

# Medieval leech therapy: A 'handy' way to anticoagulate



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## Background

- Medicinal leeches, *Hirudo medicinalis*, have been used since ancient Egyptian times for indications ranging from sexually transmitted infections to systemic ailments.
- In the 1970s, leech therapy was demonstrated to aid in recovery after hand surgery.
- Leeches release a vasodilator, a peptide called Hirudin. It causes dilation of the vasculature and functions as an anticoagulant. Leeches are effective in the management of venous congestion, relieve pressure from pooling blood especially after surgery and stimulate circulation in reattachment operations for perfused organs<sup>1</sup>.

## Introduction

- The Sydney and Sydney Eye Hospital Hand Unit is a major tertiary level centre for hand referrals within the South Eastern Sydney Local Health District (SESLHD) and from across New South Wales.
- Cases involving the loss of a digital artery resulting from traumatic injuries are common. These include blade injuries (sharp amputations), saw injuries, crush injuries and avulsion injuries. Decisions are made to surgically replant the digit and repair of the digital artery or 'revascularization'. These clinical decisions are dependent on factors such as the number of affected digits, ischemia time and zone of injury<sup>2</sup>
- Anticoagulation using intravenous heparin and oral aspirin are typically used post-replant and revascularization. The SESLHD protocol on Leech therapy describes the use of medicinal leeches to manage venous congestion, relieve pressure from pooling blood and improve perfusion post-surgery. Leeches are used following plastic reconstructive surgery for flaps, revascularisation and replant surgeries<sup>3</sup>. Patients are informed that local infection, septicaemia and meningitis are recognised complications. Leech therapy is contraindicated in patients who are immunocompromised, those with bleeding disorders and those with pre-existing arterial insufficiency<sup>4</sup>. Physicians decide on pharmacological or leech anticoagulation for each surgical patient.

**Aim:** To evaluate the effectiveness of using leech therapy compared with pharmacological anticoagulation in flap, replant and revascularisation hand surgery procedures in terms of the number of complications and failed procedures.

## Method

- A retrospective clinical audit was undertaken of patients with revascularisation surgery after replant or free flap between January 2014 and October 2018.
- For each patient, the type of anticoagulation used, the presence of complications and whether the procedure failed were recorded.

## Results

- Audit period: 112 patients had replant, flap or revascularization surgery.
- 12 patients had leech therapy and 100 patients had pharmacological anticoagulation - aspirin and heparin.
- Leech patients: 25% had complications, 8% had a failed procedure.
- Pharmacological anticoagulation patients: 25% had complications, 20% had a failed procedure.
- Note: Failed procedures refer to unsuccessful replant of the digit with vascularisation and results in digital terminalisation.

## Discussion

- The Leech project illustrates that using leech therapy for local anticoagulation post revascularisation surgery is equally as effective as pharmacological anticoagulation based on the number of complications post-surgery.
- Leech therapy may be superior in reducing the number of failed procedures.
- It must be noted that the outcome of revascularization surgery is dependent on a myriad of factors such as type of injury, age, comorbidities and others. Therefore this is a limitation of the study<sup>3</sup>.
- Moreover cases using pharmacological anticoagulation is represented 10 fold compared with leeches which would have impacted results.
- Leeches have bacterium in their stomach, *Aeromonas hydrophila*, which can cause wound infections<sup>4</sup>. Ciprofloxacin 500 mg twice a day is prescribed for prophylactic antibiotic treatment.
- Common complications after replant and revascularisation are arterial or venous thrombosis, cold intolerance, tendon adhesion, infection and malunion<sup>3</sup>.
- A strong risk factor for thrombosis is smoking. Patients who have revascularisation, flap and replant surgery are therefore are strongly advised to stop smoking.

### Failed Procedures

Figure 1. Pharmacological anticoagulation patients (n=100)

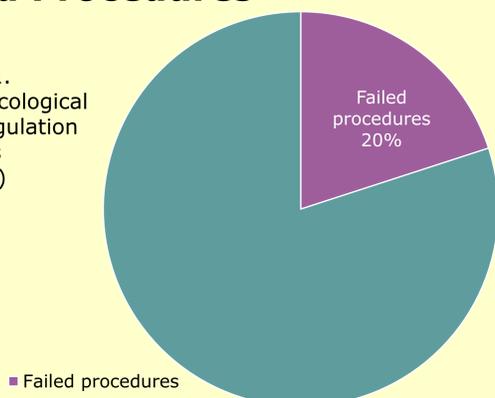
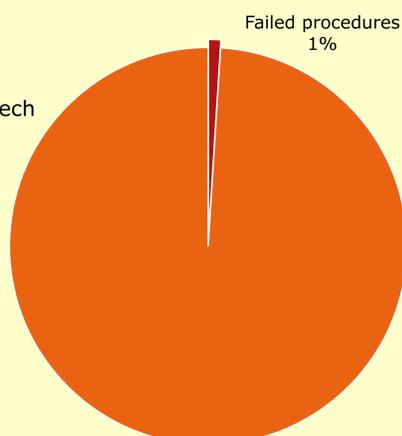


Figure 2. Leech therapy patients (n=12)



### Post surgery complications

Figure 3. Pharmacological anticoagulation patients (n=100)

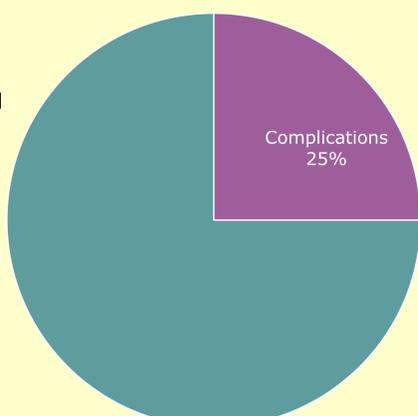


Figure 4. Leech therapy patients (n=12)

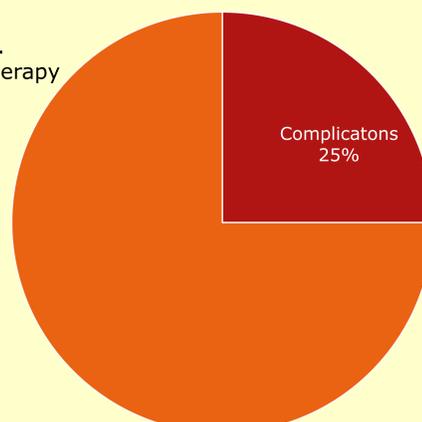


Image 1. Left thumb post revascularisation surgery with leech

## Conclusion

The leech therapy project illustrates the benefits of using leech therapy for revascularisation in hand medicine. The Local District guidelines have approved the use of this therapy. This audit shows that leech therapy may be more effective in managing venous congestion in revascularisation patients when compared with accepted pharmacological anticoagulation. An opportunity exists to investigate the novel therapy of leeches in other surgical procedures requiring vascular anticoagulation.

#### References

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#### Acknowledgements

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