Chapter 33: Home tracheostomy care

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Despite the advances in paediatric laryngeal surgery (Cotton and Evans, 1981), there are a number of children who need to have a tracheostomy for a prolonged period. Nursing these children in hospital is not only expensive and impractical, but separates them from the contact and security of family life which may be detrimental to their development. Ideally a child with a tracheostomy is best cared for at home. Occasionally, there will be patients for whom home care is not suitable and, in this case, hospital life must be made as normal as possible.

However, parents from all walks of life can be taught tracheostomy management and become confident, capable and responsible for their child at home. It is the responsibility of medical and nursing staff to prepare parents slowly and compassionately so that they gain confidence in all aspects of tracheostomy management.

Adjustment to tracheostomy

The idea of taking a newly tracheostomized child home may be daunting. It will quickly become evident that the child will put new pressures and constraints on normal daily routine. Parental reaction to a tracheostomy can vary from terror to over confidence, guilt or anger. Others are merely relieved to see their child free from stridor. Parents need repeated reassurance that these different feelings are normal reactions.

There are definite advantages in parents communication with other happy tracheostomized children and their families; this leads to the realization they are not unique and so helps them to gain confidence. Friendships often form between parents and in time this can lead to mutual support. For example, at a practical level, those living in the same locality could exchange babysitting favours.

Training for home care

Training for home care begins at the earliest opportunity, preferably before surgery, with the teaching of basic anatomy. Simple line drawings may help to explain the functions of the larynx and trachea. Parents need to appreciate and understand:

(1) the reasons why their child has an artificial airway;

(2) the extent to which normal laryngeal functions have been impaired by the formation of a tracheostomy.

They need to visualize the oesophagus and trachea as separate tubes for eating and breathing and appreciate that special precautions must be taken now that inspired air is no longer warmed, filtered or humidified.
Parents must learn the skills at their own pace. This takes time and patience on behalf of the ward team. It is essential they receive a unified teaching programme. There must be absolute uniformity of instruction from all members of staff.

In order for parents to learn tracheostomy management as quickly as possible, it is important they spend as much time as they can manage with the child in hospital.

At first they will simply observe the techniques. Gradually, with gentle encouragement, they will become increasingly competent to carry out these procedures under supervision and eventually have full confidence to undertake the task alone.

They will need education in the following:

1. stoma and skin care;
2. irrigation and suction;
3. changing the tracheostomy tapes;
4. changing the tracheostomy tube;
5. chest physiotherapy;
6. detection and management of complications;
7. resuscitation;
8. supplies and equipment for home use and the care of plastic and silver tracheostomy tubes;
9. cleaning and sterilization of all equipment;
10. problems associated with the tracheostomized child at home;
11. available help in the community.

Nursing technique

Stoma and skin care

Once a tracheostomy is established the tract usually epithelializes quickly and minimal skin care is necessary. Gentle cleaning with normal saline or a mild antiseptic solution will help keep the skin dry, clean, and free from irritation and infection. Creams and ointments should be avoided.

If the skin should become sore, it must be cleaned more frequently, and a non-adherent dressing applied; this is changed when necessary. (Cotton wool based dressings should not be used; they disintegrate and fragments may be inhaled.)
Granulomata around the tube sometimes occur and are treated with topical applications of silver nitrate.

**Irrigation and suction**

Whenever possible the child should be encouraged to cough and clear accumulated mucus from the trachea. If, however, the secretions cannot be cleared in this manner, it is important they are made less tenacious by the instillation of 0.5-1 mL isotonic saline into the trachea prior to suction.

With washed hands a clean catheter is inserted, just beyond the end of the tracheostomy tube. Suction is applied as the catheter is withdrawn, with a rotating motion. If further suctioning is required a new clean catheter should be used each time. Each suction should not take more than 20-30 seconds. The frequency of applying suction varies from child to child. Secretions usually become less plentiful as the child becomes accustomed to his tube and a daily routine is established away from the hospital environment.

Hospital staff wear disposable gloves for suction to prevent cross-infection, but there is no need for parents to wear gloves. They should, however, pay special attention to handwashing and personal hygiene before performing any of the procedures. Suction should be performed prior to feeds or mealtimes and be avoided immediately afterwards if possible.

**Changing the tapes**

Tapes should be changed daily or whenever they become dirty or wet. It is often desirable to perform tape changing as a routine after the child's bath in the evening. At this time they are often sleepy and will offer less resistance.

It is advisable to have two adults present. If necessary the child can be restrained by wrapping in a towel or blanket. The child is laid down and the neck extended over a pillow or rolled up nappy. One person holds the tube in place while the other cuts and removes the old tapes, and cleans the area around the stoma.

New tapes are attached by tying three knots on one side of the tube and a bow on the other. The first person should continue to hold the tube in place until the tension has been checked.

**Checking the tension**

The importance of obtaining the correct tension must be stressed repeatedly to the parents, as one of the causes of home tracheostomy fatality is a displaced tube.

With the child sitting up with his neck flexed forward, it should be possible to insert just one finger between the tapes and the neck. Adjust the bow until the correct tension is obtained. Once satisfied that the tapes are correctly tensioned, the bow is secured by tying it with three knots.
Changing the tracheostomy tube

This must be the most traumatic aspect of tracheostomy management and it is very natural and right that parents should view tube changing with some anxiety. Parents should be reassured that changing of the tube is safe if the taught routine is followed. It is normal for the child to cough, cry or protest; they usually become more cooperative as they get older. It is usually sufficient to change the tube once a week and it is advisable to do so prior to feeds or meal times. However, if secretions are tenacious the tube is more likely to become crusted and will need to be changed more frequently.

Special precautions

(1) There must always be two adults present for a routine tube change.

(2) Good lighting is essential.

(3) Meticulous attention to handwashing and sterility of the tube is essential.

(4) Spare tube and suction apparatus must be available.

(5) Suction is applied and the stoma cleaned before changing the tube.

Procedure

While one person extends the neck and holds the chin, the second person cuts the tapes and removes the old tube with one hand, and gently but quickly inserts the new tube with the other. The tapes are tied and tension checked carefully.

Chest physiotherapy

Once a child has been discharged from hospital, secretions tend to diminish and the need for chest physiotherapy is eliminated. However, if the child suffers from a respiratory infection, the secretions will become more plentiful and it is then advisable that the parents administer safe chest percussion. It is essential that a physiotherapist teaches the family how to do this prior to discharge.

Detection and management of complications

Respiratory tract infections

There is a significant decrease in the frequency of respiratory tract infections once the tracheotomized child is at home. Parents must be made aware of normal and abnormal conditions for their child. They should be taught to watch for fever, loss of appetite, and change in colour, consistency or amount of tracheal secretions.

They should appreciate that it may become necessary to increase the frequency of suctioning, to increase the fluid intake, and to give regular chest physiotherapy. Either the
general practitioner or hospital physician should be informed and relevant antibiotics commenced if indicated. Clinical trials have shown that S-carboxymethylcysteine (Mucodyne) reduces the viscosity of sputum. It improves the ability to cough up bronchial secretions without adverse side-effects (Edwards et al, 1976).

It is useful for the parents to have a few sputum traps at home so that specimens can be obtained for culture when necessary.

Resuscitation

There is a mortality associated with a tracheostomized child in hospital which is slightly increased when the child is nursed at home. To minimize this risk it is absolutely essential that the parents are taught cardiopulmonary resuscitation prior to discharge. It is a difficult issue to raise for the nurse, doctor and parent. It must be handled efficiently and with sensitivity. It is important that the family have quick assess to a telephone in the event of an emergency.

Equipment and supplies for home use

It is advisable to keep all tracheostomy equipment on a clean, well lit surface next to the child's bed. All electrical appliances should be checked prior to discharge from hospital.

Electric suction machine

Several different designs of machine are available. Essentially it should be reliable, light and easy to clean with a regulator switch to ensure optimal suction. Correct tubing and connectors should be supplied with the pump. Any filter in the unit should be changed weekly.

Portable suction unit

It is essential that parents are provided with a small portable suction unit, operating independently of the electricity supply, such as a foot pump. This enables the child and family to have freedom from the confines of home, and should there be an electricity power cut, this form of suction will be reliable and sufficient until normal power is restored.

Catheters

There are many different designs of catheter available. Rubber catheters which cause less tissue damage, are soft but not disposable, whereas the plastic disposable catheters are slightly stiffer. However, since the catheters will be used by only one patient, it is usually possible to clean and re-use all of them.
Tracheostomy tubes

Disposable

There are several companies who manufacture disposable paediatric tracheostomy tubes (for example, Warne/Franklin, England; Portex Ltd, England; Shiley Ltd, England). Hospital preference usually determines the type to be used.

In all cases these tubes can be sterilized at home and re-used on several occasions before discarding. Extended tubes can be used to prevent small infants with 'double chins' accidentally occluding their airways while sleeping.

The parents should be given four or five sterile tubes to take home and told to carry a spare with them at all times in case of emergency.

Advantages of plastic tubes (Stool, Campbell and Johnson, 1968):

1. They are more pliable at body temperature and conform well to the trachea, reducing the danger of tracheal ulceration.

2. The length of the tube can be easily shortened for neonates.

3. The tube is relatively inexpensive.

4. Plastic causes less inflammatory reaction and healing around the tube is rapid.

Di Santi valves

Di Santi valves are designed to fit snugly into all sizes of the 'Great Ormond Street' (GOS) pattern plastic tracheostomy tube (Warne Franklin, England). The valve closes on expiration and vocalization can occur, either due to air leak around the tube or through a fenestration which can be carefully cut into the plastic.

Silver tracheostomy tubes

There advantages and disadvantages associated with silver tracheostomy tubes. The most commonly used 'Alder Hey' tube (Downs Surgical plc, England) consists of five parts:

1. a fenestrated outer tube;

2. plain inner valve;

3. a fenestrated speaking valve;

4. introducer;

5. blocker.
These tubes are individually made and parts are not interchangeable.

**Advantages**

(1) They are reusable.

(2) They have an inner valve which is easily removed for cleaning.

(3) When the fenestration is correctly aligned within the airway, air passes up through the vocal cords and vocalization occurs. The position of the fenestra should be checked by lateral neck X-rays prior to discharge.

**Disadvantages**

(1) They are expensive.

(2) They are slightly more unsightly than plastic tubes.

(3) Occasionally it is difficult to align the fenestra within the airway and tissue damage can occur.

(4) It is sometimes difficult to clean under the flanges of the tube.

(5) Some children are allergic to the tubes.

**Special precautions with silver tubes**

(1) *Always* insert tube with introducer in position and *always* remove the tube with plain valve in position. In both cases the risk of soft tissue damage is minimized.

(2) *Always* remove the valved speaking tube and replace it with the plain tube when the child is put down to rest or sleep. There is a significant risk of the valve remaining closed due to accumulation of secretions.

(3) It is always safer to perform suction with the plain inner tube in position. *Never* perform suction through the valved speaking tube. The valve can be damaged or part of the catheter may be cut off and inhaled.

**Syringes and saline**

Syringes should be provided for insertion of saline into the trachea. If necessary saline can be prepared at home by mixing one teaspoon of non-iodized salt to 1.8 litres (one pint) of cooled boiled water, which should be stored in sterile containers.
**Humidifiers**

These are very expensive and there are only a few children who require humidification at home. It may be indicated for those with severe lower airway disease or those with extremely tenacious secretions.

**Cleaning and sterilization of equipment**

Parents should be encouraged to care for the equipment provided and to clean it regularly. All non-metallic items can be cleaned in hot soapy water and then immersed in a sterilizing fluid such as Milton (sodium hypochlorite) (Richardson Vicks Ltd, England). Metal items should be either sterilized in spirit and then rinsed with cooled boiled water, autoclaved or boiled.

**Day-to-day problems** (Tym, 1986)

Once nursing techniques are mastered, the parents will start to ask specific questions pertaining to the child’s daily routine. These issues create as many worries as the nursing care. Severe stress can be put on a family caring for a tracheostomized child 24 hours a day, 7 days a week. Single parent families will need even greater support. All family members and relatives should be encouraged to learn the care and help at home.

Sometimes the parents can gain confidence and independence by taking their child away from the ward environment for increasing periods of time prior to discharge.

**Discipline**

Parents should not blame the tracheostomy for any lack of discipline in the home. Initially parents often consider their child is weak and feel sorry for him. In the end the child becomes manipulative and the boss of the family, everything revolving around him. The family should treat the child as any other, taking into consideration three important points:

1. suction equipment is available at all times;
2. the child is protected from water, sand and wind;
3. the child is never left alone with anyone who cannot manage the tracheostomy.

**Speech and language development**

A child with a tracheostomy may be considered at risk in the development of his speech and language skills. Fortunately, many children manage to vocalize, either by using the air leak around the tube or by use of a valved fenestrated tube. In all cases children should be referred to a speech therapist for assessment around one year of age, or earlier if parents so wish. Parents must be directed to encourage language development in their child at all times.
Clothing

Clothing which is excessively fluffy or with a high neckline should be avoided. A thin scarf over the tracheostomy may be of value, especially on windy days, to prevent particles from entering the trachea.

Sleeping

Small babies should sleep in the same room as their parents. Bells or cradle plays attached to the child's bed will usually warn of distress, since a child in respiratory distress will not lie quietly but will thrash around and create noise from the attached bells or cradle play. Toddlers and older children can sleep alone. An intercom should be used. These are fairly cheap and can be purchased from several large stores. The microphone may be placed in the child's room while the auxiliary end may be placed anywhere in the house or even outdoors.

Parents can become extremely exhausted from deprivation of sleep and where possible they should alternate the night care.

Feeding

Feeding does not usually present a problem. Parents should not allow young siblings to feed the tracheostomized child without supervision. They should also avoid performing suction or routine tube changing immediately after a feed as this may cause vomiting.

Bathing and hairwashing

These children can bath normally in shallow water. They should not take a shower. Hair should be washed with the child laid on his back with a controlled spray of water directed backwards.

Schooling

Children with tracheostomies may attend either normal or special schools depending on the area in which they live. Arrangements must be made with teaching staff for them to be carefully observed and staff must be competent in all care.

Travelling

The parents must be encouraged to have a bag of equipment especially for travelling. When away from home they must always carry:

1. portable suction with catheters;
2. spare tracheostomy tube and tapes;
3. a pair of scissors;
(4) saline and syringe;

(5) tissues.

**Parental freedom**

It is important that a third person be trained to take care of the child. One of the major difficulties for parents is the inability to leave home. In some cases it may be possible to exchange babysitting favours with parents of another tracheostomized child in the same area.

**Play**

A child with a tracheostomy must not go swimming but may paddle under close supervision. Parents must be told to keep their child away from loose, fine, dry sand which is easily inhaled. Any article which could be inhaled should be kept well out of reach of the child.

**Support from the community**

Community care workers (general practitioners, health visitors, district nurses, etc) must be informed about the child prior to discharge home, so that they can be prepared to give maximum support. Social workers may be able to offer financial help. As time goes by, a routine is established and community workers will have a smaller part to play in home care.

Parents must be reassured that they can contact either medical or nursing staff at the hospital day or night for advice. They must not feel isolated.

There is now a registered charity for these children at home - ACT (Aid for Children with Tracheostomies) which aims to give encouragement, support and practical advice.

**Checklist for home care**

Before discharge:

(1) parents must be capable in all nursing techniques;

(2) they must be able to care for all the equipment provided;

(3) community health workers and the general practitioner must be informed.

In conclusion, it must be stated that there is a slightly increased mortality risk in nursing these children at home. However, with proper teaching, instruction and back up from the community and local hospital, the risk is significantly minimized.

Thus children with a tracheostomy who are otherwise well, can, and should be cared for at home.