Letter: Leeches as a cost-effective measure in plastic and reconstructive surgery

Dear Sir

The theory of the four humours and the treatment of bloodletting using leeches was a fundamental milestone for Hippocrates and his colleagues in ancient Greece. Although the treatment of leeches dates even further back to the ancient Egyptians, Babylonians and Hindus, it is not common knowledge that their use in modern medicine is a daily practice[1]. We will discuss their application with the cost-effectiveness of the 'healer', as the name leech means in ancient Gothic within the plastic and reconstructive surgery setting.

In plastic surgery, the most commonly used species of leeches is *Hirudo medicinalis*, otherwise known as the European Medical leech. Its Asian and North American cousins, which are also used, belong to the same *Hirudo* family. Their function in bloodletting has great use in plastic and reconstructive surgery, specifically in congested flaps from thrombosed venous vessels and in re-implantation of digits where congestion usually occurs because venous return has not yet re-vascularised[2]. This venous obstruction or lack of venous return threatens the flap's viability.

The leech attaches to the skin by three rows of teeth inside the anterior sucker, where blood is facilitated into its stomach by peristalsis. The biting and sucking of blood are pain free to the patient as they inject a local anaesthetic. They usually take 15–20 ml of blood and then stop sucking and detach themselves from the tissue engorged. However, their bloodletting capability does not stop there[3]. After the active bloodletting stops, passive bloodletting continues because of the injected anticoagulant, hirudin, which carries the action locally. The guidelines are 20–30 leeches per flap initially and close observation as well as monitoring the haemoglobin as excessive bleeding can be a result of this treatment. The application is simple, where the area to be treated is identified and then thoroughly cleaned with soap and water. To prevent the leeches from migrating, either a gauge should surround the area of application or petroleum jelly should be applied around the wound edges. A small needle prick is made to guide the leech on where to attach (fig. 1). Once they finish feeding, the leeches will drop off, following which they are collected and placed in a container of 70% alcohol and clearly marked as 'used leeches', as they are of single use. The unused leeches are then sent back to the pharmacy. The adverse effects of leech application and treatment are a pulling effect, once the leeches attach themselves, and transient itching. They are contraindicated in haemophilia, anaemia, bone marrow suppression, human immunodeficiency virus (HIV) infection, active peptic ulcer(s) or erosive gastritis and pregnancy.

The alternatives in flap salvage, where venous congestion has occurred, exist and are feasible; however, the risks are much greater as are the costs. The first and most common route to salvage the flap or digit is revisiting the site surgically, and re-anastomosing the veins where occlusion has occurred, the second is catheter thrombectomy the third, hyperbaric oxygen and the last, thrombolytic therapy. They are all valid ways to attempt flap or digit salvage; however, the risk of re-operating under anaesthetic or intravascular procedure carries major risks and complications especially soon after the initial operation. Hyperbaric oxygen therapy does not exist in all trusts, while thrombolytic therapy has its own complications and it is not a common practice. In re-implanted digits, however, it has no use.

international wound journal

Figure 1. Leeches improving circulation in a distal f flap suffering with congestion

Other ways of causing local bloodletting either by small machines as an active process or local anticoagulant as a passive process to mimic the effects of leeches have failed[4].

The difference in costs between using leeches and surgery is vast. In theatre, the time, anaesthetist, nursing staff, materials and surgeons can run costs between 1500 and 2000 GBP for a 3- to 4-hour operation, and if intraoperative complications occur then the costs mount further. Leeches, on the other hand, cause on average 11 GBP in the UK and with an average of 40 leeches per patient for the treatment of a single flap, the costs are much lower. The application does not require the surgeon's presence and the nursing staff can be trained within the trust for this simple procedure as well as for monitoring the treatment needs. In addition, the patient is actively taking part in the monitoring of his treatment and would be the most important link between the leeches and the surgeons prescribing them.

Respectfully submitted,

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