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

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

Case Report
- A 41-year-old male with no prior medical history was diagnosed with severe Guillain-Barré syndrome requiring prolonged ventilation via tracheostomy.
- 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.

Results
- 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.
- Silver nitrate is a caustic substance commonly utilised as a haemostatic agent and management of hypergranulation tissue.
- Silver nitrate may help disrupt the epithelial layer of the stoma 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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<tr>
<th>Step</th>
<th>Description</th>
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<tr>
<td>1.</td>
<td>Remove previous dressing &amp; clean fistula</td>
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<td>2.</td>
<td>Spray fistula once with lignocaine 5%/phenylephrine 0.5% and wait 2 minutes</td>
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<td>3.</td>
<td>Dip silver nitrate stick into water or 0.9% saline</td>
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<td>4.</td>
<td>Insert silver nitrate stick ~4mm into fistula &amp; roll to cover skin edge. Repeat twice</td>
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<td>5.</td>
<td>Apply 1cm portion of 2% lignocaine gel to fistula</td>
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<td>6.</td>
<td>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</td>
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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.

References