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Hirudo Medicinalis and the plastic surgeon

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Summary Medicinal leech therapy is an ancient craft that dates back to ancient Egypt and the beginnings of civilisation. The popularity of *Hirudo Medicinalis* has varied throughout history, reaching such a peak in Europe in the early 19th century that supplies were exhausted. During the latter half of the 19th century, their use fell out of favour, as they did not fit in with the emerging concepts of modern medicine. Leeches have enjoyed a renaissance in the world of reconstructive microsurgery during recent years, and their first reported use in alleviating venous engorgement following flap surgery was reported in this journal [M Derganc, F Zdravic, Venous congestion of flaps treated by application of leeches, Br J Plast Surg 13 (1960) 187] [1].

Contemporary plastic and reconstructive surgeons in units throughout the United Kingdom and Ireland continue to use leeches to aid salvage of failing flaps. We carried out a survey of all 62 plastic surgery units in the United Kingdom and the Republic of Ireland to assess the current extent of use, and to investigate current practice.

We have shown that the majority of plastic surgery units in the UK and Ireland use leeches post-operatively and that the average number of patients requiring leech therapy was 10 cases per unit per year. Almost all units use antibiotic prophylaxis, but the type of antibiotic and combination used is variable.

We outline current practice and suggest a protocol for the use of leeches. Whilst the use of leeches is widespread, the plastic surgery community has progressed little in defining indications for their use or in achieving an accepted protocol for their application in units throughout the UK and Ireland.

The first recorded use of the medicinal leech dates back to ancient Egypt, with images of the leech adorning the walls in a sepulchre of the 18th dynasty pharaohs (1567–1308 BC). Galen (130–201 AD), the physician to Marcus Aurelius, commonly used leeches for blood letting, and through the development of his humoral concept of disease made leech therapy widespread. The belief was that removal of the patient's blood would correct the humoral imbalance and restore good health.

In France, under the influence of François-Joseph-Victor Broussais (1772–1832), surgeon in Naploeon's Grande Armée, the use of leeches reached its zenith. Leeches were so in demand

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that supplies throughout Europe and the United States of America were almost exhausted. Government initiatives to build leech farms had to be employed to meet demand, and the trafficking of leeches throughout the world reached an all time high. By the end of the 19th century, the leech had lost its popularity as their therapeutic use did not fit in with the concepts and development of modern physiology, pathology and microbiology.

Haycraft[2] discovered a pure anti-coagulating preparation contained in the saliva of the leech in 1884 which he named 'Hirudine' after the Latin word 'Hirudo', and bought the possible uses of leech therapy back into mainstream medical literature.

In 1955, Markwardt[3] isolated and accurately characterised Hirudin from leech pharyngeal glands, and in 1986 this potent anticoagulant was first produced in quantity by genetic engineering.[4] In addition to Hirudin, the leech also secretes hyaluronidase, which allows the anticoagulant to spread throughout the wound, and antihistamines, which vasodilate and contribute to prolongation of bleeding following a bite.

The medicinal leech has been used by reconstructive surgeons in recent years to aid salvage of compromised microvascular free-tissue transfers,[5,6] replanted digits,[7] ears,[8] lips[9,10] and nasal tips.[11] Peer-reviewed evidence suggests that the survival of compromised, venous-congested tissues are improved by early application of a leech.[12–14]

Although we know from our experiences in plastic surgery units throughout the United Kingdom and Ireland that leeches are used post-operatively in certain cases, no quantitative study on this subject has been previously published. In addition to assessing the current extent of use of *Hirudo Medicinalis*, we also assess current practice, and make recommendations for future improvements in protocols.

Method

A telephone survey of all 62 plastic surgery units in the United Kingdom and the Republic of Ireland was conducted in November 2002. The names, addresses and phone numbers were obtained from the British Association of Plastic Surgeons Website (www.baps.co.uk). Information was obtained from a senior member of nursing staff, who had first hand experience of the use of leeches on the unit.

1. Are leeches used post-operatively by the plastic surgeons in your unit?
2. How many times per year on average are leeches used?
3. Do you use antibiotics routinely post-operatively when leeches are applied?
4. Do you disinfect sites prior to leech application?
5. How frequently are the leeches monitored?
6. Do you routinely counsel patients?
7. Had any patients refuse treatment with leeches?
8. Were there written protocols for the use of leeches?
9. Do you keep leeches in the hospital overnight?

Results

Accurate information was gained from 50 (81%) of the 62 units. Of these, 40 (80%) had used leeches post-operatively in the salvage of compromised free flaps or digital replants within the last 5 years. Fifteen units used leeches 1–5 times per year, 10 units used leeches 6–10 times per year, 12 units used leeches 11–15 times per year and three units used leeches more than 16 times per year (see Fig. 1). The average number of patients requiring leech treatment was 10 cases per unit using leeches per year. Thirty seven units used prophylactic antibiotics routinely during leech application, with augmentin, metronidazole, benzyl penicillin, ciprofloxacin and flucloxacillin all being used (see Fig. 2).

The site of application was disinfected by 31 units (77.5%). Of these, 13 (42%) used sterile water, 12 units (39%) used saline, three units (10%) used alcohol, one unit (3%) used heparinised saline, one unit (3%) used warm saline and one unit (3%) used warm water. Eleven of the 40 units (27.5%) routinely had a nurse stay with the patient for the entire duration of 'leech therapy'. In the remainder of units, nurses observed at 5–10 min intervals, and plastic surgeons observed patients when on the ward. Most units counted leeches on the wound to avoid losing leeches in the dressings.

Patients were routinely counselled in 21 (52.5%) of the plastic surgery units, patient information leaflets were available in four units (10%), and the services of a clinical psychologist were available in five units (12.5%). Four units (10%) reported patient refusals in the last 5 years. Written protocols concerning the use of leeches were available in 35 units (85%) and 28 units (68%) routinely kept leeches in the hospital pharmacy overnight.

Discussion

Our study shows that the majority of plastic surgery units in the United Kingdom and Ireland use *Hirudo*