UZ LEUVEN

Tracheostomy in children and babies

Patient Information

Introduction

Your child has been, or is to be, fitted with a tracheal cannula. There are various reasons why this procedure is performed. This brochure explains what a tracheostomy is and provides further details on the daily care of a tracheal cannula.

If you have further questions or something is not clear after you have read this brochure, please do not hesitate to contact our care providers.

- hospitalisation paediatric pulmonology: tel. 016 34 58 09
- paediatric pulmonology fellow: tel. 016 34 02 70

MEDICAL BACKGROUND INFORMATION

Medical terms

Tracheotomy:
incision into the trachea/windpipe to facilitate the insertion of a tracheal cannula. An opening is created via the skin to provide direct access to the airway (the trachea). During the operation, a tracheotomy is performed to insert a tracheal cannula in order to prevent the tracheotomy opening from closing again spontaneously.

Tracheal cannula:
hollow arc shaped tube that allows outside air to reach the airway.

Instillation:
drip feed administration of a physiological saline solution (e.g. NaCl 0.9%) into the tracheal cannula or nose to soften mucus.

Aspiration:
aspirating mucus (from the cannula, nose or mouth) using a vacuum system and aspiration probe.

Mandrin:
guide which must always be placed in the cannula when replacing a tracheal cannula. It makes the cannula more rigid and easier to insert.

Decannulation:
removing the cannula from the tracheostomy as planned, although it can also happen accidentally.

WHY IS A TRACHEAL CANNULA INSERTED?

A tracheal cannula may be lifesaving if normal access to the upper airways is blocked. There are a number of reasons for a narrowing of the upper airways. Some disorders are congenital, other causes may be acquired, e.g. narrowing due to scarring as a result of long term ventilation, tumours and trauma.

A second potential cause is a need for invasive ventilation whereby the insertion of a traditional ventilation tube is not possible. A tracheal cannula may also be used if long term ventilation is required, e.g. in children with a severe muscle disorder.

OPERATION PROCEDURE

The doctor will explain the exact procedure of the operation beforehand. The operation will be performed under general anaesthetic. Your child will have to fast beforehand unless it is an emergency operation or the doctor or anaesthetist tells you otherwise.

A nasogastric tube may be inserted during the operation because feeding will be difficult during the first few days after the operation. Fluids may also be administered via a drip if feeding is still problematic.

AFTER THE OPERATION

In the room

Once your child has woken up in the recovery room, he will be taken to the intensive care unit or back to the paediatrics unit. Your child will now be breathing through the tracheal cannula.

In many cases extra oxygen will be administered via the tracheal cannula, which needs to be heated and humidified (see below). During the period when your child is not eating yet, fluids will be given via a drip or nasogastric tube.

Systematic pain relief will be provided during the first few days to ensure that your child is kept as comfortable as possible.

Potential complications

Haemorrhage after the operation

There may be some leakage of blood or blood stained fluid around the cannula, which is normal and not dangerous. The compress applied around the tracheal cannula will absorb these wound secretions and will consequently have to be replaced at regular intervals. Blood may still be present in expectorated sputum even after some considerable time. It can be the result of irritation caused by the cannula and is not dangerous. If necessary, mucus and fluids can be aspirated.

Narrowing or closing of the tracheostomy

If the tracheal cannula accidentally ‘drops out’ or is removed (decannulation), the diameter of the tracheotomy opening will quickly reduce in size, which is why the cannula has to be replaced as quickly as possible. A spare cannula should always be at hand, preferably also in a smaller size (diameter). The smaller sized cannula can be used if the replacement is problematic. The first few days after the operation (first 5-7 days) 'traction sutures' will be in place to help keep the tracheotomy open during decannulation.

Infections

Wound infections may occur around the cannula. Infections of the airways, with an increase in dark and bloody mucus, are also possible. Local disinfection and/or antibiotics will be initiated in consultation with the doctor.

Granulation tissue

Sometimes granulation tissue will form around the tracheotomy after a while, which can be treated with a silver nitrate applicator upon instruction from the doctor.

Tracheal cannula obstruction

If mucus becomes sticky, the tracheal cannula may become obstructed, leading to your child having difficulty breathing or not being able to breathe at all. If mucus cannot be removed quickly enough via aspiration, a clean cannula needs to be inserted immediately.

CONSEQUENCES OF THE CANNULA INSERTION

Not being able to talk or produce sound

Once the cannula is inserted very little or no air can pass along the vocal cords, making it difficult or impossible to produce sounds. After a while, a speaking valve (see below) can be introduced.

Risk of acute respiratory problems

If the cannula drops out or becomes blocked your child may develop respiratory problems, which is why we recommend the use of a monitor at home when your child is asleep.

Impaired nasal function

The nose warms up, humidifies and filters the air we breathe. With a tracheal cannula in place, the nasal function is disenabled, which may result in mucus thickening and crust formation. That is why the cannula is fitted with an 'artificial nose' which takes on nasal functions where possible. In the immediate postoperative period oxygen/air can be connected to the cannula via a humidification system (see below). The patient's sense of

smell will also be partially or completely lost as there is no passage of air through the nose.

Skin irritation around the tracheostomy and neck

The rather humid environment around the stoma can lead to weakening and/or redness of the skin. Skin protection, e.g. with CavilonTM, combined with a split compress (e.g. Alupad Tracheo®) will keep the surrounding skin dry. The compress also helps to protect against pressure lesions caused by the cannula. Hydrating the skin in the neck with body lotion can help relieve irritation caused by rubbing of the cannula tape. If the skin is dry and not irritated there is no need to use a compress.

Respiratory infections

Children with a tracheal cannula tend to produce more phlegm and are more prone to respiratory infections. This is due to the absence of the nasal filter function, the presence of an artificial cannula in the airway and the fact that coughing as normal is more difficult.

Key aspects to remember are the use of an artificial nose, moistening of the cannula when administering oxygen, the correct aspiration technique and good hand hygiene. In some cases the doctor may recommend additional treatment with medication to loosen mucus via aerosol, respiratory physiotherapy or antibiotics.

Psychosocial

A tracheostomy (with tracheal cannula) will have a significant impact on the child and its parents. Initially many parents worry about how to look after it and are anxious about something happening to their child. That is why it is so important that enough time should be devoted to training the parents under the supervision of our medical care providers. The impact on the daily routine should also not be underestimated. Parents will be able to rely on our nursing staff, doctors, social workers and our KITES home care team. It is not always possible or advisable from a medical point of view for children who were fitted with a tracheal cannula in hospital to be subsequently cared for at home. A number of children will need to temporarily rehabilitate in a children's rehabilitation centre, e.g. at Pulderbos (more on this below). In such cases further training can be provided regarding cannula care. Moreover, respiratory problems, feeding issues and learning how to use a speaking valve can also be fine-tuned in conjunction with the medical staff.

CARE AND EXCHANGE OF THE CANNULA BY PARENTS AND FAMILY (AT HOME)

Learning how to care for the cannula is organised in stages. The nursing staff and doctors will teach you how to do it. Initially you will observe, then you will perform the care process under supervision and eventually you will look after your child and the cannula independently with supervision. The safety of your child will be paramount throughout the entire process. A child will only be discharged from hospital providing both parents have the necessary skills and familiarity with all aspects of cannula care.

Mucus aspiration

Aspiration involves sucking out mucus from the cannula using a vacuum system. Initially (particularly in hospital) following the operation, aspiration is performed in a sterile environment, taking care to ensure that the tip of the aspiration probe is not touched when inserted into the cannula.

At home it will be sufficient to thoroughly wash your hands. There is no need to wear gloves. Aspiration probes can be reused (one per day), providing they are cleaned with water and dried with a clean tea towel after each use.

Aspiration is performed with an aspiration kit, which will be loaned to you by our unit. When your child is discharged from hospital you will also be given an emergency aspiration system in case your kit is not at hand or not working properly.

When is aspiration necessary?

In normal circumstances phlegm produced by the lungs is subconsciously coughed up or swallowed. When a tracheal cannula has been inserted this is no longer possible and any phlegm/mucus needs to be removed via the cannula.

Children who have been fitted with a tracheal cannula also produce more mucus and will often make a rattling sound. This is quite normal and doesn't necessarily mean that aspiration is required. Too much aspiration will make your child feel uncomfortable, will irritate the airways and may result in even more mucus being produced. Excessively deep aspiration (beyond the tip of the cannula) could damage the airway.

As the child gets older the need for aspiration will reduce because older children are better able to cough up mucus.

Aspiration is definitely required when:

- rattling breathing coincides with coughing fits, breathing difficulty and/or your child showing signs of restless behaviour,
- mucus seeps out from the cannula,
- an unusual sound is audible, via the tracheostomy,
- your child asks for it,
- your child has difficulty breathing (see below).

Technique

Mucus is removed using an aspiration probe connected to a vacuum system.

- Wash your hands.
- Get some physiological water ready (NaCl 0.9%).
- Open the packaging of the aspiration probe, leaving the tip of the probe in the packaging. Connect the end to the hose of the aspiration kit.

- Remove the probe from the packaging without touching the tip.
- Switch on the aspiration kit.
- Remove the artificial nose (making sure you keep the cannula in place).
- If the mucus is quite sticky use one hand to drip feed some physiological water into the cannula. This process is referred to as instillation.
- Insert the probe into the cannula but stop it from aspirating (bend the probe between the fingers).
- Do not insert the probe further than the length of the cannula (excessively deep aspiration can be risky and lead to irritation and damage of the mucosa).

- Release the probe (don't bend it any longer). Remove the probe from the cannula in a rotating movement (DO NOT aspirate for more than 5-6 seconds, otherwise it may start to feel oppressive). This procedure can be repeated if there is a lot of mucus.
- Rinse the aspiration probe with water.
- Wash the probe in soapy water with washing up liquid, rinse well under the tap.
- Dry the probe with a clean tea towel.
  Discard the probe if the mucus is too sticky and difficult to remove/rinse away.
- Refit the artificial nose.

Tracheostomy and neck care

The tracheostomy should be cleaned with physiological or regular water at least once a day and whenever the split compress or skin are visibly soiled. Get the water ready first.

- Wash your hands.
- Get any necessary material to hand (compresses, physiological water, if necessary, split compress and new tape).

- Position your child with its shoulders supported (e.g. with a rolled up towel) to ensure that the neck is properly stretched.

- Release the cannula tape on one side and hold the cannula with one hand.
- Remove the split compress and clean underneath the cannula with a compress moistened with physiological water. Thoroughly dry the area.
- Also wash the neck with water and soap because the skin underneath the cannula tape can get sweaty, which can soften the skin.
- Apply a new split compress and new cannula tape if necessary.

If there are signs of redness, an open skin lesion or granulation tissue growth it is advisable to contact a doctor. In most cases a mild disinfectant such as Dakin Cooper® can be used if that is the case. In the event of excess granulation tissue the doctor will initially apply a silver nitrate stick.

Silver nitrate must only be used on granulation tissue, as it will cause burns on healthy skin.

If the skin of the neck or around the tracheostomy is very dry you can apply a (hypo-allergenic) body lotion.

If the skin around the tracheostomy is clean and dry there is no need to apply a split compress around the cannula.

Exchanging the tracheal cannula and cleaning the cannula and cannula tape

Exchanging the cannula

When?

- This will be discussed for each child individually, depending on how much mucus is present (at least once a week). Initially this will be done more frequently so that you can learn the technique.

- If the cannula is blocked.
- If the cannula is accidentally pulled or coughed out.

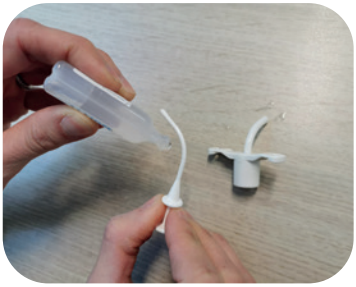
What do you need?

- Spare cannula with mandrin (same size)
- Cannula one size smaller than the current size
- Split compress (if necessary)
- Cannula tape cut to size
- Compresses

- Physiological or sterile water
- Scissors
- Artificial nose
- Aspiration kit
- Aspiration probes
- Rolled up towel
- Clean tea towel
- Hydrogen peroxide water
- Pipe cleaner (to clean the inside)
- Ambu bag (where applicable)

Technique

- Wash your hands.
- Gather all the material you need beforehand and place it on a clean surface. The cannula tape can already be attached to one side of the new cannula.
- Moisten the mandrin (guide) of the new cannula with physiological water (NaCl 0.9%) to ensure that you can retract it easily and replace it in the cannula.



- Position your child on its back with the shoulders resting on the rolled up towel.
- Release the cannula tape.
- If it is not urgent, complete the care procedure first (see above). Hold the cannula in one hand in the meantime.
- Aspirate first if necessary.
- Remove the cannula.
- Insert the new cannula with the mandrin.
  Remember: only take hold of the external part.
- Proceed smoothly along the bend. Do not use force.
- Use a smaller cannula if you're having difficulty.
- Quickly remove the mandrin (your child won't be able to breathe with the mandrin in place in the cannula). Remember to hold the cannula in position.
- Reattach the cannula with the cannula tape. Make sure the tape is not too tight or too loose when attaching the Velcro. You should be able to insert your little finger between the skin and the cannula tape, but no more than the width of your little finger.
- Comfort your child if it is in distress. Clean the cannula and, if necessary, the cannula tape. Replenish the bag with care materials (see below).

- If your child is very restless you can allow it to sit up once the cannula has been inserted. In older children the cannula can be fitted whilst they are in an upright position.

Cleaning the cannula and cannula tape

Once the cannula has been removed, rinse it under running water (boiled tap water or sterile water if you were told to do so) if you are doing it at home.

In hospital sterile water will be used. Allow the dirty cannula to soak for a few minutes in a mixture of 50% hydrogen peroxide water and 50% sterile water.

You can use a pipe cleaner to remove mucus from the inside of the cannula, but it is not obliged. Dry the clean cannula with a clean tea towel and place it in a container.
Make sure that the mandrin has been re-inserted in the cannula ready for (urgent) use.

The cannula tape can be washed with soap and water and left to dry. The tape can be reused until you notice
that the Velcro strip no longer attaches properly. If that is the case discard the tape and cut a new piece to size. Put it out ready for use together with the other care materials.

Tip: use a wash bag or other bag or box in which to store care material for one other care session. This should also include a spare cannula and a cannula in one size smaller. This will enable you to act quickly in an emergency without having to gather all the necessary material and cutting items such as the cannula tape to size. This bag should accompany your child at all times. Also take the bag with you when your child is in hospital.

Always take a spare cannula and a cannula one size smaller with you, even when your child is going for an examination or to the operating theatre.

Use of artificial nose and oxygen

If your child is producing sticky mucus, coughing up blood or suffering from a tickly cough, the air in the room may possibly not be humid enough. In fact, the nasal function is inhibited by the cannula and the nose humidifies and warms up the air we breathe.

To prevent this we use an artificial nose (e.g. Humid-Vent®, Trach-Vent®) which is placed on the cannula. This artificial nose has a filter function, but sometimes this may not be comfortable, particularly if it is soon saturated with mucus and other fluids.
Replace the artificial nose daily or even more frequently if the filter is saturated with mucus and moisture.

If your child is particularly uncomfortable and needs additional oxygen, warmed and humidified air can be administered temporarily. The air is administered directly via the cannula. This treatment is usually performed in hospital.
Check, together with the nursing staff, that the lines through which the air flows are not showing signs of condensation and that water

is prevented from flowing into the tracheal cannula. Always ensure that the lines are suspended below the position of the child in order to prevent this. If necessary, disconnect the lines to allow any excess water to flow out.

Speaking valve

This valve, which is placed on top of the cannula, opens when your child breathes in and closes when it breathes out. This means that your child breathes in via the cannula but breathes out via the nose or mouth, making it possible to talk and produce sounds.

It does take time though to learn how to do it. Depending on your child's age and the time the cannula remains in position, there may be a delay in language and speech development. If that is the case speech therapy will help as soon as the cannula is removed.
The speaking valve is cleaned in the same way as the cannula.

Children suffering from severe narrowing or obstruction of the upper airways cannot use a speaking valve. Your doctor will discuss this with you.

WHAT SHOULD YOU DO IN CASE OF AN EMERGENCY?

When you are instructed on how to manage the care process you will also be told what to do if your child suffers acute respiratory problems.

If you suspect that the cannula is blocked (your child is no longer breathing or having great difficulty breathing):

- Instill with physiological water and aspirate. Remember to check your child's position.
- If that doesn't help, remove the cannula and insert a new one (mandrin!).
- If there is still no air passage:
  - Call 112 and ask for Mobile Emergency Care support.
  - Remove the cannula and keep the tracheostomy open with an endotracheal tube (which is used to keep the cannula opening open).
  - Initiate the reanimation procedure (see below).

If, when changing the cannula, you cannot replace the cannula:

- Check your child's position.
- Try to insert a smaller cannula (mandrin!).
- If that doesn't work, keep the tracheostomy open with an endotracheal tube.
- Call 112 and ask for Mobile Emergency Care support.
- Initiate the reanimation procedure (see below).

If your child has difficulty breathing or is not breathing enough:

- Call 112 and ask for Mobile Emergency Care support.
- Initiate the reanimation procedure (see below).

Reanimation procedure

As mentioned above, a cannula may be fitted for a number of different reasons. This means that your child's upper airways may still be (partially) functional and allowing some air to pass through, which could be important in the event of reanimation. Depending on your child's medical condition, temporary ventilation with ambu bag via the tracheal cannula or via the nose and mouth with a mask, may be useful. If the upper airways are totally blocked it would not be useful. The doctor will explain this in detail.

Three key aspects need to be taken into account during a basic reanimation procedure. It is referred to as the ABC of reanimation.

A = airway
B = breathing
C = circulation

It is important to keep the correct sequence of these terms in mind in the event of a potential reanimation. Always check first that the airway is

free. If it isn't free or can't be freed start ventilating. If that is not enough and there is still no sign of life, start the cardiac massage procedure.

A = AIRWAY

- Reposition your child.
- Instill and aspirate.
- Insert a new cannula, a smaller sized cannula or an endotracheal tube.

Is your child still having difficulty breathing?

B = BREATHING

- Remove the mask from the Ambu and place the Ambu on the tracheal cannula or endotracheal tube.
- Press the balloon, check whether the chest is rising and make five ventilation attempts.
- Now check whether your child is breathing independently. If so, stop ventilating.

Is your child still not breathing independently?

C = CIRCULATION

- Initiate the cardiac massage procedure and repeat 15 times.
- Alternate between two ventilation attempts and 15 cardiac massages until the Mobile Emergency Care team arrives.

PULDERBOS REHABILITATION CENTRE FOR CHILDREN AND YOUNG PEOPLE

The Pulderbos rehabilitation centre will temporarily care for children and young people up to the age of 21 with neurological and/or respiratory problems, who require intensive rehabilitation.

The neurological unit looks after children and young people with epilepsy, non-congenital brain damage (following an accident, tumour, bleeding), paraplegia, peripheral nerve hyper excitability and functional disorders. The respiratory support unit looks after children and young people with respiratory diseases of the lower (cystic fibrosis, bronchopulmonary dysplasia, asthma, etc.) and upper (tracheal cannula, etc.) airways. As described briefly above, Pulderbos focuses on the specific needs of your child and will initiate an appropriate rehabilitation programme. For example, some children (temporarily) need extra respiratory support (e.g. CPAP or BiPAP).

The centre accommodates both inpatients (day and night) and outpatients (only during the day). Parents are always welcome, either to share in the care process or learn step by step how to manage it. Children are allowed to go home during weekends as soon as possible. If necessary, a daytime stay can be arranged. Once back at home, caring for a child with a tracheal cannula can be challenging, not least because of a lack of continuous support. To provide some respite the care process can be taken over for a few days at the Limmerik respite unit where continuous supervision is provided by a nurse.

For further information please visit the Pulderbos website www.revapulderbos.be or ask the doctors at the unit for advice. Specific questions can be emailed to info@revapulderbos.be.

PRACTICAL TIPS

- ✔ You can buy or rent an aspiration kit or it can be lend by our home care team.
- ✔ Children who have been fitted with a cannula are entitled to increased child benefit (growth package). Contact the social worker for more information.
- ✔ You will be provided with a starter pack to enable you to care for the tracheal cannula at home for the first few days.
- ✔ You will also be given an overview of which materials you need and where you can obtain them.

ASPECTS TO REMEMBER

- ✔ Store the spare cannula (after cleaning) in a container that is easy to open and keep it in the care materials bag. Make sure you keep this with you always and everywhere, even when attending a consultation at, or following admission to, the hospital.
- ✔ Ensure that the bag with care materials is always replenished and ready for use. Tip: cut some tape to size.
- ✔ Also take the aspiration kit with you everywhere you go or use the emergency aspiration system. You will be told how this works when your child is discharged from hospital.
- ✔ Do not use Vaseline when administering oxygen to your child at home.

NOTES

Design and implementation
This text was written by the Paediatrics Unit in cooperation with the communications department.

You can also find this brochure at www.uzleuven.be/en/brochure/700709.

Please send comments or suggestions relating to this brochure to communicatie@uzleuven.be.

Published by
UZ Leuven Leuven
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www.uzleuven.be

700709_v102022