Which pediatric patient should be tracheostomized and when?

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What about tracheostomy in 2015?

- Use of non invasive ventilation reduced indication of tracheotomy especially in neuromuscular diseases but some indications still remain.
The percentage of invasively ventilated children varies among countries and departments (otolaryngology department or home care unit)

United Kingdom (23%)
Switzerland, more than 30%
Italy (41%),
Turkey (32%),
part of the USA (49%)
Netherlands 51%
Canada 17%
Auckland 3%

These differences reflect differing years of study and study designs (as well as discrepancies in international clinical management.
• Indication for invasive ventilation: Patient meets indication for Invasive Ventilation when:
  – Uncontrollable airway secretions despite use of non-invasive expectory aids or
  – Impaired swallowing leading to chronic aspiration and repeated pneumonias
  – Patient has persistent symptomatic respiratory insufficiency and fails to tolerate or improve with NIV
  – Patient needs round-the-clock (>20H) ventilatory support because of severely weakened or paralyzed respiratory muscles and patient or provider prefers invasive ventilation
In literature

Pediatric tracheostomy: JC Fraga et al
Pediatric tracheostomies: changing indications and outcomes: JD Carron and al
Pediatric tracheostomy: the Universitair Ziekenhuis Brussel’s experience: JM Graf and al
Tracheostomy in young patients: indications and long term outcome: J. Zenk and al
Pediatric long term home mechanical ventilation: Amin R, and al
Long term pronosis of tracheostomized patients in Japanese children’s hospital: Y Kondo

• The main causes:
  • Airway obstruction: 45%
  • Chronic diseases requiring ventilatory support: 55%
• The mean age:
  – 70% under 3 years
  – even under 1y mostly for airways obstruction or prolonged ventilation
• Mortality: 10 to 30% but 0 to 4% related to tracheostomy
• Successful Decannulation: 30 to 70% after 4 months to 6 years
Tracheostomies performed in the unit during 40 years

- Did their number change: yes in the last years

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<td>10</td>
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- Are the reasons different: Younger patients and less NMD

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<td>2</td>
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<td>2 polio</td>
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<td>1</td>
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<td>Brain stem lesions</td>
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In < 2 years patients needing round-the-clock ventilatory support (life support): Tracheostomy is performed as soon as possible

- Severe congenital respiratory insufficiency often associated with feeding problems:
  - Neuromuscular disorders:
    - Congenital myopathies (nemaline..)
    - Congenital myasthenic syndrom
    - Arthrogryposis
  - Brainstem lesions and congenital central hypoventilation
    - Ondine
    - Other brainstem lesions with diaphragmatic involvement
- Bronchopulmonary dysplasia
  - Rare in preterm children and often associated with cerebral palsy
Severe neonatal pattern with swallowing problems in neuromuscular disorders

Nemaline myopathies, congenital myasthenia, arthrogryposis
Central hypoventilation
Brainstem lesions

- Ondine disease and others brainstem lesions with diaphragmatic involvement: tracheostomy is safer in the first years
Obstructive bronchodyplasia

- The way of treatment of severe premature children makes long term ventilation rare but some cases still exist often with severe neurologic pattern
- Severe viral pneumopathies with ARDS need often prolonged invasive ventilation and tracheostomy
In young patients with severe dysautonomia needing ventilatory support, tracheostomy must be done before occurrence of ischemic cerebral lesions.

- NIV is often performed but patients often have gastroesophageal reflux and dysautonomia. Hypoxemic episodes suddenly occur. Invasive ventilation is safer and tracheostomy must be performed.

- It is often seen in the first years of congenital myasthenic syndrome, C5-C7 tetraplegia in young patients, brainstem lesions with short respiratory autonomy.
Congenital myasthenic syndrome

Many among them die in the first years of sudden death when occurs a dysautonomic malaise. Spontaneous improvement is seen after 3 or 4 years.
• Tracheostomy is necessary in tetraplegia in two cases:
  – When the level is above C4
  – In young dysautonomic children under 2 years when intercostal paresis is responsible for atelectasia bronchospasm and vagotony
In infants, tracheostomy can be discussed for some children failing to improve with NIV

• Central nervous system lesions with swallowing problems without severe respiratory insufficiency: Moebius syndrome...

• Congenital myopathies without swallowing problem (Congenital muscular dystrophy merosine deficient..)

• Jeune syndrome
In older children

- The indications are the same in children and adult:
  - Patient has persistent symptomatic respiratory insufficiency and fails to tolerate or improve with NIV (very rare)
    - Uncontrollable airway secretions despite use of non invasive expectory aids
    - Impaired swallowing leading to chronic aspiration and repeated pneumonias
    - Patient needs round-the-clock (>20H) ventilatory support because of severely weakened or paralyzed respiratory muscles and patient or provider prefers invasive ventilation
When there is severe swallowing problems

- Congenital myasthenia, centronuclear myopathies, brainstem lesions...
Why must we do a tracheotomy when NIV is efficient?

- When ventilatory support is necessary more than 20H a day, life depends on surroundings and of quick clearing of secretion. Tracheostomy is safer but it must be the patient’s choice.
In progressive diseases leading to a complete respiratory dependency

- FKRP myopathies
- but not
- Selenopathies
In tetraplegia C2-C4
Trauma, Myelitis, tumor..
Central neurologic causes

Coma

- Tracheotomy in coma whatever the cause is (traumatic, infectious, vascular) makes the cares easier in the first period
IN SEVERE RESTRICTIVE RESPIRATORY INSUFFICIENCY

When there is a very severe scoliosis leading to orthopedic treatments with casts

• The treatment impedes quick intubation so a transient tracheostomy can be necessary
Ethic problem

Tracheostomy is not always a solution in very severe diseases with mental retardation (Congenital steinert myopathy), or severe motor impairment (myotubular myopathies, early SMA I...).
The impact of paediatric tracheostomy on both patient and parents: Hopkins C. and al

- 26 caregivers, 7 after decannulation in London
- Adverse effects on all aspects of QOL: sleep, relationships, social life and ability to work
- Need to better preoperative preparation
- Greater support for such families
Quality of life of care givers

• Children’s care givers QOL has been studied showing in all the countries that:
  • Parents spend an average of 8 hours each day caring
  • Their responsability is described as stressful and sometimes overwhelming
  • They are seeking normality but report a deep sense of isolation and are offended by the reactions they faced in their everyday communities
  • Nevertheless, they experience « good things »
    (Carneval FA and al: Pediatrics 2006 Jan;117(1):48-60)
In conclusion

- Tracheostomy must be easy in infants to avoid acute gastrointestinal and dysautonomic problems and facilitate discharge.
- In children, NIV is often effective and indication of tracheostomy decreased especially in neuromuscular disorders and depends of the efficacy of care givers to clear the secretions.
- Decannulation, if possible, is often difficult in children if mechanical ventilation is always necessary. They always prefer IV to NIV.
LIFE SATISFACTION OF PATIENTS