

The salvage of congested skin flaps by the application of leeches

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Summary—A series of seven patients with engorged skin flaps is reported. Application of leeches avoided the expected partial or complete loss of these flaps. Practical details of their application and the absence of complications are described and discussed.

During the course of general plastic surgical practice, various forms of pedicled skin flaps occasionally suffer periods of severe venous congestion. It is generally recognised that flaps undergo necrosis more frequently as a result of venous congestion than arterial insufficiency. Venous congestion of flaps is therefore a significant clinical problem. A series of seven patients is presented in whom flaps that had been raised, either by surgical intent or by trauma, suffered periods of intense venous engorgement. These flaps were expected by the authors and other observers to progress to partial or complete necrosis. In every case this undesirable outcome was avoided by the timely application of leeches.

Case reports

Case 1

A man, aged 81, presented with an 8-year history of an extensive ulcerating basal cell carcinoma involving the skin and bone of his glabella and nose. The excisional defect required a flap repair which was provided by a large forehead flap. At the end of the operation abnormally rapid capillary return was noted in the flap and this progressed to obvious severe venous engorgement within an hour. Soon the flap became mottled and its loss was anticipated. At this point two leeches were applied and the flap rapidly regained a more normal appearance. The application of leeches was repeated three times a day for 60 hours. Between applications blood oozed freely from the leech wounds in the flap. At the end of this period the flap, although suffused, was obviously viable and out of danger. Healing by first intention proceeded without any further local complications.

Case 2

A 57-year-old man presented with a 5-year history of an ulcerating basal cell carcinoma involving the skin and periosteum of the glabella and upper nose. The excisional defect was repaired with a forehead flap which

became severely congested within 4 hours of the operation. Leeches were applied every 6 hours for 72 hours. At the end of this period the flap was thought to be viable and it survived completely without any further complications.

Case 3

A 46-year-old man presented with a post-irradiation recurrence of a basal cell carcinoma in the left nasolabial region. The lesion was excised and the defect closed with a subcutaneous pedicle flap. When seen 3 hours later the flap was noted to be deeply congested. One leech was applied twice daily for the following two days, at which time all but the most distal edge of the flap had returned to a more normal colour. Even this portion of the flap survived completely along with the rest of the flap.

Case 4

A 67-year-old man was referred with an exposed tibial fixation plate. This was covered by a local fasciocutaneous sliding transposition flap raised lateral to the tibia. Uncharacteristically for this type of flap, venous congestion was noted almost immediately. Two leeches were applied four times a day for 72 hours. The entire flap except for a small area at the most distal corner survived. This patch of necrosis did not lead to re-exposure of the plate and after a short delay complete healing was achieved.

Case 5

A 47-year-old man was admitted for a two-stage reconstructive rhinoplasty following radical excision of a basal cell carcinoma 6 months earlier. At the first operation a "turnover flap" was delayed, the tissues involved consisting almost entirely of healed skin graft. At the end of the operation the flap showed severe venous congestion and its loss seemed almost inevitable. As a last resort one leech was applied twice a day for 2 days, at which time the appearance of the flap had improved although it was still congested. The flap survived completely and it was possible to proceed without postponing the second stage of his reconstructive rhinoplasty.

Case 6

A 17-year-old young man was involved in a fight which resulted in the near-complete avulsion of his right ear. On admission to hospital the ear, which was based on a 3 × 4 mm pedicle at the lobule, was deeply congested. This congestion was only partly relieved by returning the ear to its normal position. One leech was applied twice a day for 3 days. Virtually the whole ear survived, the only loss being a small patch of crushed skin caused by his assailant's teeth.

Case 7

An 18-year-old girl involved in a road traffic accident, sustained multiple injuries including the near-complete avulsion of her left ear. Her poor general condition prevented the timely management of her ear wound. At the time of her referral the ear was black in colour and considered non-viable. At operation (24 hours after the original injury) it was noted that the pedicle at the lobule, by which the ear was attached, was twisted through two complete revolutions. After relieving the torsion a slight improvement in colour was noted and because of this a leech was applied immediately during the operation. The leech attached itself without hesitation and the greater part of the ear rapidly regained a cherry-red colour. A crushed area at the upper pole which did not change colour was resected. Leeches were applied three times a day for the following 4 days. At the end of this time only a few small areas of superficial desquamation were noted and these all healed with conservative management.

Discussion

Medicinal leeches are becoming accepted as part of the armamentarium of the microsurgeon, especially on the continent of Europe. They have been shown to be useful in distal digital replantation (Foucher *et al.*, 1981) and in the replantation of other tissues (Henderson *et al.*, 1983). This series demonstrates that they may be of benefit in the more traditional techniques of plastic surgery.

We have found the following technique of application to be effective. The desired site of application must be thoroughly cleaned. In particular all traces of skin antiseptics, Vaseline from Vaseline gauze and the base from similar greasy dressings must be removed. We have found that these substances will deter the leech from its purpose. Attachment may be further encouraged by a drop of something sweet to the desired site. We recommend 5% glucose. It may sometimes be difficult to decide which is the "working end" of the leech. Attraction of the anterior end with its mouth parts to the source of the sugar will help solve the dilemma.

The leech is best handled with disposable polythene gloves. Once attached, it should be allowed to feed undisturbed until replete when it will drop off, thus avoiding the potential complication of detached teeth. The typical trefoil wound will ooze for several hours thereafter. In the circumstances that we have described we believe that this oozing should be allowed to continue. This ooze seems to enhance the beneficial effect of serial application of leeches, but along with other authors we can only speculate on the local anticoagulant effect of leech secretions.

We have been surprised by the ready acceptance of this form of treatment by our patients. Four patients had leeches placed on their faces within their field of vision. With adequate prior explanation, the patients tolerated this form of treatment extremely well. It should be noted that no discomfort is associated with leech application on flaps which in any case are usually insensitive. We have seen no significant scarring at the sites of attachment of the leeches.

Other authors (Henderson *et al.*, 1983) have alluded to the fact that a leech will not attach to necrotic tissue. We are not in a position to confirm this. However, Case 7 illustrates how the use of a leech may help in the distinction between tissues which are viable and those that are not.

According to Whitlock *et al.* (1983) there is a potential risk of infection associated with this form of therapy. In this series, although the leeches were being applied to tissue of doubtful viability, no evidence of local or systemic infection was observed. The only precaution we have taken has been to use each leech once only to avoid the risk of hepatitis B cross-infection. In our experience regurgitation of infected gut contents is not a problem. It has been further suggested by Whitlock, on the evidence of delayed improvement in a single case, that topical "hirudoid" creams may produce the effects of leech application without risk of infection. Anyone who has witnessed the extremely rapid change in colour of a congested flap following the application of a leech is unlikely to accept that any topical therapy could be as effective.

Green and Gilby (1983) give helpful advice on leech husbandry and suggest that they may be kept in the pharmacy for up to 6 months so as to be readily available. Replacements may be obtained from Messrs Griffin and George of the Gerard Biological Centre, Walling Road, East Preston, West Sussex, telephone 090-627 2071.

Conclusion

Our clinical experiences with these seven patients have shown that good, old-fashioned blood-letting by means of leeches is a useful salvage procedure when faced with an intensely congested flap. It should not be regarded as a substitute for good flap design or lack of attention to mechanical problems at the site of the pedicle. In this series the application of leeches was associated with no significant complications and a number of apparently doomed flaps have been rescued.

References

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