

ESTABLISHING A DIAGNOSIS BEFORE TREATMENT: TERMINAL ILIAC ARTERIAL DISEASE

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PATIENT DETAILS AND HISTORY

A 68-year-old woman with a long history of peripheral vascular disease was admitted to a medical ward with a chest infection. It was necessary to admit her to critical care because her respiratory functions had deteriorated.

The patient was known to the vascular department who had been treating her for the previous 15 years. She had undergone many investigations and surgical interventions; a diagnosis of vascular disease culminated with a right hindquarter amputation and an above-knee amputation of her left leg. She had type 2 diabetes.

The patient was a smoker and had been unable to stop smoking despite the very visible damage it had caused. She was often seen smoking outside the hospital grounds during her many admissions to the vascular unit. A referral to tissue viability was made, as during this period as an inpatient, the skin on the patient's sacrum and buttocks had deteriorated over 4–5 days with dramatic speed (*Figure 1*). This wound was described as a Grade III pressure ulcer on the European

Pressure Ulcer Advisory Panel (EPUAP) scale.

ASSESSMENT AND ESTABLISHMENT OF TREATMENT OBJECTIVES

On assessment, the patient was nursed on a low air loss bed, which was the suitable therapy bed for her and ensured that she was comfortable. Low air loss mattresses allow for the patient to sink into the mattress allowing for an even distribution of pressure. They conform to the patient's bony prominence, minimising tissue deformation. Her respiratory functions were poor but she was able to breathe by herself without assistance from ventilatory equipment. She was not supported by inotropes (drugs that vasoconstrict to increase blood pressure) and was not given any other vascular constrictors.

The patient had been catheterised and also had faecal incontinence. She was conscious but very tired. Communication was, therefore, limited and it was hard to judge her state of mind.

Her sacrum had multiple necrotic areas, some with hard necrosis and some with soft necrosis.



Figure 1. Skin damage due to iliac artery occlusion.

The extremities of both her hindquarter and above-knee stump showed signs of being vascularly compromised (there was not enough blood flow to this area), with blue-purple discolouring along the healed suture line. At first glance it would be easy to mistake this extensive skin damage for damage caused by pressure but this was not the case.

This woman's symptoms were consistent with internal iliac arterial disease, where the internal iliac arteries become occluded and no blood supply feeds the sacral region. This was confirmed by a scan. Knowledge of the disease process of peripheral vascular disease enables the expert clinician to offer a realistic and humanistic plan of care.

ANATOMY AND PHYSIOLOGY

The aorta is the largest artery in the human body; it leaves the heart with oxygen-rich blood and passes behind the lower abdomen. It splits into two common iliac arteries at the level of the fourth lumbar vertebrae in the lower back. The common iliac artery then splits into the internal and external iliac arteries at the level of the fifth lumbar vertebrae. The internal iliac artery supplies blood to the pelvis and buttocks and the external iliac artery continues to the groin. The superior and inferior gluteal arteries supplying blood to the buttocks are the main branches of the internal iliac artery (Hassen-Khodja et al, 1987).

Arteries are composed of three layers: intima, media and adventitia. The intima lines the inside of the blood vessel and contains mostly elastic tissue, which allows the artery to change shape. The media contains muscle and fibres that allow the artery to dilate when blood is pumped through it. The adventitia contains fibroelastic tissue. In traditional 'textbook' arterial disease, a cholesterol plaque builds up and sticks to the blood vessel side of the intimal layer.

Smoking and its impact on the arteries

Cigarette smoke is a complex mixture of toxic matter containing more than 4,000 substances (Silverstein, 1992), and while it is difficult to ascertain from the literature which components adversely affect wound healing, the toxins of greatest interest are nicotine, carbon monoxide and hydrogen cyanide (Whiteford,

2003). Nicotine is the principle vaso-active component in smoke, causing vasoconstriction and decreased tissue perfusion (Silverstein, 1992). Carbon monoxide contained in cigarette smoke has the ability to bind with haemoglobin that is 2,000 times greater than oxygen (Whiteford, 2003). Haemoglobin combines with oxygen in order to carry it to the body's cells. Cigarette smoke effectively inhibits the binding of oxygen, decreasing the oxygen-carrying capacity of haemoglobin which leads to tissue hypoxia. Hydrogen cyanide inhibits the enzyme system necessary for oxidative metabolism and oxygen transport at the cellular level (Silverstein, 1992). This means that the patient's ability to transport oxygen to the cells is limited, and the ability to heal damaged tissue is also limited.

TREATMENT PROVIDED

It was decided that because the patient's wound had no vascular flow to the skin, it would never heal without surgical intervention to unblock the iliac artery. Unfortunately the patient's general health was not good enough to sustain an attempt to re-establish flow as she was in multi-organ failure. The aim was, therefore, to keep the patient as comfortable as possible in the end-stages of life.

The skin was washed with emollient (Hydromol, Alliance Pharmaceuticals, Wiltshire) melted in warm water. Hydromol was chosen to keep the skin in the best possible condition. By ensuring the skin's pH is kept as near to 5.5 as possible, it allows the skin to maintain its functions (barrier to infection and temperature regulation).

The skin was then patted dry and Cavilon (3M, Berkshire) sprayed for extra protection. The use of incontinence pads was discouraged because their plastic backing encourages sweating and maceration of the skin. The patient was nursed instead on a low air loss mattress with Gore-Tex sheets. Air flows through Gore-Tex at a controlled rate, removing excess moisture and maintaining a constant skin temperature, while preventing bacterial contamination.

The patient died peacefully shortly after. The treatment aim had been achieved as she had not had to have painful debridement, and did not have to have her sacrum dressed, which would have made her uncomfortable.

CONCLUSION

It is important to establish a diagnosis before prescribing treatment. This wound was erroneously described as a pressure ulcer by staff in the critical care unit, when in fact it was due to tissue death caused by an irreversible blockage of the iliac arteries. The aim of the treatment for this patient was achieved: comfort in her last days of life. **WE**

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