Electronic Annex 3d
Tracheostomy management in patients in PDOC

Background

The pathological process that leads to prolonged disorders of consciousness (PDOC) often requires the patient to be admitted to intensive care for multi-organ (level 3) support. The commonest form of organ support is mechanical ventilation, which requires endotracheal intubation.

Patients in a PDOC on the intensive care unit (ICU) will usually, but not always, have the endotracheal tube changed to a tracheostomy after the acute phase of their illness has resolved. Weaning from mechanical ventilation with a tracheostomy *in situ* in patients with PDOC can be more complicated and prolonged than with conscious patients.[1] However, it has been shown that GCS is not predictive of weaning success,[2, 3] with multiple cases of patients in both minimally conscious state (MCS) and vegetative state (VS) being successfully decannulated.

Trials of cuff deflation and appropriate tracheostomy weaning programme must not be delayed purely because the patient is in a disorder of consciousness. As with other populations a multidisciplinary approach is required, which has been shown to help to reduce the total time a patient has a tracheostomy.[4]

Issues to consider in patients in PDOC

Some issues to consider when making decisions regarding tracheostomy management and weaning in PDOC patients are listed below:

- inability to manage saliva independently with consequent risk of aspiration, due to severe dysphagia and/or lack of awareness of saliva
- neuromuscular weakness impacting on ability to take a deep breath and ability to cough/expectorate effectively
- exaggerated or diminished cough reflex
- impaired posture can impede effective respiratory mechanics and reduce lung compliance
- upper airway obstruction – eg due to subglottic stenosis, arytenoid oedema, granulation tissue, tracheal stenosis / tracheomalacia etc.
- impaired central respiratory control (abnormal breathing patterns)

- the impact of medications on respiratory function – usually depression (eg spasticity, neuropathic pain and antiseizure medications may reduce respiratory function)
- fatigability
- frequency of respiratory tract infections
- dysautonomia
- pre-existing pulmonary disease – eg chronic obstructive airways disease, smoking history, emphysema etc.

The clinical team should consider carefully which of the above features are among the reasons for the continued tracheostomy and take them into account in their clinical reasoning around weaning and decannulation.

When considering tracheostomy weaning the patient's best interests and the risks and benefits of having a tracheostomy need to be taken into account.

Benefits of weaning:

- increased placement options, including possible home discharge
- reduced care and equipment needs / healthcare costs
- decreased risks associated with tracheostomy (immediate and long term), eg
  - occlusion, dislodgment
  - infection due to lack of natural filter
  - hyper-granulation, tracheal stenosis, erosion, bleeding
- avoids need for regular replacement/review.

Possible risks associated with weaning:

- reduced airway protection in case of deterioration
- increased risk of complications associated with aspirating saliva
- decreased access to allow removal of excessive secretions by suction
- reduced life expectancy due to above.

Weaning plan

The use of fibreoptic nasendoscopy by ear, nose and throat (ENT) specialists or speech and language therapists (SLTs) can be used to assess airway patency and saliva management to provide information to guide tracheostomy weaning.[5]

The multidisciplinary team (MDT) should formulate a weaning plan, taking into account current management priorities and the impact of fatigue from tracheostomy weaning on other aspects of assessment, rehabilitation and recovery.

The stages of weaning will be the same as for other neurologically impaired patients. The management of saliva and chest secretions should be optimised using positioning, appropriate medications and humidification. See the National Tracheostomy Safety project for guidance on humidification.

One-way valves (OWVs) should be used as part of the weaning process to enable the redirection of airflow through the laryngo-pharynx. This facilitates the build-up of sub-glottic pressure, which restores sensation to improve swallowing[6] and cough.[7,8]

The term 'speaking valve' should be avoided, as this can be misleading for family members, giving the impression that the patient will be able to speak once the valve is in use. Instead, 'one-way valve' should be used for patients in PDOC. It is important to provide early education to family members to ensure that they understand that the tracheostomy is not the cause of communication difficulties and that cuff deflation or decannulation will not result in the patient being able to speak.

This patient group are more likely to have tracheostomy in the longer term. Ongoing monitoring is required by teams experienced in tracheostomy to establish if the patient becomes appropriate for weaning, and to remain vigilant for signs of tracheostomy complications (eg granulation, tracheomalacia and tracheal stenosis)[9] which should be referred to ENT for management.

In general, fenestrated tubes should be used with caution and due to the high risk of complications, such as granulation.[10] On the other hand, patients with significant neurological weakness / fatigability may struggle to breathe round a non-fenestrated tube (even of reduced size). A fenestrated tube may therefore be used as part of a weaning programme in this context, but under close monitoring by an ENT team.

Onward referral to ENT should be made following decannulation if the stoma fails to close. If weaning is achieved, consideration should be given to the immediate post-decannulation plan due to the potentially long-term nature of PDOC, for example whether recannulation, the use of non-invasive ventilation (NIV) or cough assist should be offered.

If the chances of successful decannulation are uncertain, and recannulation would be offered, one option is to leave a Minitrach *in situ* for the first 24–48 hours. This may or may not be useful a route for suction, but it can serve as a stent to facilitation recannulation if this is required, without the need for transfer back to theatre.

Optimising management

Decannulation may not be the only goal for PDOC patients. Optimising chest and tracheostomy management through tube type and size, humidification, postural management and secretion and saliva medications can all decrease the need and intensity of specialist care. Frequency of suction, infection, risk of occlusion and long-term complications can all be reduced.

The use of tracheostomy tubes with a subglottic port can be beneficial if a patient is at high risk of aspirating their saliva and can help to guide need for anticholinergics. Short periods of cuff deflation may allow for assessment of awareness using smell and/or tastes.

Long term tracheostomy

Clinicians should be aware that patients in PDOC who require long-term tracheostomies are already in the group with poor prognosis for recovery and have a significantly reduced life expectancy. While tracheostomies can be protective, the can also bring significant risks. They require regular review and changing, which can be disruptive to care and over time

there may be damage to the airway. Some patients for example have been known to bleed out after the tracheostomy eroded through a major blood vessel.

Historically clinicians have tended to be risk-averse in relation to tracheostomy weaning, but it is important to consider carefully both the benefits and harms of long-term cannulation and to discuss these with family members.

Consider using a tracheostomy passport which contains important information about the patient's tracheostomy which is updated as required. It should be completed prior to discharge from hospital and stored in the tracheostomy emergency box to accompany the patient wherever they go. The Trachi-Pass can be obtained free of charge from Kapitex Healthcare Ltd – Tel: +44 (0)1937 580211.

Risk of decannulation / end-of-life care

For some patients it will be clear that the harms of continued tracheostomy outweigh the risks of decannulation, even though these may be considerable.

For others, rapid weaning / decannulation and/or withdrawal of ventilator support may be considered as part of an overall plan for ceiling of care or withdrawal of all life-sustaining treatment. In this situation, weaning / withdrawal must be planned by a MDT (with input from both ENT and palliative care physicians) to ensure that a care plan is in place that includes palliative and end-of-life care should this be necessary.

The palliative care plan should include a strategy for management of acute respiratory distress, should this occur following decannulation. If this is considered a likely possibility (for example in the presence of tracheomalacia or upper airway stenosis), it may be appropriate to consider decannulation in a hospital and establishment of IV access in advance of decannulation to enable IV medication to be given for rapid relief of symptoms should the need arise. Family members should be counselled carefully to understand what to expect.