Children with Special Health Care Needs

Will/Grundy EMS System

3rd Trimester CME - November 2009

Objectives

- Describe special concerns in the initial assessment and stabilization of Children with Special Health Care Needs (CSHCN).
- Explain steps in managing complications of indwelling devices.
- Outline management priorities for selected special needs children.

Case Presentation

- You are dispatched to a home for a 9-year-old boy with trouble breathing.
- The child with tracheostomy lies in a hospital-style bed and is connected to a ventilator.
- The home health nurse reports sudden onset of respiratory distress 20 minutes ago that did not improve with suctioning.

General Assessment: PAT

Appearance
Listless, poor muscle tone

Work of Breathing
Gasping respiratory efforts
No chest rise

Circulation to Skin
Pale lips and nail beds cyanotic

What is your general impression? Sick or Stable?

General Impression

- General impression:
  - Sick — altered appearance, increased work of breathing and cyanosis = respiratory failure; possible shock ⇨ ***Obstructed Airway***
  - Sudden onset of distress implies mechanical problem with ventilator or tracheostomy tube.

Is immediate treatment necessary?

Management Priorities

- Disconnect ventilator- ***Caregivers can assist, they are familiar with equipment.***
- Connect bag-mask device.
- Begin bag-mask ventilation.
- Removal of patient from ventilator will determine whether equipment failure is the cause of obstruction.

Initial Assessment: ABCDEs

- Airway: obstructed
- Breathing: RR 20; gasping respirations; resistance to bagging and poor air movement bilaterally; Pulse Ox 84% on 100% O_2
- Circulation: HR 130; strong central and peripheral pulses; capillary refill 3 seconds; BP 95/palp
- Disability: alert, no focal findings
- Exposure: gastrostomy tube in place; very thin, small for age

Stay or go? What else do you need to know?

Additional Assessment: Focused History

- Born at 28-weeks gestation, intubated and on ventilator for 3 months.
- Tracheostomy placed at 4 months of age.
- Home nursing 8 hours per day.
  - New nurse uncomfortable with tracheostomy changes.
- Cough, congestion, and increased thick secretions for 3 days.

What are your management priorities?

Ventilator does not appear to be the problem…..

Thick secretions can obstruct the tracheostomy tube causing “airway obstruction”

Management focus: remove the obstruction

Management Priorities

- BLS:
  - Instill 2 mL normal saline in tracheostomy tube *(helps loosen the secretions)*
  - Suction tracheostomy tube-

    10-15 sec time limit per attempt
  - Provide 100% oxygen between suctioning attempts
  - Monitor for bradycardia *(Caused by hypoxia)*

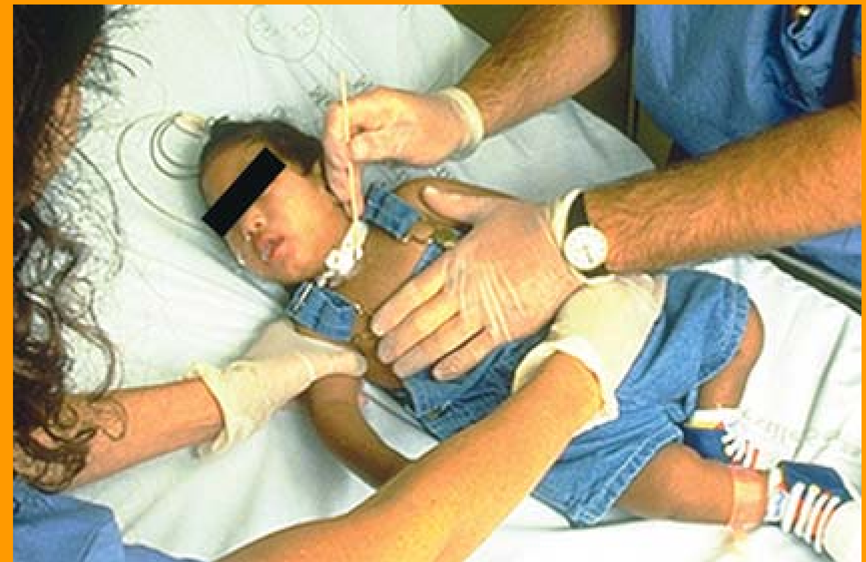
Management Priorities

- BLS:
  - Reattempt ventilation.
  - If there is no chest rise, remove the tracheostomy tube.
  - Bag-mask ventilation over mouth while partner covers stoma.
  - If unsuccessful, use a small mask over stoma.

Management Priorities

Advanced Life Support

- ALS:
  - If there is no chest rise after suctioning, remove and replace the tracheostomy tube.
  - If a replacement tracheostomy tube is not available, insert an endotracheal tube through the stoma.



Key Concept: Tracheostomy Tubes

cuffed tracheostomy tube – Just like a cuffed ET Tube, deflate the cuff before trying to remove

tracheostomy tube with an inner cannula – If unable to clear the obstruction by suctioning, attempt to remove the internal cannula

pediatric tube with an obturator

neonatal tracheostomy tube with an obturator - ***similar to a stylet.***

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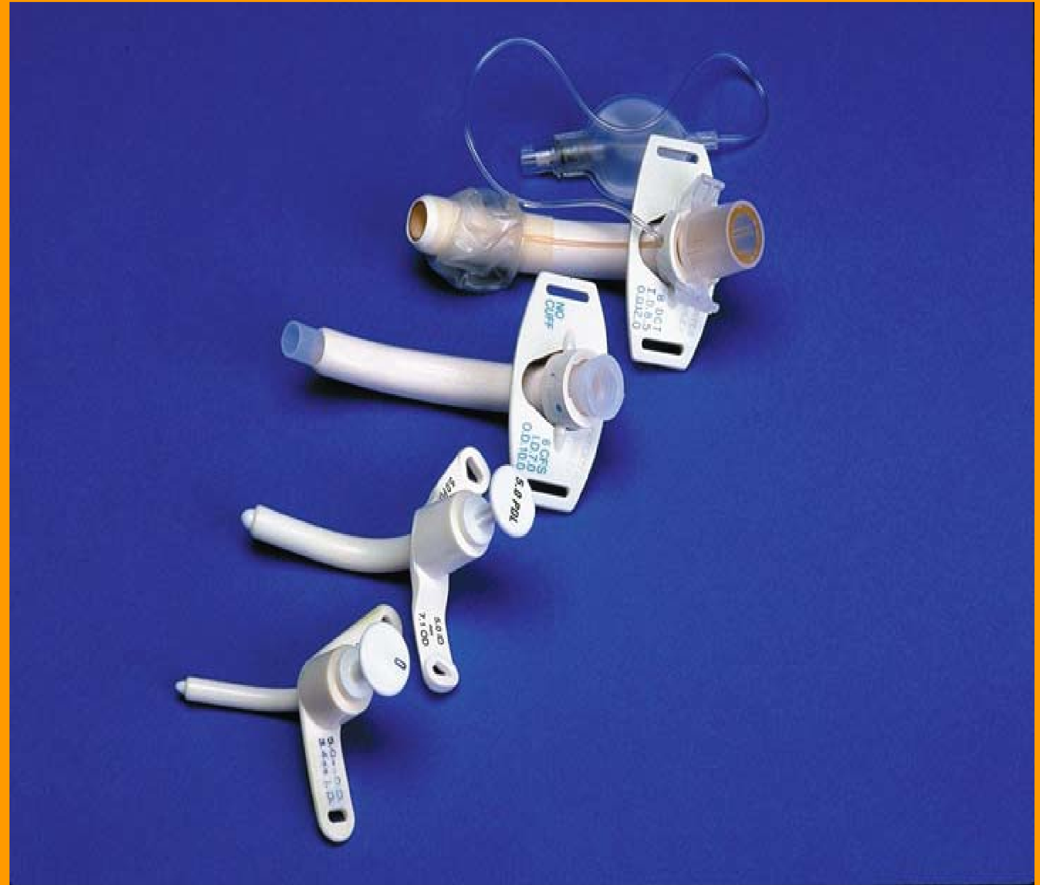


Case Progression

Advanced Life Support

- Ventilation improved with removal of obstructed tracheostomy tube.
  - Endotracheal tube inserted in stoma.
  - RR 26, nonlabored; skin pink
- What other problems might EMS encounter in a child with a tracheostomy tube?

It is easy to insert an endotracheal tube too far when placing it through a stoma, resulting in right mainstem bronchus intubation.

Before transporting, listen carefully for the presence of good breath sounds over both lung fields. If breath sounds are unequal, pull the tube back until good air movement is heard bilaterally and then secure the tube and transport.

Key Concepts: Tracheostomy Complications

- Obstruction from secretions
- Dislodgement of the tube
- Bleeding from the stoma
- Tube misplacement on reinsertion
- Infection

Key Concept: Establish the Child's Baseline

- CSHCN may have abnormal vital signs or mental status at baseline.
  - Treatment decisions must be based on what is "**normal**" for *this* child.
- Caregivers of CSHCN are an important resource for baseline information.
  - Ask:
    - What is his usual breathing pattern?
    - What are his usual oxygen saturations?
    - What would your child be doing if he were well?
- What special transport considerations may you face?

Key Concept: Special Transport Considerations

- CSHCN with cardiopulmonary problems may have limited physiologic reserves.
  - Small changes from baseline may cause significant distress and rapid deterioration.
- Contact Medical Control for guidance early on
- Reassess frequently during transport.

Key Concept: Special Transport Considerations

- Bring any special equipment and records with the child, including medications and medications list and Emergency Information Form (EIF).
- If possible, transport to facility familiar with child's care.

Case Progression

- En route: the home health nurse places the child back on the home ventilator and accompanies you in transport. The patient experiences no further problems.

ED Course

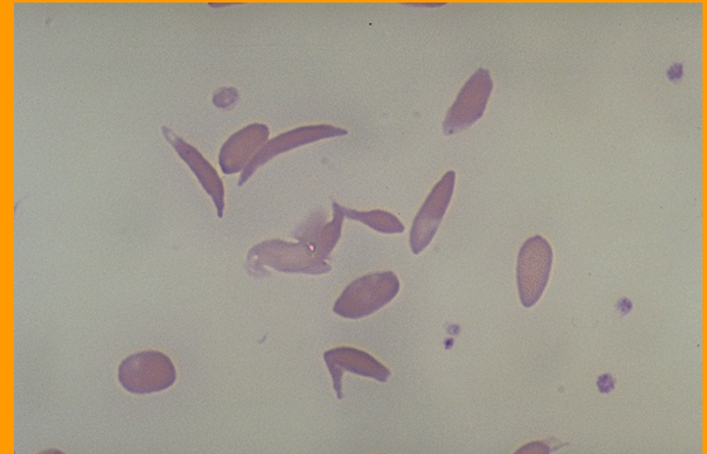
- In the ED:
  - Tracheostomy replaced
  - X-ray showing pulmonary infiltrates
  - Admitted for antibiotics, respiratory care
- Diagnosis: pneumonia, tracheitis
- Outcome: discharged with home antibiotics by PICC line on day 3.

Summary

- Technology-dependent children present a special challenge to EMS.
- A history of acute deterioration should trigger a search for equipment failure.
- Always establish the child's functional/medical baseline, drawing on the expertise of caregivers.

Case Presentation 2

- A 26-month-old boy has severe pain in both legs.
- The patient lies on the couch, clutching his teddy bear and crying uncontrollably.
- The father tells you that his son has sickle cell disease, and that the pain began 2 hours ago.



General Assessment: PAT

Appearance

Alert, agitated, cries

Work of Breathing

Mild tachypnea; no increased work of breathing

Circulation to Skin

Pale lips, mucous membranes

What is your general impression? Sick or Stable?

General Impression and Management Priorities

- Although the only abnormality on the PAT is the child's pallor, severe pain requires urgent attention.
  - ***Think of pain as the "5th vital sign."***
- Complete the assessment to determine the cause of pain.

Initial Assessment: ABCDEs

- Airway: patent
- Breathing: RR 30; lungs clear; Pulse Ox 97%
- Circulation: HR 130; strong peripheral pulses; pale nails and lips; BP 100/66
- Disability: alert, responds to questions
- Exposure: no bruising, deformities or swelling; both legs extremely tender to touch
  - *tenderness of an extremity, in the absence of any signs of infection or trauma, is typical of vaso-occlusive crisis.*
- What is your overall assessment?

Focused History

- SCD was diagnosed by newborn screening.
- First crisis was dactylitis (*swelling of the hands and feet*) at age 8 months.
- Two prior vaso-occlusive crises required hospital admission. *Vaso-occlusive crisis may be precipitated by dehydration, hypoxia, infection, fatigue, exposure to cold, or psychologic stress*
- He is on prophylactic penicillin twice daily. There was no fever or preceding illness.

  **increased risk for overwhelming sepsis due to spleen malfunction*
- Normal hemoglobin is 8.5 g/dL — "always looks pale."
- Dad gave oxycodone 30 minutes ago, without relief.

  Most patients with SCD have been prescribed analgesics, including narcotics, for home management of pain

Management Priorities

- What is your overall assessment?
- What are your management priorities?
- What are your transport considerations?

Transport Decision

Advanced Life Support

- Child is in sickle cell vaso-occlusive (pain) crisis.
- BLS:
  - Supplemental oxygen by mask
  - Transport without delay.
- ALS:
  - If transport time is short, BLS actions only.
  - Peripheral vascular access
  - Morphine sulfate 0.1 mg/kg slow IV

Key Concept: Severe Anemia

- Tachycardia and pallor in a child with SCD may be due to severe anemia or sepsis.
  - Anemia: absence of fever, normal mental status, strong peripheral pulses
  - Sepsis: altered mental status, fever, variable pulse quality

Key Concept: Vaso-occlusive Crisis

- Pain episodes can occur in any body part.
- The precise cause is not clear –

  Theory: *due to sickled (deformed) cells getting caught in the microcirculation and occluding blood vessels and leading to tissue ischemia and infarct. Vasospasm may also play a role.*
- **The treatment is:**
  - **Pain management**
  - **Fluids**

    **Fluid resuscitation should be given to any child with SCD who appears to be dehydrated or in shock. In the child who appears adequately hydrated, only maintenance IV fluids are administered.*

Key Concept: Severe SCD Anemia

- Aplastic Crisis:
  - Bone marrow stops forming red blood cells; hematocrit drops precipitously.
  - It is usually from infection.
  - Symptoms include dyspnea, fatigue, and high-output congestive heart failure.
- Sequestration Crisis:
  - Spleen traps deformed (sickled) red blood cells.
  - Rapid splenic enlargement, falling hemoglobin, and shock are diagnostic.
- Prehospital Rx: oxygen and rapid transport.

Key Concept: Infectious Complications of SCD

- Patients with SCD are at high risk for serious infections.
  - Pneumonia, bacteremia, meningitis, osteomyelitis, and septic arthritis
  - Vulnerable to infection with "encapsulated" bacteria such as salmonella and pneumococcus.
- A febrile patient with SCD should be considered to have a serious bacterial infection until proven otherwise.

Key Concept:
SCD Cerebrovascular Events

- **Always consider a cerebrovascular event if a child with SCD has neurologic complaints or findings**.
- Stroke, transient ishemic attack, subarachnoid bleed
- Symptoms:
  - Hemiparesis
  - Hemiplegia
  - Headache
  - Altered consciousness
  - Seizures

Key Concept: SCD Acute Chest Syndrome

- Leading cause of mortality in SCD patients
- "Acute chest syndrome" is characterized by fever, chest pain, and respiratory distress. The combination of infection and / or vaso-occlusive infarct of the lungs in generating these symptoms is not well understood.
- Symptoms:
  - Fever
  - Chest pain
  - Cough, wheezing
  - Dyspnea /Hypoxia
  - Tachypnea

*__When acute chest syndrome is suspected, treat with oxygen, and transport rapidly.__

Case Progression

- En route: morphine 0.1 mg/kg IV given on scene and repeated once in transport with some pain relief.
- Supplemental oxygen administered.

ED Course

- In the ED: hemoglobin 5; type and cross obtained; admitted for pain management, red blood cell transfusion
- Diagnosis: sickle cell vaso-occlusive crisis; aplastic crisis with severe anemia
- Outcome: discharged after 4-day hospitalization; hemoglobin 8.4 post-transfusion

Summary

- Vaso-occlusive crisis is most common reason for EMS transport of a child with SCD.
- Anemia can be life threatening and acute.
- Children with SCD have a higher risk of having a serious bacterial infection.
- Oxygen should be given during transport to all SCD patients.

Advanced Life Support

- Treat severe pain with morphine, especially if the transport time is long.

Summary

- As medical care advances, more CSHCN survive beyond infancy.
- With trends toward home care, EMS must be ready to manage children with severe and complex chronic disease.
- Collaboration with caregivers and consultation with medical oversight are key in treating this special population.