THE USE OF LEECHES IN MEDICINE

Guidelines

Clinical Use of Leeches
The first clinical use of medicinal leeches occurred approximately 2500 years ago. This small invertebrate is particularly valuable for plastic and reconstructive surgery since it can produce a small bleeding wound that mimics a venous circulation in an area of compromised tissue. The leech produces a number of important substances which contribute to the special property of the bite, including an anticoagulant, a local vasodilator and a local anaesthetic. These substances allow continued bleeding to be normal for up to 10 hours after the animal has detached.

Patient Acceptability
As with most medical/surgical procedures, a patient’s attitude towards the use of leeches depends largely on the physician’s skill in clearly explaining the process. It may help to mention that this age-old procedure is quite painless mainly because the area to be treated is usually denervated and the leech produces its own anaesthetic. In most cases, patient receptiveness is excellent.

Indicators for Therapeutic use of Leeches

*Plastic and Reconstructive Surgery*
Leeches are generally useful on any skin flap or other tissue suffering from impaired venous circulation. It is prudent that a true venous congestion be diagnosed before using leeches since they will not be helpful in cases of insufficient arterial inflow. Note also that insufficient arterial supply could lead to infection from any source, including leeches.

The following criteria may help in diagnosing a true venous problem in a flap:
- Skin colour—dusky or bluish;
- Capillary return—brisker than normal (note that areas of fixed colouration are beyond salvage);
- Pinprick response—bleeding should be rapid and dark;
- History—known problems with veins at operation, either in the pedicle or at the site of a micro-vascular anastomosis.

*Oedema*
Increasingly leeches are being used to treat severely oedematous patients.

Post-bite Care of Wounds
The major therapeutic effect of leech application occurs during the post-bite period, and depends greatly on the care given to the bite wounds. Each bite must be encouraged to bleed by the gentle removal of any locally forming clot at regular intervals. Clinical response of the tissue being treated should be closely observed during this period.

General Patient Care
The area around leech bite wounds should be routinely observed for local infection, and swabs taken if indicated.

If bleeding is severely prolonged, haemoglobin levels should be checked daily. It is quite possible for significant falls to occur.

Temperature
Keep leeches cool (15°C is ideal). Avoid temperatures over 20°C and never leave leeches in direct sunlight. When used in heated hospital wards, take special care to ensure the leeches are kept in a cool place.

Dealing with Leeches After Use
Return all leeches to the Flinders University School of Medicine Animal Facility (SoMAF). Please kill them by placing them in 70% ethanol. Unused leeches must be killed and returned with the used leeches. An audit is made and all those which leave the SoMAF must return.

When returning leeches please ensure that no blood is left on the outside of the specimen containers.

Return the leeches to:

FLINDERS UNIVERSITY SCHOOL OF MEDICINE ANIMAL FACILITY
Flinders Medical Centre, Room 3E 205
(Jack Loader Laboratories)
Flinders Drive, Bedford Park SA 5042.
Phone: 08-8204 4488 or 0415 703 401.

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Guidelines contd...

How to Use Leeches

The animals should be applied in adequate numbers to the general area of maximal congestion. One or two leeches may be sufficient to treat the skin of a partially de-gloved finger, whereas a large flap may require six or more depending on initial response. The head (or biting end) of the animal can be recognised by its searching movements, while the broader tail end is used mostly as a sucker for fixation. It is best to use the hungriest (normally the smallest) leeches first. Preferably do not use forceps forcibly on the leech.

1. Clean the patient’s skin thoroughly with soap and water to remove all substances with strong odour or taste such as operative prep fluids or saline. Rinse cleaned areas with plain water.

2. Dampen a square of gauze with water and cut a 1cm hole in the middle. Place the gauze on the patient with the hole in close contact with the area to be treated. This will form a barrier to prevent the leech from wandering.

3. Steer the leech’s head to the hole in the gauze. Attachment generally occurs quickly. However, if the leech is reluctant to bite, make a small needle prick on the skin to produce a tiny droplet of blood (which should result in enthusiastic attachment) - or try another leech. Sugar or sweet substances are not necessary.

4. Once the leech is attached, it will likely remain safely in place until fully distended. The gauze square can be removed and used elsewhere without disturbing the animal. However, it is important that the site be checked continuously to ensure that the leech hasn’t moved.

5. Leeches usually stay attached at a truly congested site for 30 to 60 minutes. If the blood supply is poor (in which case the diagnosis of venous congestion is probably wrong), they may detach prematurely and attempt to wander to another site, for example, nearby normal skin. Leech movement can be prevented by simple physical persuasion, but the best way to avoid wandering is to pre-cut holes in a sheet of “Op-Site” dressing and apply this to the treatment area.

6. Leeches will simply drop off the skin when satisfied and will not attempt to bite again. They should then be placed in a capped container and labelled with the patient’s name. This will avoid confusion between used and unused animals and prevent accidental use on another patient. Leeches are single use only in practical terms because they are rarely hungry again after a feed for approximately one month.

7. Encourage the bite site to ooze blood by frequent wiping (every 15 seconds) with a saline soaked swab to remove any developing clot. This will maximise the benefit of the leech application and therefore reduce the number needed.

WARNING

Never use a leech on a second patient.

Blood-borne virus transfer from the leech to another bite site is a theoretical possibility and therefore must be avoided.

All leeches dispatched for medical purposes are guaranteed to have never fed on human blood. There is no evidence that viruses will remain viable once ingested by leeches, but caution is an achievable policy and is therefore mandatory.

Mode of Action—Prolonged Localised Bleeding

The leeches’ main therapeutic benefits are not derived from the average 5mls of blood removed during biting (although this may provide dramatic relief at first), but from the fact that each bite wound can continue to ooze up to 150mls of blood for 10 or more hours. The goal then is to produce a minimally adequate venous outflow from the tissue by adjusting the number of bite wounds to suit the clinical situation.

Research indicates that after approximately 3-5 days, new vessel in-growth around flap margins develops sufficiently to restore effective venous drainage. Therefore, it is important that treatment is not terminated too soon, but rather, continued over a period of time to avoid failure.

The property of the leech bite wound to continue bleeding, with encouragement, for 10 or more hours is related to pharmacologically active secretions (not the anticoagulant alone) introduced by the leech bite. It has not been found possible to simulate this effect by introducing conventional anticoagulants, such as heparin, into small stab wounds in the skin.