

A description of the use of silver nitrate for management of persistent tracheocutaneous fistula

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Introduction

- Persistent tracheocutaneous fistula (TCF) results from squamous epithelialization of the tracheostomy stoma tract following tracheostomy decannulation^{1,2}
- The primary risk factor for developing TCF is postulated to be duration of tracheostomy insertion^{1,2}
- Most published management strategies focus on surgical interventions⁴ particularly in paediatric populations^{2,5}
- Surgical interventions may pose unacceptable perioperative risk to some patients, especially in patients with complex respiratory issues including neuromuscular weakness



Figure 1: Persistent tracheocutaneous fistula 3-months post decannulation (pre-treatment)

Case Report

- A 41-year-old male with no prior medical history was diagnosed with severe Guillain-Barré syndrome requiring prolonged ventilation via tracheostomy (Percutaneous insertion, Portex Blue Line Ultra® Suctionaid Tracheostomy, Size 8, Smiths Medical)
- After 374 days of invasive ventilation, the tracheostomy was removed
- Nocturnal non-invasive positive pressure ventilation (NIPPV) and mechanical insufflation-exsufflation (MIE) was required due to ongoing respiratory muscle weakness
- Three months following tracheostomy decannulation, a TCF persisted despite careful attention to occlusive dressings (Figure 1)

References

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- The TCF had a deleterious effect on NIPPV efficacy and ability to effectively clear airway secretions despite MIE due to air leaking from the patent stoma
- A non-surgical management approach utilising silver nitrate was entertained given concerns about the patient's ability to tolerate intubation and general anaesthesia

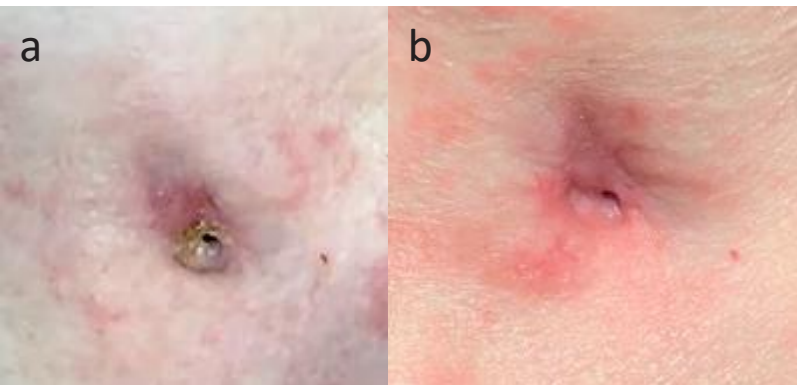


Figure 2: Progress of tracheocutaneous fistula at weeks 2 (a) and 5 (b) of treatment with topical silver nitrate

- Silver nitrate is a caustic substance commonly utilised as a haemostatic agent and management of hypergranulation tissue⁶



- Silver nitrate may help disrupt the epithelial layer of the stomal tract allowing apposition of the dermal layers required for closure
- Silver nitrate was administered topically to the stomal tract twice weekly for a total of 52 days (Table 1)

Table 1: Silver Nitrate Treatment Regimen

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| 1. Remove previous dressing & clean fistula |
| 2. Spray fistula once with lignocaine 5%/phenylephrine 0.5% and wait 2 minutes |
| 3. Dip silver nitrate stick into water or 0.9% saline |
| 4. Insert silver nitrate stick ~4mm into fistula & roll to cover skin edge. Repeat twice |
| 5. Apply 1cm portion of 2% lignocaine gel to fistula |
| 6. Cover fistula with an occlusive DuoDerm® dressing. Encourage the patient to support the dressing with their fingers when voicing or coughing to reduce air leak |

Results

- The size of the TCF progressively reduced (Figure 2), with complete resolution (Figure 3) over the 52 days of treatment
- Treatment was complicated by a single episode of self-limited small volume haemoptysis
- Nocturnal NIPPV & MIE tolerance improved, with marked reduction in frequency of respiratory tract infections and improved subjective sleep quality
- This clinical improvement facilitated the transfer of the patient to a subacute rehabilitation facility 506 days following initial presentation.

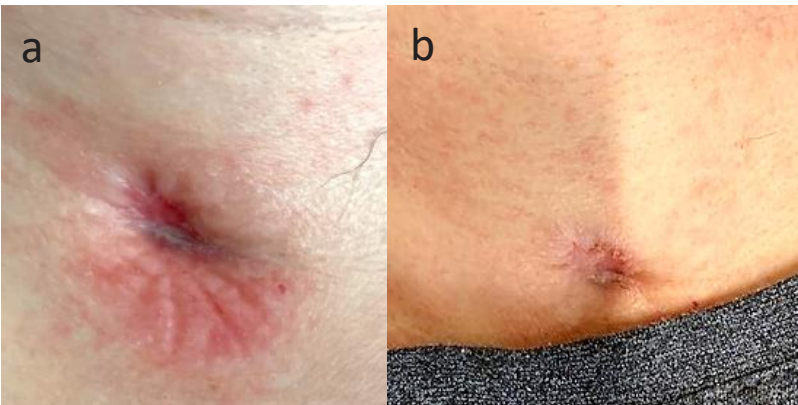


Figure 3: 2 weeks (a) and 3 months (b) after final treatment with topical silver nitrate

Conclusion

- A non-surgical approach to closing a tracheocutaneous fistula using silver nitrate has not been previously well-described in the literature
- Given the complex medical issues of many patients who ultimately require prolonged tracheostomy, many of these patients will be at high risk with more frequently described surgical management approaches
- Silver nitrate administered topically represents an important and minimally invasive treatment option for persistent tracheocutaneous fistula

Conflicts of interest: None to declare

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