saving life in the full knowledge that peripheral ischaemia may arise. That is a known adverse effect of life-saving treatment.

Delayed treatment of sepsis or haemorrhage leads to worse outcomes. For that reason much effort has been put into additional training of staff to ensure that deterioration in the condition of patients is detected at an early stage. I recommend careful review of the clinical records in those cases to identify evidence of delayed treatment. Where that is present a claimant may be able to assert that a better outcome would have been achieved with prompt diagnosis and treatment.

As I have already noted, the role of the vascular surgeon is limited in those cases and any treatment is delivered with careful consideration by experienced senior staff. I have not identified a single case where the outcome of peripheral ischaemia arising from sepsis or haemorrhage would have been improved by better vascular surgical care.

In conclusion, in cases where sepsis or major haemorrhage, gangrene of limbs or digits may occur despite normal function being present in the peripheral arteries, the explanation is that the circulation collapsed and the claimants were supported by modern ITU care which permitted preservation of blood flow to the heart, lungs, liver and kidneys but this was at the expense of blood flow to the limbs. The severity of the loss of peripheral blood flow was so great that amputation of toes, fingers or limbs was required. Expedient treatment of sepsis and major blood loss is required to minimise the likelihood of such complications. Vascular surgeons have a very limited role. □

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20 years

Defendant instructions

Claimant instructions

Single joint expert

Court experience

Areas of experience:

- Surgery of veins and arteries
- Sclerotherapy & laser ablation of varicose veins
- Varicose veins
- Deep vein thrombosis
- Pulmonary embolism
- Leg ulcer
- Lymphoedema
- Peripheral ischaemia
- Injury to blood vessels
- Medical negligence and personal injury

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