Intensive Care Unit
Nepean Hospital

ARTIFICIAL AIRWAYS EDUCATION PACKAGE

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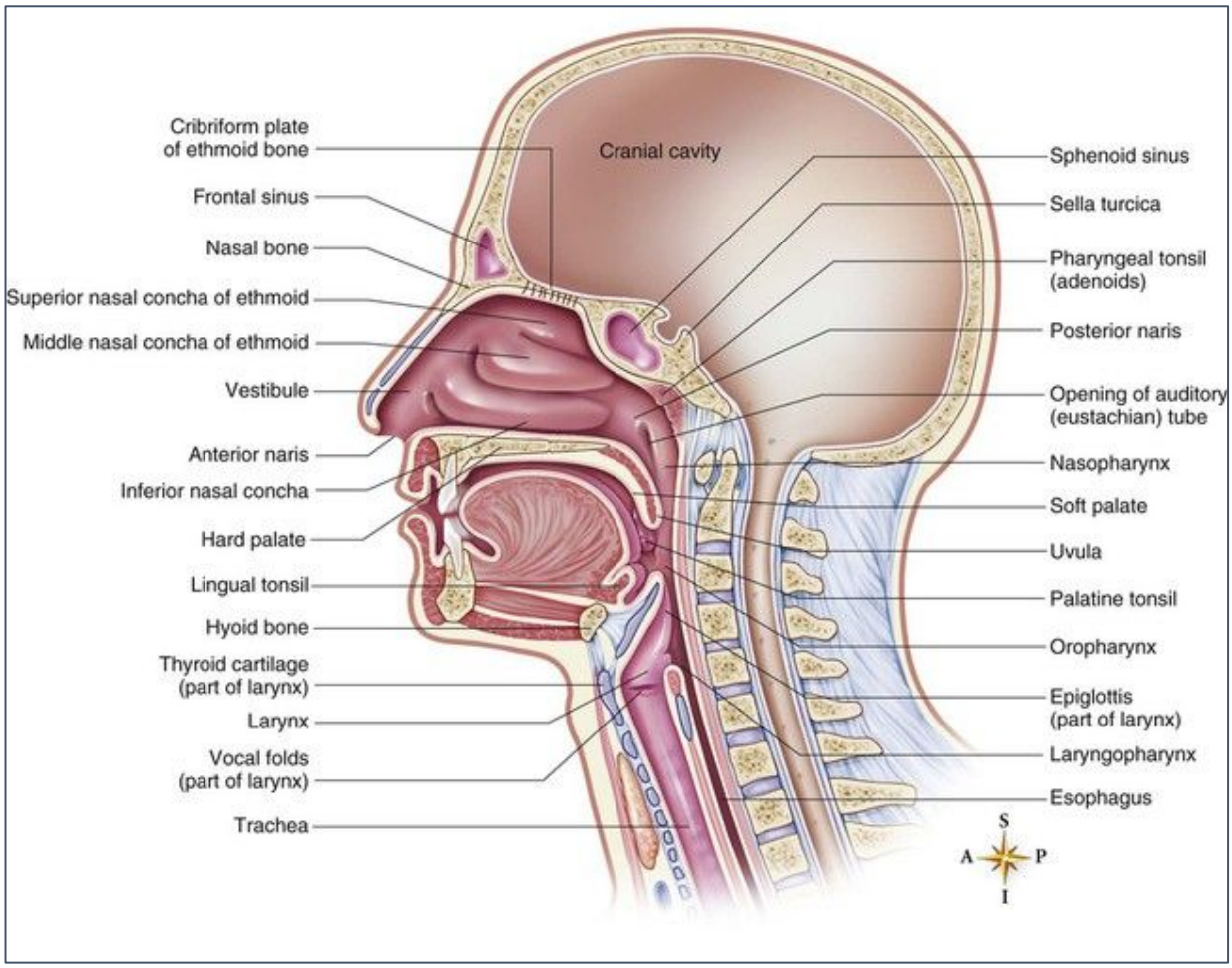
2020

Introduction

Before we delve into the world of artificial airways, it is worth taking a few moments to review normal upper airway anatomy and physiology. As with most medical interventions, once we have a good understanding of where and why a procedure has been undertaken, the context for nursing care becomes far clearer. In addition, decision making regarding day to day nursing management as well as semi-urgent or emergency management can be made with a far deeper understanding of the benefits and risks to the individual patient.



The term 'upper airway' refers to everything above and including the larynx. Anything below this structural landmark is generally referred to as the lower airway (Yartsev, 2019)

The upper airway consists of the nose and nasal cavity; the oral cavity including the tongue, teeth, hard and soft palate; the pharynx which consists of the nasopharynx, oropharynx and laryngopharynx; and the larynx which contains the vocal cords.

Broadly speaking, the upper airway structures provide the following 3 functions:

1. Using complex and comprehensive muscular structures, it provides a non-collapsible passage for the movement of air in and out of the lower airways
2. It filters, heats and humidifies air
3. It is involved in coughing, swallowing and speech

More specifically, the nose and nasal passages are responsible for filtration, humidification and warming of inspired air, reclamation of expired moisture and heat, smell and sense information regarding air temperature and sneezing. The oral cavity is responsible for mastication, saliva production, speech and taste. The pharynx is responsible for swallowing, phonation and separation of the respiratory and digestive tracts while the larynx is responsible for swallowing, phonation and coughing. (Yartsev, 2019)

All of these structures play a role in providing a pathway for air to travel to the lower airways or lungs.

In the Intensive Care setting it is common for us to look after patients with artificial airways that bypass the upper airway anatomy. These artificial airways include endotracheal tubes, laryngeal masks and tracheal tubes. Artificial airways can be inserted via the nose, mouth or trachea. Different airways will be used for different indications and are inserted to facilitate adequate ventilation, either by the patient themselves, or by a mechanical ventilator.

Day to day care and management of these devices falls within the scope of a registered nurse working in the Intensive Care Unit (ICU) and therefore it is important that the bedside nurse understands these devices, the specific indication for insertion, the general care and management of these airways as well as specific emergency management in the event of an adverse incident.

This education package will discuss in detail the following devices:

- Endotracheal tubes (ETT)
- Laryngeal Masks (LMA)
- Tracheostomy tubes

It will also review the following procedures:

- Intubation
- Tracheostomy
- Laryngectomy
- Cricothyroidotomy

It will also discuss the nursing management and considerations of each device – however, please refer to the relevant Nepean procedure document for current specific guidelines.

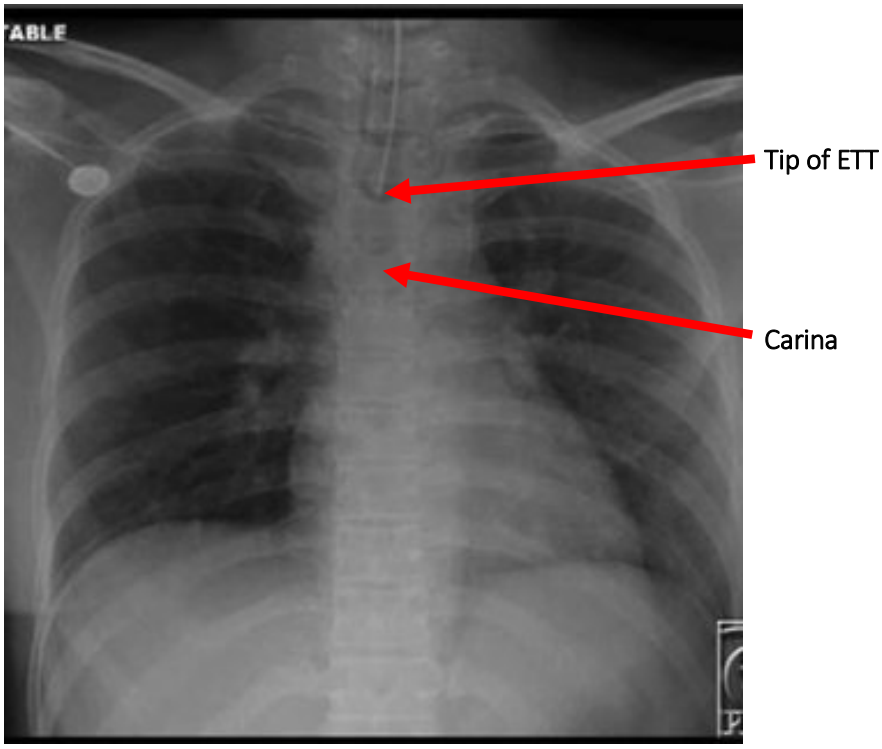
There are a wealth of resources publically available to further your knowledge on this topic. A reference and resource list can be found at the end of this education package.

Definitions

A definitive airway is defined as a cuffed tube that sits below the glottis and therefore usually includes endotracheal tubes and cuffed tracheal tubes. A definitive airway not only maintains an airway, but the presence of an inflated cuff below the cords allows protection of the airway e.g. from soiling such as aspiration. Other airway adjuncts such as naso/oro-pharyngeal airways and laryngeal masks may be used to establish or maintain an airway, facilitate ventilation and be life-saving, but do not provide protection from soiling and therefore are not classified as 'definitive'.

Intubation

Intubation is a medical procedure that entails a cuffed plastic tube, referred to as an Endotracheal Tube (ETT) being passed through the patient's nose or mouth down through the vocal cords. The tip sits a few centimetres above the carina (the bifurcation of the trachea into the right and left main bronchus), which is formally measured on a chest x-ray shortly after insertion and on any subsequent chest x-rays the patient may have.



Intubation can be done while the patient is awake, under local anaesthetic or after they have been administered a general anaesthetic. Intubation can also occur without any drugs or 'cold' but only during a cardiac arrest.

Intubation can be performed by consultants from Intensive Care, Anaesthetics and Emergency. Trainees in these specialties (senior registrars) will also be proficient at intubation. Junior registrars in these specialties will have varying levels of experience and may need a more senior person available for support.

There are many, many different ways intubation can occur, and inevitably, each specialty has their own 'normal' way of doing things. It can be done using a traditional laryngoscope (direct view) or using a video laryngoscope. It can also be done using bronchoscopey. It can be done using aids such as external laryngeal manipulation, bougies or stylets. Each operator will have their preference for what equipment they require and how the intubation is going to occur. Ultimately, this will be discussed on a case by case basis and in ICU, the team should do a final 'Time Out' before they start the procedure which includes discussing the plan for intubation as well as back up emergency plans.

There is however, a 'standard' approach that will mostly be used in the ICU setting, and this is the approach that we will discuss below.

General speaking, intubation will occur in the following way:

- All equipment and drugs prepared
- Patient prepared (monitoring, IV access, positioned well, pre-oxygenated/optimised etc)
- Roles allocated
- Patient anaesthetised – sedation followed by paralysis in rapid succession (this style of anaesthetic is referred to as 'RSI' or Rapid Sequence Induction) aiming to minimise apnoea time
- Cords visualised by airway operator
- Grade of intubation noted
- ETT passed through cords with or without the assistance of a bougie (will depend on view)
- Cuff inflated
- Laerdel bag attached to ETT with C02 device
- Patient bagged
- Chest auscultated and presence of C02 checked
- ETT secured
- Mechanical ventilation commenced
- Chest XRAY attended and tube position confirmed

The bedside nurse will usually assume the role of airway assistant, although this can vary and needs to be discussed when the team roles are being allocated.

The best way to familiarise yourself with the vast array of intubation equipment available, is to routinely check the airway trolley, as it contains most of the equipment that we use here in the ICU.

As discussed in the introduction, intubation occurs to facilitate mechanical ventilation and/or protect the upper airway. Mechanical ventilation is required to facilitate the delivery of oxygen and/or the removal of C02. Examples include:

- Pneumonia
- Asthma
- Sepsis
- Multi-organ failure
- Chest trauma

Intubation itself, may be required to protect and/or maintain the upper airway. Examples include:

- GCS <8
- Swollen airway
- Inability to manage airway secretions
- Airway bleeding

Intubation is usually a reasonably straight forward procedure, however, like any medical procedure – particularly one where a general anaesthetic is being administered, there are risks to the patient.

When we intubate patients in the ICU, they are often very unwell. Their reserves for compensation are already exhausted and their physiological ability to cope with invasive procedures, and the drugs required to facilitate these procedures, is poor at best. Complications from intubation can be divided into three main areas:

1. Adverse reaction to drugs:
    a. There are (reasonably rare) reactions to some drugs routinely used in RSI. A couple of examples are:
        i. Suxamethonium (a short acting paralysing agent) causes prolonged depolarisation of skeletal muscles to a membrane potential above which an action potential can be triggered. This causes serum potassium levels to rise, but uncontrollably so in patients with recent burns, paraplegias or severe muscle trauma and can, at worst, cause cardiac arrest from hyperkalaemia (Koupparis, 2019).
        ii. Malignant Hyperthermia is a rare genetic disorder, where susceptible patients who have been administered depolarising muscle relaxants have a significant, abnormal reaction which can include: massive CO2 production, skeletal muscle rigidity, tachyarrhythmias, unstable haemodynamics, respiratory acidosis, cyanosis, hyperkalaemia, lactic acidosis, fever, and eventually (if untreated) death. Dantrolene is the treating agent (kept in theatres)

    For this reason, it is important to be familiar with the drugs that are routinely used to facilitate intubation.

2. Haemodynamic compromise directly related to administration of paralysing or sedation agents:

a. A drop in blood pressure is reasonably common once sedation and/or paralysis has been given. The intubating team should be prepared for this to occur and have discussed blood pressure management as part of the teams 'Time Out' process.

3. Issues with oxygenating/establishing an airway after induction:
    a. It is important to quickly and competently work out whether this is a true 'Can't Intubate, Can't Oxygenate' (CICO) situation. If it is, it is a time critical emergency that requires a high level of clear and concise communication to rapidly work through the appropriate algorithm and ultimately secure an airway so that oxygen can be delivered to the patient.

        Mostly, issues with oxygenation are not true CICO scenarios and strategies to aid with oxygenation of the patient include:

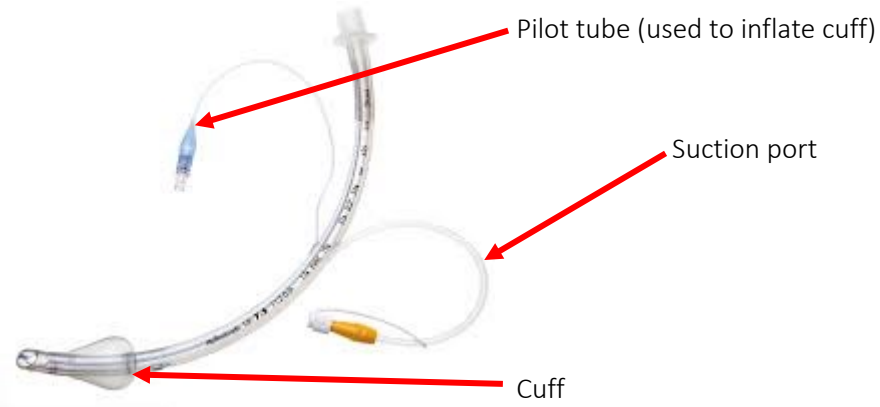
        i. Adjusting the BVM techniques, in particular using a 2 person technique
        ii. Inserting an LMA

From a nursing viewpoint, it is good to be aware of these potential complications and to develop the skills to recognise the early warning signs of an airway emergency. In addition, hands on familiarisation with emergency airway management equipment is important, as this equipment requires a highly skilled airway assistant in the event that it is used. This is discussed in more detail under 'cricothyroidotomy' and 'emergency airway management principles'.

Endotracheal Tubes

The endotracheal tube (ETT) itself, is a long plastic tube that comes in a variety of styles and sizes. Most ETT's have a cuff towards the end, which is inflated after insertion, once the cuff is below the vocal cords. The cuff has 2 purposes; it seals off the lower airway, so that mechanical ventilation can be administered to the lungs without air escaping up the airway (leaking) and it helps prevent soiling of the lower airway from oral secretions or vomitus etc (see below).

Some ETT's also have a suction port. This suction port allows for upper airway secretions that collect on top of the cuff to be suctioned.



The picture above shows a typical ETT used in the ICU. Other ETT's include:

- Un—cuffed
    - May be used in neonates (NICU)
- Reinforced
    - Used in theatres, particularly in facial or neurosurgery, they are designed to resist kinking or compression
- Pre-formed RAE tubes – north or south facing
    - Usually used in a surgical context, where the tube needs to be directed away from the surgical site such as ENT surgery
- Double lumen endobronchial tube
    - Used in theatre or the ICU when the lungs needs to be isolated from each other – either for surgical or mechanical ventilation reasons

Of all of the ETT's the only one that should not be used in the ICU is a reinforced tube. Because these tubes hold their shape, if a patient bites the tube it can be permanently and irreversibly occluded leading to loss of a patient's airway.

If a patient arrives in the ICU from theatre with a reinforced ETT in situ (this should not occur without the ICU consultant's advanced knowledge), it is essential that either the anaesthetist or the ICU medical officer exchange the tube before paralysis wears off.

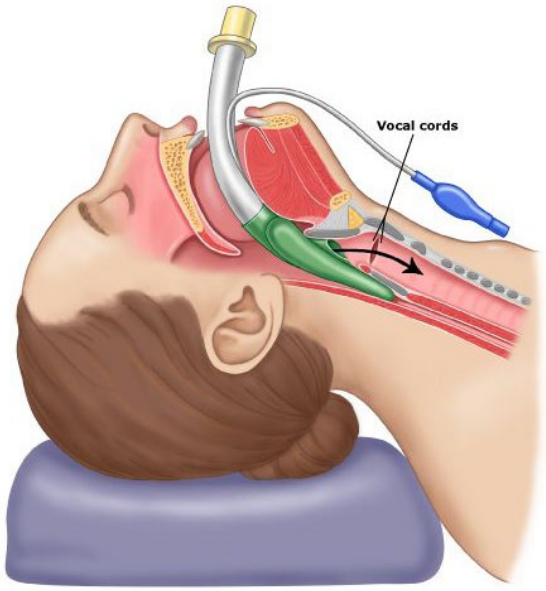
Nursing care of a patient with an ETT involves the following:

- Ensuring the ETT remains at the depth required (usually documented as a cm marking at the teeth)
- Routinely changing the tapes securing the tube – and whilst doing so, moving the ETT's position at the lips to prevent pressure injuries
- Performing appropriate oral care including brushing teeth twice a day
- Ensuring the cuff is appropriately inflated
- Maintaining patency of the ETT: this includes regular suctioning of the patient and ETT and using devices (when needed) such as a bite block to prevent occlusion from biting
- Ensuring appropriate and continuous C02 monitoring (as a first line indicator of ETT position)
- Ensure quick and easy access to the head of the bed, in the event of an emergency
- Appropriate documentation of above

Laryngeal Mask

A Laryngeal Mask Airway (LMA) is a supraglottal airway device that is shaped like an ETT on one end and has an elliptical shape on the end that is inserted into the patient's mouth. The outer rim is the 'cuff' and is inflated once in situ to create a seal and relative tracheal isolation allowing for

oxygenation and ventilation. They can be reusable, but mostly these days, LMA's are single use, disposable items.



Traditionally used in the operating theatre, LMA's are becoming more and more accepted in both the ED and the ICU as a way of managing a patient with a difficult airway or as a first line option in the event of a cardiac arrest (or significant patient deterioration) where the airway operator is not highly skilled. LMA's can also be used to create an external seal for the purposes of BMV over a laryngectomy stoma.

Like with most medical devices, there are a wide range of LMA's available on the market and different practitioners have their preferred devices.

Here in Nepean ICU, we typically have 3 types of LMA's available to us:

1. LMA original
2. LMA supreme
3. LMA fastrach

The original LMA is the one shown in the above image and are the type that is most commonly used in an emergency situation. They can be comfortably and easily placed in most of the population, with only a very small percentage having anatomy that leads to an ineffective seal.

The LMA supreme (gastric LMA), shown in the image to the left, is more curved and has the addition of a gastric port, designed to insert a small nasogastric tube, or to suction gastric contents.

The LMA fastrach is rarely used, but consists of an LMA, an ETT and a stabilising rod. The LMA is inserted first and when the patient is ready to be intubated, the ETT is passed through the centre of the LMA (blindly inserted). The ETT is then extended with the stabilising rod and the LMA removed.

ICU nurses learn how to insert an original LMA when they complete their ALS course.

Nursing care of an LMA is the same as the nursing management of an ETT.

Tracheal Tubes

GENERAL WARNING:

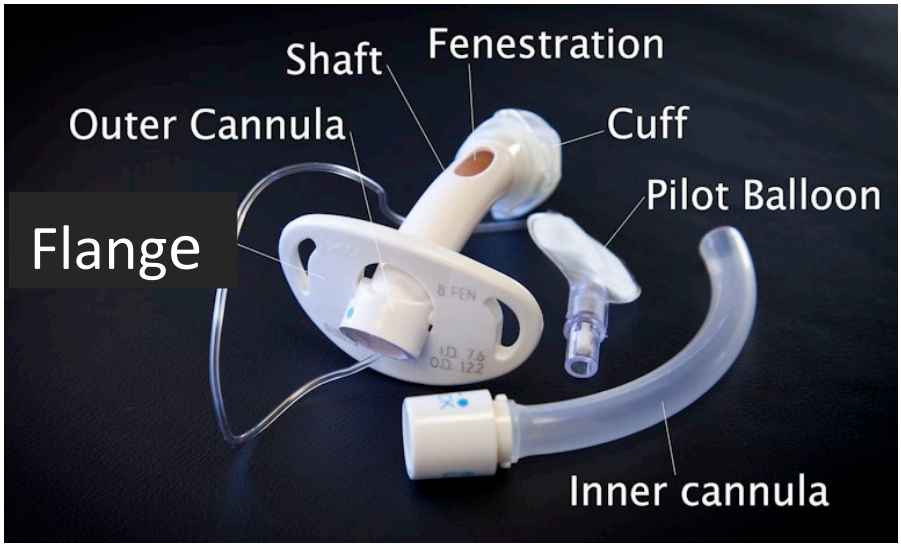
It is important to be careful of the terminology you use when describing, documenting or handing over a patient with an opening to their airway in their neck (stoma). A stoma could be a tracheostomy, a laryngectomy or a cricothyroidotomy.

The indications, nursing care and considerations as well as emergency airway management are different for each.

A *tracheal tube* may be inserted into any stoma in the neck, regardless of whether it is a tracheostomy, a laryngectomy or a cricothyroidotomy.

A tracheal tube (also known as a tracheostomy tube and colloquially referred to as a 'trachy') is a hard plastic (occasionally metal) tube that is placed in the trachea to maintain an airway and/or facilitate mechanical ventilation.

The tube itself is short and an arc shape. It may be single or dual lumen (this refers to whether the tracheal tube has an inner cannula or not), be cuffed or un-cuffed and be fenestrated or un-fenestrated. Extended length tracheostomy tubes are also available for patients who have abnormal anatomy. These tubes may be longer on either end of the tube (either the part that is inserted into the patient, or the part that remains on the outside of the patient). In addition, there are tubes that have adjustable flanges (the flat part of the tracheostomy that secures the device to the patient, either by straps or sutures).



The different components of a tracheostomy tube are demonstrated in the picture to the left.

Original image retrieved and adapted from: https://www.practicalslpinfo.com/trach-tube-anatomy-101.html

Again, it is important that the bedside nurse is aware of the type of tracheal tube that is inserted in their patient as it impacts on nursing care. A tracheal tube with an inner cannula will need 2-4th hourly attention, as the inner cannula needs to be swapped and cleaned. A patient with a fenestrated tracheal tube will need an inner cannula inserted for suctioning. A patient with an un-cuffed tracheal tube will need this changed to a cuffed tube if they require mechanical ventilation.

Often, information about the size and fenestration of the tracheal tube can be found on the flange, however, specific details about the type and size of tracheal tube should be documented in the patient's notes when it is inserted.

Regardless of what type of tracheal tube is in place it is the bedside nurse's responsibility to:

- Ensure the tube is secured appropriately. Usually this is done with white cotton tapes or Velcro straps. If the tube is secured with sutures and these are threatened or have been dislodged, the bedside nurse needs to escalate this emergently to the ICU fellow or consultant.
    - Sutures are often used in the following circumstances:
        I. Oedema formation secondary to interruption of venous and lymph drainage
        II. Increased intra-cranial hypertension as venous flow from the head may be impaired by ties around the patient's neck
        III. Complete loss of the airway if the tracheostomy was to be displaced
        IV. Patients who have undergone micro vascular reconstruction (flap) to the head/neck area.
- Ensure the skin underneath the flange is not at risk. The flange of the tracheal tube poses a pressure area risk. Routine inspection of this skin is required. The patient may require a protective dressing such as comfeel.
- Ensure the tube itself is appropriately cared for. This refers to maintaining patency (via suctioning when required) and being careful to not damage structures on the tracheal tube (such as the screw on an adjustable flange tracheal tube).
- Appropriate positioning and support. When a patient is ventilated via a tracheal tube, the bedside nurse needs to ensure that the ventilator tubing is appropriately positioned and supported so that the tracheal tube is not angled or pulled as this can cause significant damage to the tissue and/or cartilage of the trachea.
- Ensure appropriate cuff pressure. Cuff pressure needs to be maintained in the 'green' zone on a manometer. Not only can tracheal wall damage occur if the cuff is overinflated, but damage to the cuff itself may happen.
- Ensure quick and easy access to the head of the bed and appropriate emergency equipment (this will be dictated by what type of procedure the patient has had; a tracheostomy, a laryngectomy or a cricothyroidotomy). Details are discussed in the emergency airway management section.

Tracheostomy

A tracheostomy is a small opening (stoma) that is created by a surgical incision that penetrates through the skin and between tracheal rings (either the first and second, second and third or third and fourth tracheal rings) into the trachea. A tracheal tube is inserted through this hole and secured in place.

Tracheostomies are performed for a number of reasons:

1. As a weaning step from the ventilator in patients who have had a prolonged period of intubation with an endotracheal tube.
2. To protect the airway from secretions entering the lungs in patients with a compromised swallow and or impaired airway protection
3. To allow access to bronchial secretions when a patient is unable to cough effectively
4. To maintain an upper airway in patients who have a mechanical obstruction (tumours, bilateral vocal cord palsy)
5. Prophylactic insertion during head/neck or ENT surgery where airway is likely to be temporarily compromised by post-surgery oedema

In general terms, at Nepean Hospital, tracheostomies are performed by the following medical officers:

1. Intensive Care Consultants:
    a. Intensive Care Consultants will *usually* perform a tracheostomy in the ICU

2. Ear, Nose and Throat Consultants (ENT):
    a. ENT surgeons will *usually* perform a tracheostomy in the operating theatre.

These specialties will usually use different techniques to create the stoma, which is discussed in more detail below. The indication for tracheostomy will also dictate how the tracheostomy is formed and by whom, as different techniques are suitable for different indications.

There are other specialties that are qualified to insert tracheostomies (such as head and neck surgeons) – however, this is not currently routine practice at this hospital.

There are 2 ways of creating a tracheostomy, percutaneous and surgical.

Percutaneous:

The percutaneous method refers to a number of different techniques including graded dilation, forceps dilation and translaryngeal (Nickson, 2019). In Nepean ICU, we use a graded dilation method.

The percutaneous method is best suited for patients who require a tracheostomy due to prolonged ventilation with an endotracheal tube, patients who require airway protection from secretions entering the lungs (either from a compromised swallow or with impaired airway protection) or for secretion management/bronchial toileting.

Broadly speaking, a percutaneous tracheostomy is inserted in the ICU in the following way:

- Consent obtained, coagulation profile checked, valid group and hold sent
- All equipment and drugs prepared, NG aspirated
- Patient prepared (IV access, monitoring attached, positioned well, pre-oxygenated/optimised etc)
- Roles allocated
- Patient anaesthetised – sedation deepened followed by paralysis, mandatory mode of ventilation (if not already)
- Proceduralist scrubs and gowns
- Sterile field established (patient draped)
- Local anaesthetic administered (usually lignocaine with adrenaline to minimise bleeding)
- ETT cuff deflated and ETT pulled back to at or just above the cords, reinflated to maintain seal for ventilation – this may be done with either a laryngoscope or a bronchoscope
- Cannula puncture into trachea
- Guidewire inserted
- Scalpel incision of skin

It is worth noting at this point that the sequence of the first few steps may differ between proceduralists, depending on their individual preferences.

- Dilator over guidewire
- Dilator removed and tracheostomy tube inserted over guidewire
- Guidewire removed, cuff inflated
- Laerdel bag attached to ETT with C02 device (or mechanical ventilator) – ventilation commenced (occasionally proceduralist may wish to suction the airway prior to positive pressure ventilation to prevent blowing blood from procedure into distal airways)
- Chest auscultated for bilateral air entry and presence of end tidal CO2 confirmed
- Tracheostomy secured, cuff pressure checked
- Mechanical ventilation commenced (if patient bagged once tracheostomy tube inserted)
- Chest XRAY attended to confirm adequate position and exclude pneumothorax

The bedside nurse's role during procedure is to:

1. Monitor patient and document observations as required
2. Provide assistance to the medical team. This may include the opening of items onto the sterile field, retrieving extra equipment that they need for the procedure or administration of drugs
3. Managing the ventilator – connecting to the tracheostomy tube once it is in situ
4. Connecting suction – ensuring correct in-line suction is applied

5. Securing tracheostomy tube – once tube is in place and adequate ventilation has been provided, the bedside nurse will secure the tracheostomy tube with either white tapes or velcro straps
6. Applying an appropriate dressing underneath the flange of the tracheostomy

Generally speaking, these patients will have normal upper airway anatomy. This is important to highlight as it does effect emergency airway management choices.

Surgical:

A surgical tracheostomy refers to surgical dissection down to the trachea, which is performed to create a window through which a tracheostomy tube is inserted.

The surgical method is advantageous in particular cases, as you dissect under direct vision. This means that structures such as tumours or aberrant vessels can be avoided. It is considered safer for more technically difficult cases and overall has a lower complication rate.

Typically, the patients that are admitted to Nepean ICU following a surgical tracheostomy, do so following complex head and neck surgery that may or may not include some form of plastic surgery. They can be extremely oedematous, have significant facial and upper airway anatomical abnormalities and will often have significant skin and/or muscle transplant considerations.

When a patient arrives in ICU following a formation of a surgical tracheostomy it is really important that the bedside nurse receives a thorough handover. The bedside nurse should be comprehensively informed of the following:

- Why the surgical tracheotomy was performed
- How the tracheostomy is secured
- Any specific post-operative management plans for the tracheostomy (dressings etc)
- Any specific considerations for emergency airway management

The bedside nurse should have a very low threshold for seeking senior (fellow/consultant) medical assistance if they have any concerns regarding these patients' airways as these types of patients are extremely challenging to manage in the event of an airway emergency with a very high risk of death to the patient.

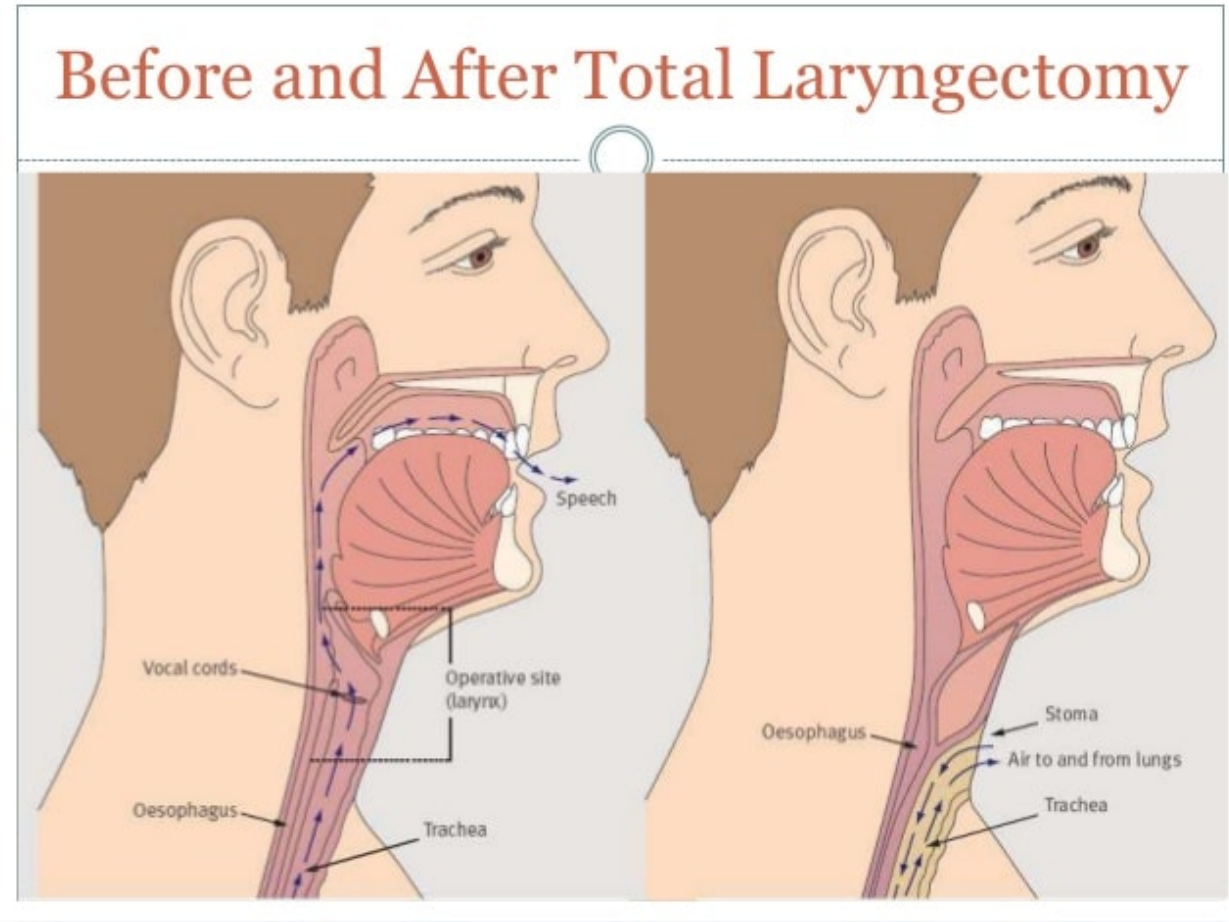
Laryngectomy

A Laryngectomy is a procedure where the entire larynx is removed (usually because of cancer). The trachea is brought to the surface of the neck, where a permanent opening is formed. A tracheal tube

is often inserted in the immediate post-operative period, while the stoma heals and the patient recovers from anaesthesia.

The reason it is important to understand the difference between a tracheostomy and a laryngectomy, is primarily to do with management during an airway emergency.

In a patient who has a laryngectomy, **re-establishing an airway via the nose or mouth is not possible**, as they have no upper airway (see diagram below). In these patients, the only option for airway management is via their neck stoma.



These patients are often not ventilated for long periods of time, usually just while they recover from their anaesthetic. Speech pathology are heavily involved in their care, as they require long term support, follow up and education.

In the ICU it is important to strictly adhere to the surgeon's post-operative orders as the internal anastomosis heals. If this is damaged, it can be devastating to the outcome of the patient. Eating, drinking, insertion of orogastic or nasogastric tubes and removing or changing the tracheal tube (unless in the event of an airway emergency) are all activities that need to be directed by the surgical team and a clear plan should be in place.

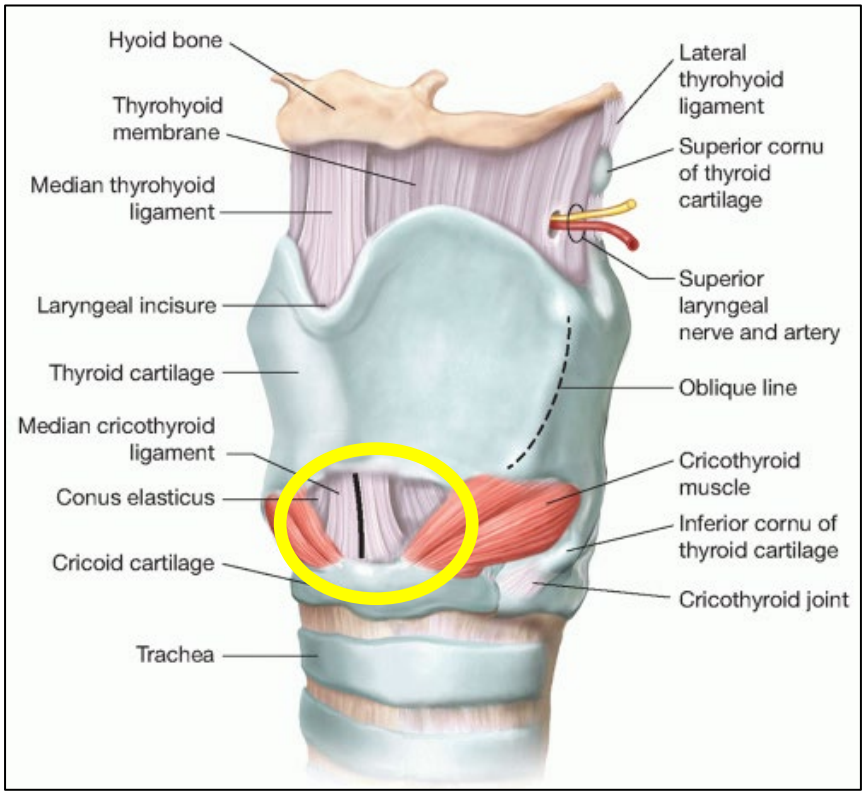
Cricothyroidotomy

The term 'cricothyroidotomy' refers to a procedure where an incision is made in the cricothyroid membrane allowing a small size tracheal tube or small size ETT to pass into the airway. This procedure is almost always done in the event of an airway emergency.

There are a number of techniques that clinicians may use to achieve this. One of the easiest and most commonly taught techniques is the knife – finger - bougie surgical Cricothyroidotomy approach.

There are a range of kits available that use a Seldinger technique (hollow needle puncture followed by a guide wire and dissection or dilation for a tube to be inserted) – however these vary from site to site and given the time critical nature of these events, simplification of equipment is a core factor in decreasing team confusion and ultimately time to securing an airway. However – if the team has access to a specific kit and is comfortable in using it, then it remains a valid option.

In addition, there is a cannula (or needle) Cricothyroidotomy technique. This is an airway rescue procedure that allows for transtracheal oxygenation. A needle is inserted into the trachea and manually stabilised while oxygen is delivered via the needle.



In all of these methods, the point of access remains the same (hence the overall name) – through the cricothyroid membrane. This anatomical point is circled in the image to the left.

Original image retrieved from https://thoracickey.com/cricothyroidotomy/

Ultimately, patients who have had a Cricothyroidotomy will usually need their airway changed, once they are stabilised. The airway will need to be changed to a more secure site, which allows for bigger access (either via an ETT or tracheal tube) to facilitate appropriate ventilation. This airway exchange will almost always be done by a consultant in extremely controlled conditions.

For the ICU nurse involved in a Cricothyroidotomy, it is important to take the time to process and feedback about this clinical event. These scenarios are extremely rare, and you may only ever be involved in one or two across your entire career. They can be clinically challenging and personally confronting. It is important that you seek out your NUM, Educator, Team Leader or other support person if you need to. In addition, formal debriefs will often be offered following these critical events.

Communicating with Patients who have an Artificial Airway

Communication with patients who have an artificial airway can, at times, be extremely challenging. In Nepean ICU we are well resourced for this, with multiple options available. In addition, we have highly skilled Speech Pathologists and Occupational Therapists who can assist us if required.

For a number of years now, it has been our practice to minimise sedation as much as possible, as early as possible. The long term effects of sedation are well documented and not only have many physiological considerations, also play a part in the patient's long term mental health. Hence, we are often able to communicate with our patients within the first 24-48 hours after an artificial airway has been inserted.

Strategies for communication can include:

- Letter boards
- Picture boards (to assess things like pain, temperature etc)
- Etcha sketch devices
- Pen and paper
- Using hand signals (thumbs up, thumbs down)
- Head gestures (nodding and shaking of head for yes and no)

In addition, some patients may use their personal electronic device to type messages.

Ultimately, communication between the patient and their nurse is core to building a trusting, therapeutic relationship. It is essential that you spend time establishing how you are going to communicate with each other. Keep in mind that you may need to trial a number of techniques before you find one that works well for your patient. Also keep in mind how incredibly frustrating it would be to not be able to communicate something you need. Be patient and be kind!

Emergency Airway Management Principles

Any patient who has an artificial airway, or needs one, is at risk of an airway emergency. There are a number of algorithms that can be used to rapidly work through to achieve the ultimate goal – provision of oxygen.

While establishing an airway that is suitable for *ventilation* needs to happen at some stage – the absolute priority is ensuring the patient has access to adequate oxygenation – this will buy time, while equipment, resources and personnel are sourced and a plan established to secure a larger, more definitive airway.

Any time we are either intubating a patient or are looking after a patient who already has an artificial airway in place, we should have a staged plan for how we will manage the airway. In some cases (surgical tracheostomy patients, laryngectomy patients) – this plan is on a poster in the bedspace and the bedside nurse needs to ensure that they have familiarised themselves with it. This is usually because these patients have very specific or high risk airway needs.

There are some general 'Golden Rules' of airway management:

- Before you do anything with an airway, have a plan. This plan should include what is going to happen in the event of an emergency (Plan A, B & C)
- Do not have multiple attempts at oral intubation. If an operator has already had 2 attempts, someone more senior needs to step in, or another device (such as an LMA) needs to be used
- If a laryngectomy patient has an airway emergency *YOU CANNOT USE THE NOSE OR MOUTH TO INTUBATE* or BVM as the trachea has been brought to the skins surface at the neck. This is the only airway access you have – apply oxygen at the site of the stoma whilst help arrives.
- If a percutaneous tracheostomy is dislodged in ICU, the airway needs to be established via oral or nasal intubation – this is to minimise the risk of creating a false tract with blind reinsertion of the tracheal tube.
- Never blindly reinsert or 'push' a tracheal tube back into a neck stoma
  If a surgical tracheostomy is dislodged in ICU the individual airway plan at the bedside needs to be followed.

Airway emergencies are stressful for all concerned. It is not uncommon for the airway practitioner (often a senior medical officer) to become task fixated e.g. on trying multiple times to intubate and not noticing the patient is continuing to deteriorate – graded assertiveness of other staff is essential to ensure that progression on to other lifesaving airway manoeuvres are followed and help is called for early– all clinical staff have a role to play in raising concerns (and making suggestions using graded assertiveness where appropriate) in a timely fashion irrespective of the perceived seniority of the airway operator – emergency airway management is very much a team effort

As a general guide, in a routine scenario, where there is no airway abnormality, the process for managing a patient's airway should be:

- Adequate BVM ventilation.
    - Is the patient's chest moving? If not, use an airway adjunct (guedels, nasopharyngeal airway) and perform 2 person BVM. Optimise your airway opening manoeuvres and reassess.
- In the event that intubation has failed, try an LMA
- If the LMA fails → go back to BVM. If this is oxygenating your patient, keep doing this and seek senior assistance.

If BVM ventilation is not working and you have tried all of the steps above, this is called a CAN'T INTUBATE, CAN'T OXYGENATE (CICO) situation and is a life threatening, time critical event.

Once this situation has been recognised, a Cricothyroidotomy needs to be performed.

References

Nickson, C. (2019, February 10). Retrieved from LifeIn The Fast Lane: https://litfl.com/percutaneous-vs-surgical-tracheostomy/

Yartsev, A. (2019, August 8). Retrieved from Deranged Physiology: https://derangedphysiology.com/main/cicm-primary-exam/required-reading/respiratory-system/Chapter%20011/structure-and-function-upper-airways

Resources

There are thousands of great resources available for you to further your knowledge on this topic. This is certainly not an exhaustive list!

1. Agency for Clinical Innovation - Care of Adult Patients in Acute Care Facilities with a Tracheostomy Clinical Practice Guideline

   https://www.aci.health.nsw.gov.au/__data/assets/pdf_file/0005/181454/ACI_Tracheostomy_CPG.pdf

2. Johns Hopkins Hospital - Types of tracheostomy tubes:

   https://www.hopkinsmedicine.org/tracheostomy/about/types.html

3. St Georges University Hospital (UK) – Tracheostomy information page

   https://www.stgeorges.nhs.uk/gps-and-clinicians/clinical-resources/tracheostomy-guidelines/tracheostomy-tubes/

4. Emergency airway management (Can't Intubate, Can't oxygenate) – The Vortex Approach

   http://vortexapproach.org/

5. Critical Care Airway Management

   https://www.ccam.net.au/

6. Difficult Airway Society

   https://das.uk.com/