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SHORT COMMUNICATION

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Methods to Train Hospital Staff Treating Pediatric Tracheostomy

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ABSTRACT

Temporary and permanent tracheostomies in children have been performed in Israel and around the world for many years. They are used to help with long-term ventilatory support, to assist in elimination of secretions or following a blockage in the upper respiratory tract. The most common indication for tracheostomy in children today is the need for long-term ventilation.

Tracheostomy in children is performed in about 0.2% of those hospitalized in tertiary children's hospitals. Mortality among children with a tracheostomy ranges from 10%-20% due to significant comorbidities in this population.

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KEYWORDS
Upper respiratory tract; Long-term ventilation; Respiratory distress; Therapeutic confidence

Description

Tracheostomy-specific mortality and complications are now rare [1-2]. The survival rate of preterm infants with a tracheostomy following BPD and other complex cardiopulmonary conditions continues to improve. Between 2007 and 2015, in-hospital mortality improved from 9.9% to 8.2% among low-birthweight preterm infants in all eleven high-income countries studied [2]. This is due to the improvement in the treatment of medically complex premature babies around the world. The deaths in children with a tracheostomy that were directly related to the tracheostomy and not to the associated diseases were caused by the clogging of the cannula by secretions or by accidental Dec annulation. These events have a greater risk in children due to the lack of an internal tracheostomy tube and the smaller anatomy of their airways [3]. Most tracheostomies in children are performed on children under the age of 4 [4]. Although pediatric tracheostomies are overall similar to adult tracheostomies, there are a number of major and essential differences in routine management and emergency care in children.

Complications

Common complications of tracheostomy in children include obstruction by secretions, accidental Dec annulation, pressure sores, bleeding, granulation tissue, and Trachea Cutaneous Fistula (TCF). Less common complications include subcutaneous emphysema, pneumomediastinum, Tracheo Innominate Fistula (TIF), subglottic and/or tracheal stenosis, and esophagus injury.

The potential for complications is significant and becomes more important in children due to the small diameter of their airways [5]. Subglottic stenosis or granuloma formation are more critical in children because the diameter of the airway is smaller. In a newborn, the diameter of the windpipe is between 3.5 mm-4 mm and in premature babies can reach a diameter even smaller than 3 mm [6].

Likewise, accidental Dec annulation is more common in small children who reach for the cannula and are not aware of the danger of pulling it out.

One of the most significant safety considerations in these vulnerable patients is the skill of the nursing and medical staff [7]. In the world, awareness that many of the complications can be prevented is on the rise, and is a result of systematic training and practice of the treating teams. National efforts are being made in the USA to improve the care and knowledge of the treating team [8]. Recently, guidelines were published for the treatment of tracheostomy in general and children in particular [9]. One of the main guidelines includes training and practice of the treating team.

The situation in Israel and the children's hospital safra tel hashomer

Since 2010, nurses in Israel are allowed to reinsert a tracheostomy cannula to a patient in situations of emergency.

According to the procedure, "Returning a cannula to the trachea as a life-saving operation will be possible as a nursing operation for any certified nurse who has undergone training as detailed in Ministry of Health Circular No. 86 dated 21/03/20 even if she does not

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have advanced training in intensive care [9]."

In practice, theoretical and practical training is currently given using an anatomical doll, and not repeated on a regular schedule. After certification a nurse is allowed to return a cannula.

In most inpatient wards (excluding intensive care), the nurses are exposed to a child with a tracheostomy once every few months, if at all.

Similar to the nursing staff, many doctors and interns may not have encountered life-threatening situations related to a tracheostomy. Doctors who may never have treated a clogged or pulled out cannula, or even changed a cannula, are often the ones next to the patient in the evening or night shift. In emergency situations, for example, if the cannula is pulled out or blocked and the child is in respiratory distress, there is fear and apprehension to return the cannula or replace it.

The insecurity visa tracheostomy may pose a real danger to the patients' lives.

During the last two years since we opened the children's ENT clinic in Safra Hospital Tel Hashomer, we have taken several initiatives to increase the knowledge and therapeutic confidence of the teams treating this issue.

1. We created a dedicated treatment protocol for children and inculcated it among the medical staff; children are certainly not in relation to tracheostomy treatment and therefore a protocol adapted to children is of great importance.
2. We carried out periodic training and practice sessions to raise the level of skill and confidence of the treating staff. We added training for newly hired staff, and provided refresher knowledge for teams and specialist doctors.
3. We created a dedicated tracheostomy care and transport kit, so that all the necessary equipment is accessible for treatment. The uniform tracheostomy kit is used in all the hospital departments, to ensure that every child with a tracheostomy has access to necessary equipment in case of emergency. This kit is used when transporting the children from a ward to scans, clinics or any other treatment.
4. We created a training video on the topic of tracheostomy treatment. We are currently working on creating detailed training video for staff and parents in both Hebrew and Arabic, as many of our patients come from the Palestinian Authority and need a lot of help with guidance and treatment.
5. We published a booklet for tracheostomy home care, including broad explanations of the components and detailed explanation of procedures required for long term care of tracheostomy.
6. Collaborative training at the patient's bedside, When a patient with a tracheostomy needs a routine cannula change, we do this with accompaniment of the treating team available with guidance and explanation, so the team experiences changing a cannula on a patient when the conditions are optimal and not for the first time in an emergency situation.

Conclusion

In order to promote better treatment of children with a tracheostomy, it is important to create a change and increase the knowledge and therapeutic confidence of the teams that care for these children.

Safra Tel Hashomer Children's Hospital implemented various processes to increase the knowledge and confidence of the nursing and medical staff. We believe a combination of the changed presented in the article lead to both increased confidence of staff and better outcomes for these young patients.

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