Children And Their High Tech "Toys"

What EMS Providers need to know

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We may not know what caregivers are saying…

What we will cover

- General Stuff
- CSF Shunts
- Feeding Tubes
- Ventilators
- Pulmonary Hypertension
- Insulin Pumps and More
- Car Seats

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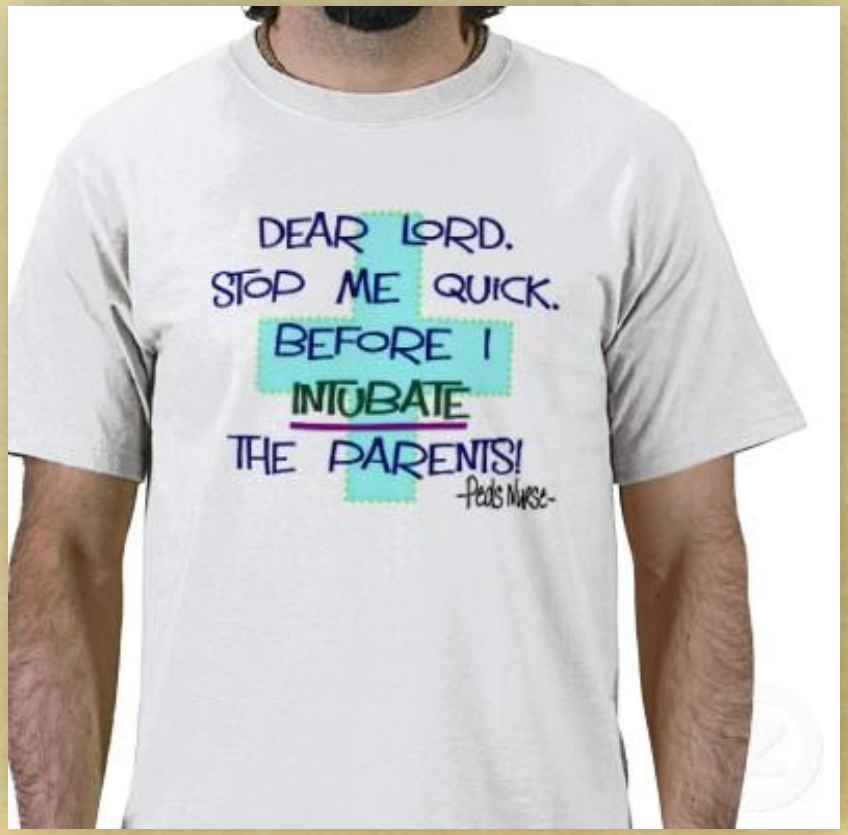
AKA

- General Stuff
- Brain Drains
- Fun Things to Tug
- Beeps, Bells and Whistles
- The Missing Link
- Gizmos and Gadgets
- Baby Buckets

General Care



- Treatment of ABC's first
  - Treat Child—Not Equipment
  - If the problem is secondary to the equipment, use your equipment
- Always remember to speak with the family or primary care giver-Family Centered Care
  - Baselines, SAMPLE, etc…
- Remember that children do not always have mental impairment just because of physical impairment

General Care

- Ask Caregiver if the have a “GO BAG”… Most do
  - This would include equipment that may be useful to you on scene.
- Contractures or Immobilized Extremities
- Transport to “Home Hospital” whenever possible

General Care

Sick vs. Not Sick

TEST TIME

Sick vs. Not Sick

Sick vs. Not Sick

A.L.T.E.

Apparent Life Threatening Event

ALTE

Definition:

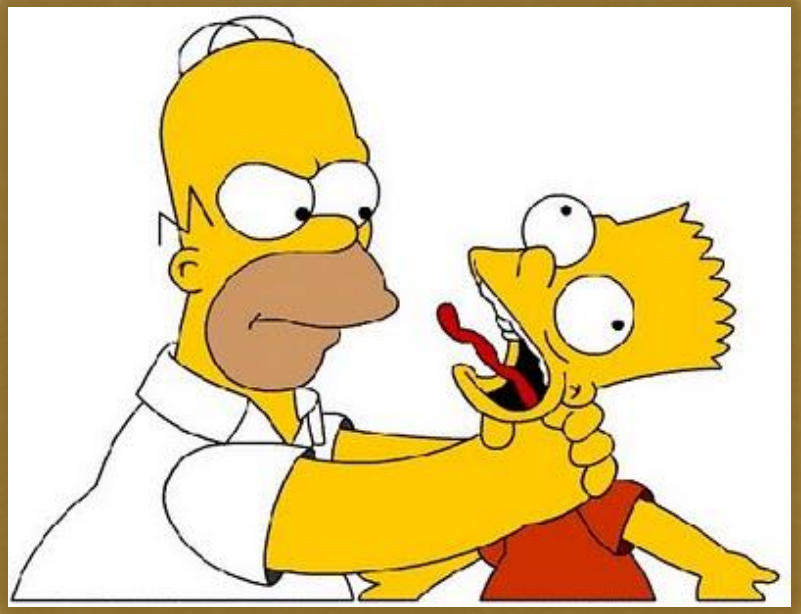
A sudden event, often characterized by apena, change in color, or muscle tone, coughing or gagging.

Usually occurs in children less than one

Hard to track because many are

not seen at the ED

LISTEN TO THE CAREGIVERS!!!



ALTE

- Premature infants, those with RSV, and those that undergo anesthesia are at greater risk for ALTE
- Infants that feed to rapidly, cough frequently, or choke during feeding.
- Boys more than girls

ALTE-Findings

- Idiopathic—50%
- GI– Reflux, swallowing abnormalities
- Neurologic– Seizure disorder, febrile seizure, CNS bleeding, Hydrocephalus, VP Shunt malfunction
- Respiratory– Vocal cord abnormalities, Laryngotracheomalacia, obstructive sleep apena, croup
- Cardiac– Long QT syndrome, WPW, Myocarditis, Cardiomyopothy
- Less than 5% include– Metabolic, child abuse, allergies

ALTE

- Description of the event
  - Condition of child
  - Activity
  - Breathing Efforts
  - Color
  - Movement
  - Coughing/Airway noises
  - Duration

ALTE

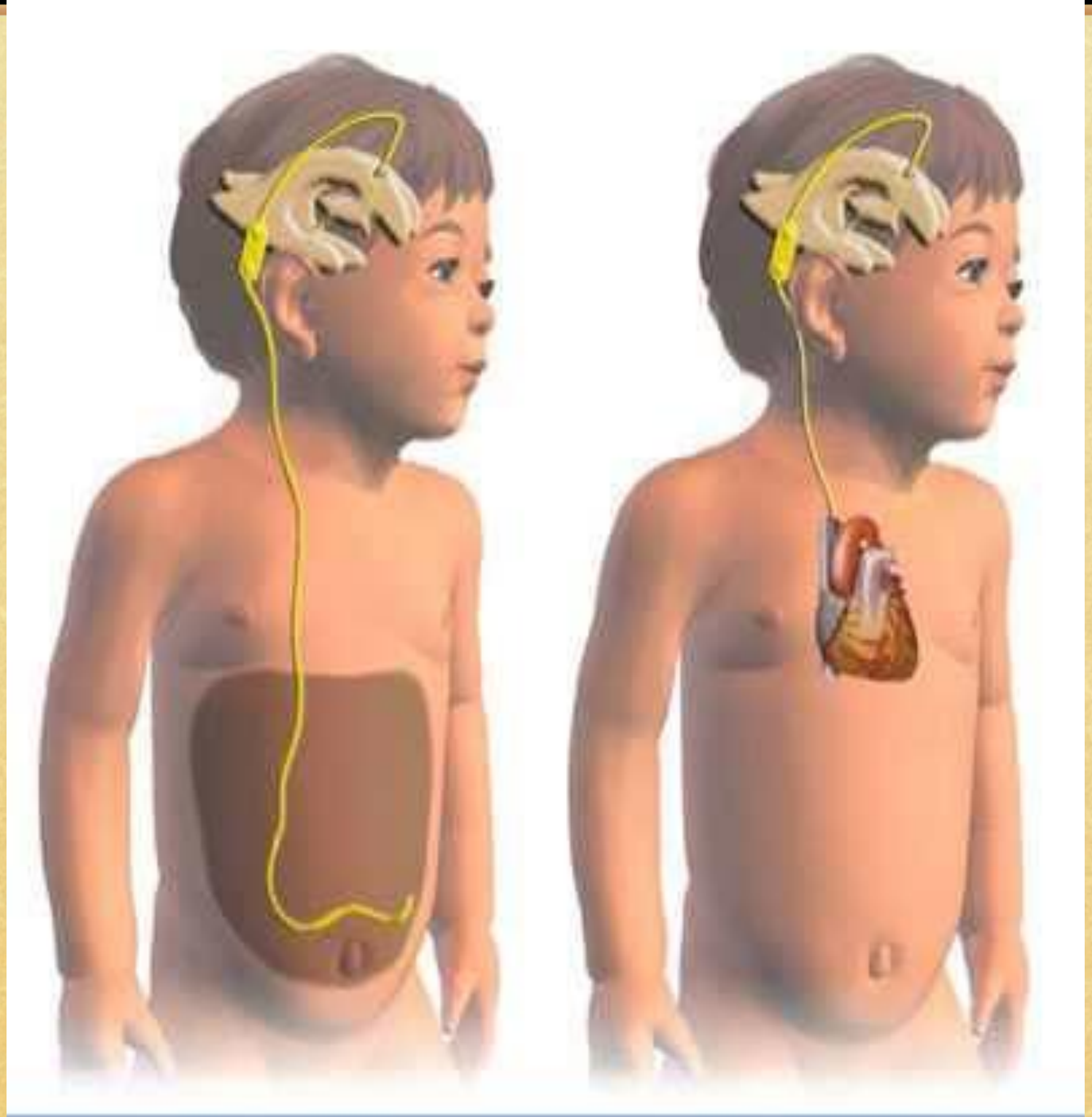
- Interventions
  - None
  - Gentle Stimulation
  - Vigorous Stimulation
  - Rescue breathing
  - CPR
- HPI
  - Ill
  - Fever
  - Rash
  - Change in mentation
  - Contact with anyone else who was sick

ALTE

- Medical History
  - Premature
  - Issues at birth
  - Feeding history
  - Developmental milestones
  - Possibility of trauma
- Family History
  - Congenital problems
  - Smoking
  - Cardiac
  - SIDS

CSF Shunt

- Cerebral Spinal Fluid Shunt
  - Inserted into infants and children who have some type of swelling to the brain.
    - Drains fluid into the stomach most of the time



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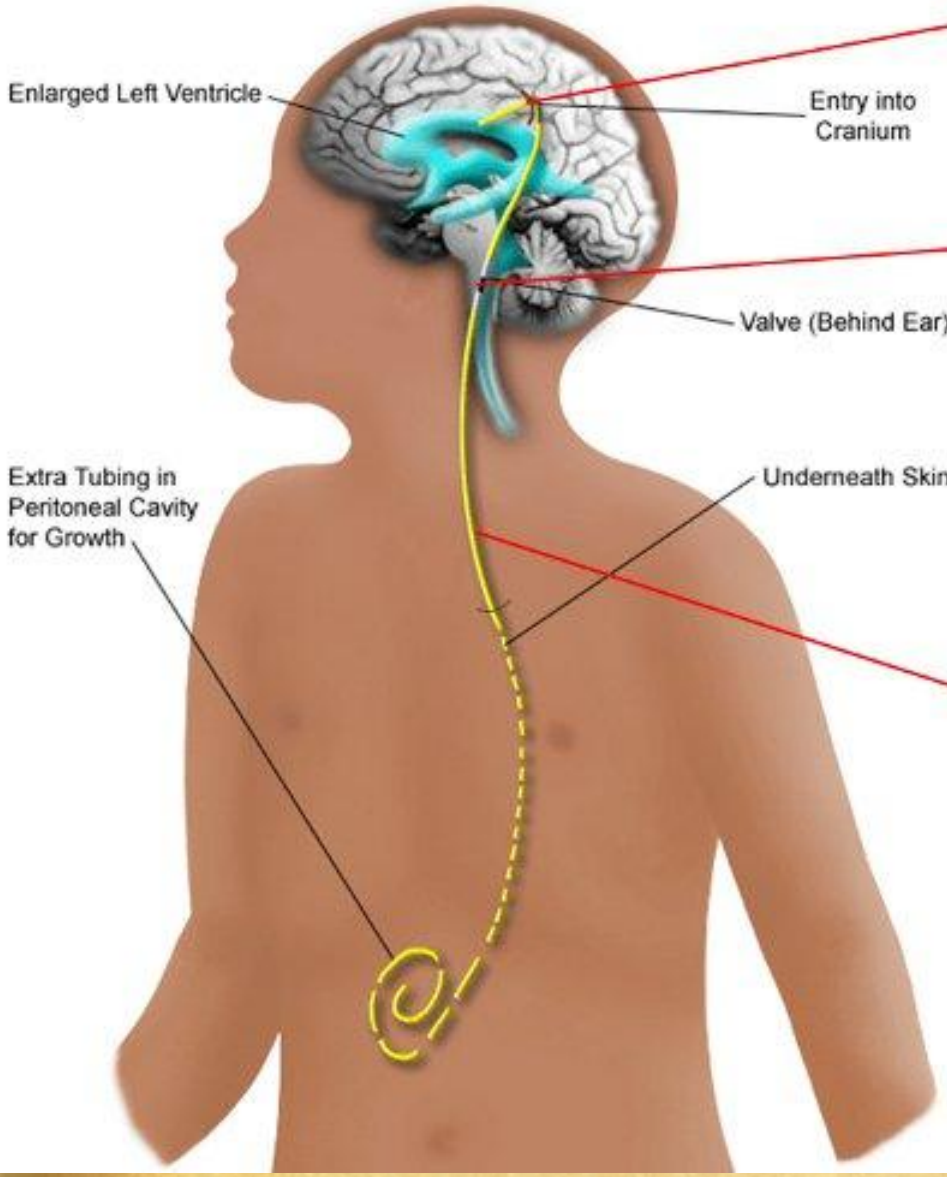
CSF Shunt

Notice the bulge



proximal catheter

Valve

distal catheter

Valve programmer

CSF Shunt

- Problems
  - Most usual problem that is run into with these is that thy become blocked
    - Although 1 out of every 3 visits to ER finds they are working fine
  - Can become dislodged
  - Can rupture with penetrating trauma to any area where it is placed

CSF QUIZ

- What complications can arise from patients who have problems with these devices?

CSF QUIZ

- What complications can arise from patients who have problems with these devices?
  - Nausea
  - High pitched cry
  - Vomiting
  - Headaches
  - ICP
  - Seizures
  - Airway
  - And it goes on……..

Indwelling Catheters

- Tunneled- Hickman
- Implanted- Mediport
- Peripheral inserted catheter- PICC
- Most emergencies are due to blockages, complete or partial removal, or laceration of the line
- Use sterile technique as much as possible

Indwelling Catheters

- If line is blocked….Leave it alone and transport
- If lacerated… Clamp proximal to laceration using a padded clamp if available. Shut off infusion
- If line is out or partially out:
  - Do not push back in
  - Apply direct pressure
  - Stop infusion
  - ALWAYS BRING LINE AND PUMP WITH YOU TO THE HOSPITAL

Indwelling Catheters

- If the catheter is functioning properly and there are no signs of damage, as well as, no medications running….It may be used for fluid and medication administration
- In the event of a cardiac arrest, the indwelling catheter is the preferred route of medication administration

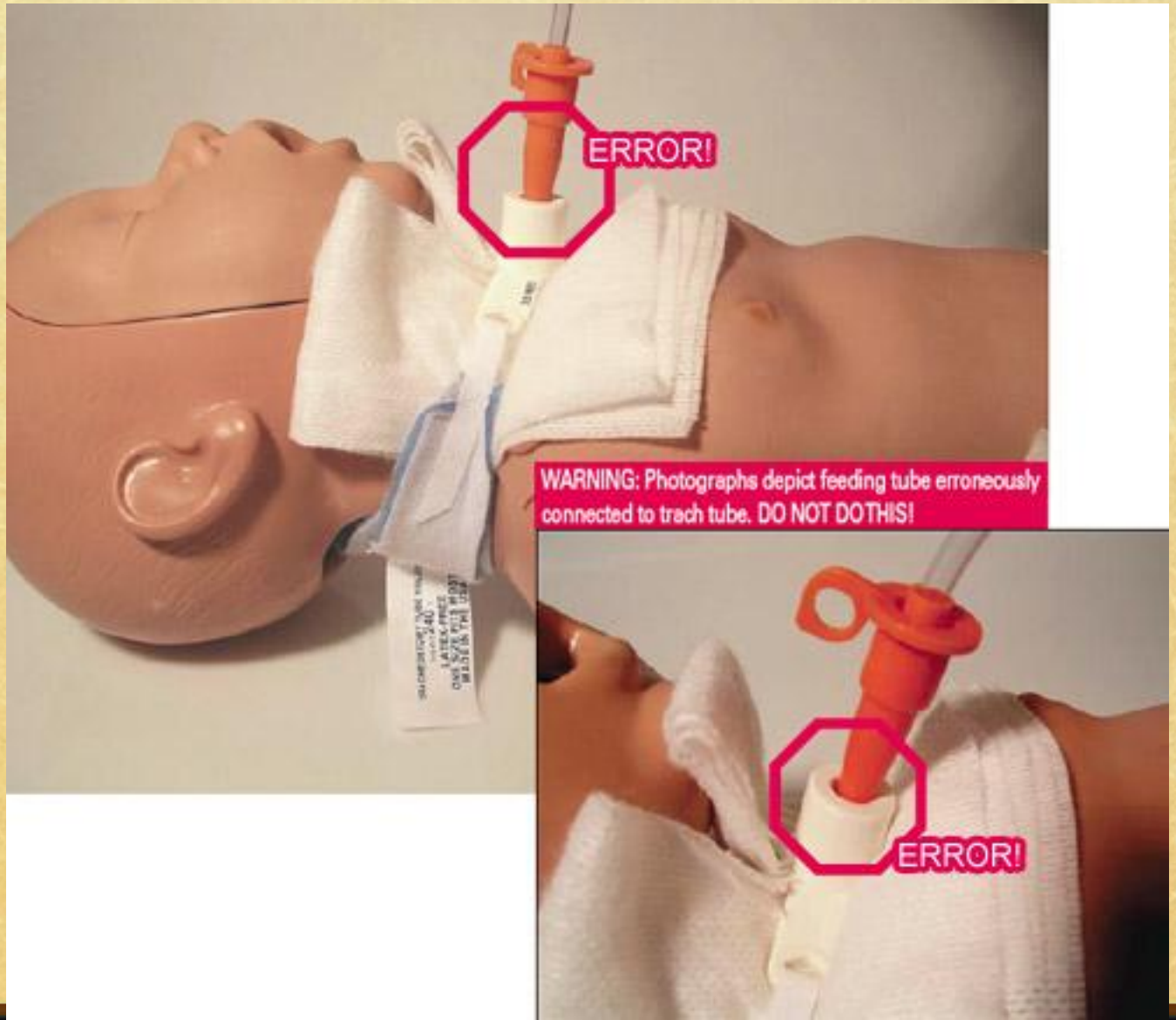
DOPE WORKS HERE

- D-Displacement-Stop infusion if allowed
- O-Obstructed- Unable to flush-Needs replacement
- P-Pulmonary Embolism-Clamp and lie pt left side head down
- E-Equipment Failure-If tube flushes easily the problem is with the pump

Gastrostomy Tubes/Feeding Tubes

- NGT-Nasogastric tube-Nose to stomach
- NJT-Nasojejunal tube-Nose to small intestine
- OGT-Orogastric tube-Mouth to stomach
- GT-Gastrostomy tube-Abdomen into stomach
- JT-Jejunostomy tube-Abdomen to small intestine

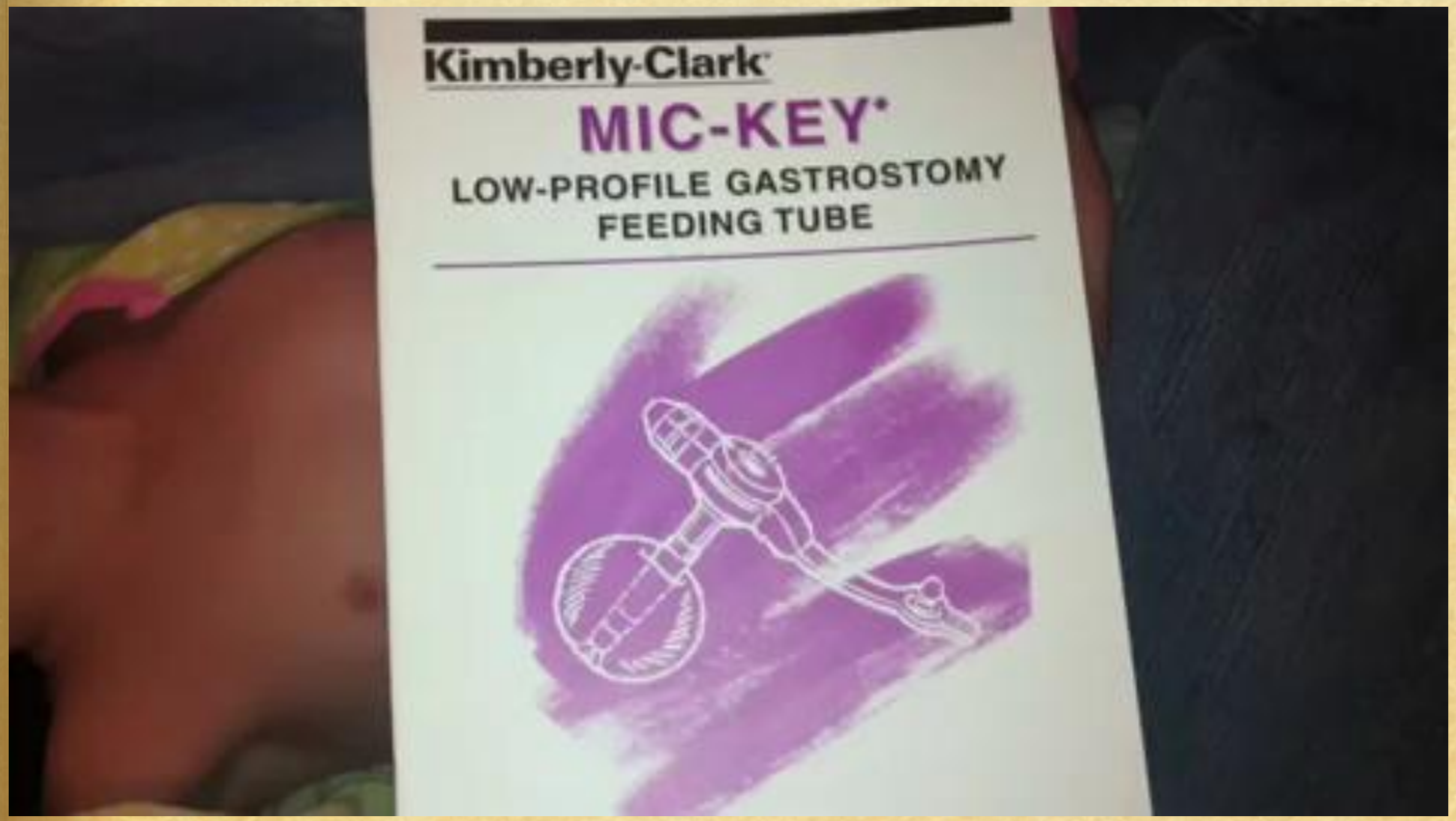
Feeding Tubes-WRONG!!!!!!!



Gastrostomy Tubes/Feeding Tubes

- Check for bleeding where site enters skin
- Any signs of infection could be due to leaking tube and should be transported
- Dislodgement is not life threatening unless the child is dependant on the feedings
  - Keep child flat if possible to prevent gastric leakage
  - Ask parents if they have tried to reinsert, if not allow them to if it passes easily. Possibly still need ED follow up
  - Assess for dehydration and/or hypoglycemia
  - Nearest hospital with capabilities (most)

Feeding tubes


Kimberly-Clark
MIC-KEY®
LOW-PROFILE GASTROSTOMY
FEEDING TUBE

Tracheostomy

- An airway device that is use in patients that are unable to maintain their own airways due to a number of conditions.

Tracheostomy

- Normally not a problem
- Most common problem is obstruction or removal
- KNOW THESE DEVICES

Transparent and flexible adjustable flange

open

Flexible wings to allow access to the stoma for cleaning

Tube dimension featured for easy identification

closed

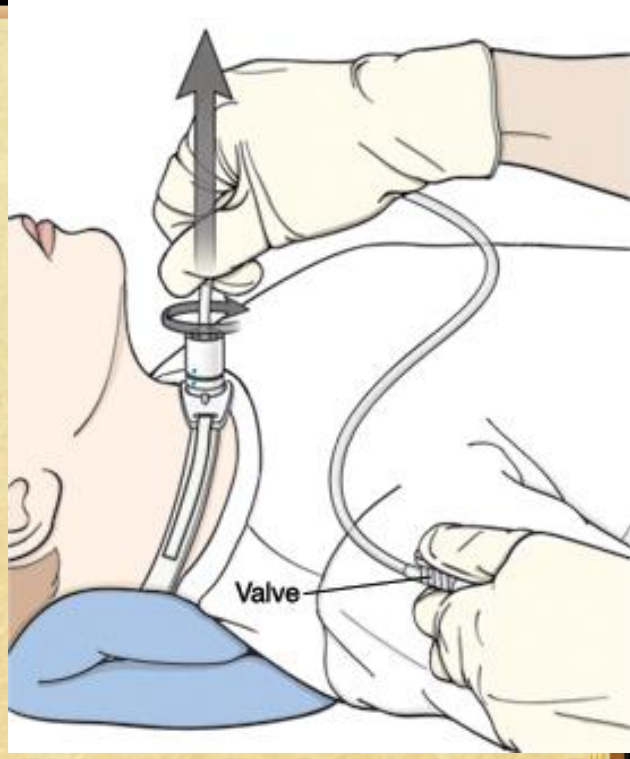
Trach Care

- Have suction unit available
  - Soft suction
  - Many patients have this by their bedside
  - Parents/caregivers are usually well trained
    - Then why are we there?
  - Have BVM Ready
    - Trach's have standard adapter 15/22mm adapter

Trach Care

- Assess the trach tube
  - Is it in place
  - Is obturator in place –It should not be
  - Has the decannulation plug been removed

Trach Care



- Breathing
  - Rate, Rhythm , and quality
  - SaO2 and EtCO2
  - Mucous Plugs are most common
    - SUCTION
      - Use one that the family has as it is already sized
      - Two times ID of inner trach and round down for suction cath size or largest that will pass easily
      - Measure depth using spare trach
      - Use 2-3 cc sterile saline if secretions are thick
  - If the trach is a double lumen
    - Remove inner cannula and suction. Replace before BVM


SHILEY
NO CUFF
5.5 PED
5.5 ID
7.7 OD

Trach Care

- IF UNABLE TO PASS SUCTION….TRACH TUBE NEEDS TO BE REPLACED
- Two techniques
  - Direct
  - Facilitated
- With both allow family to assist as they have been trained

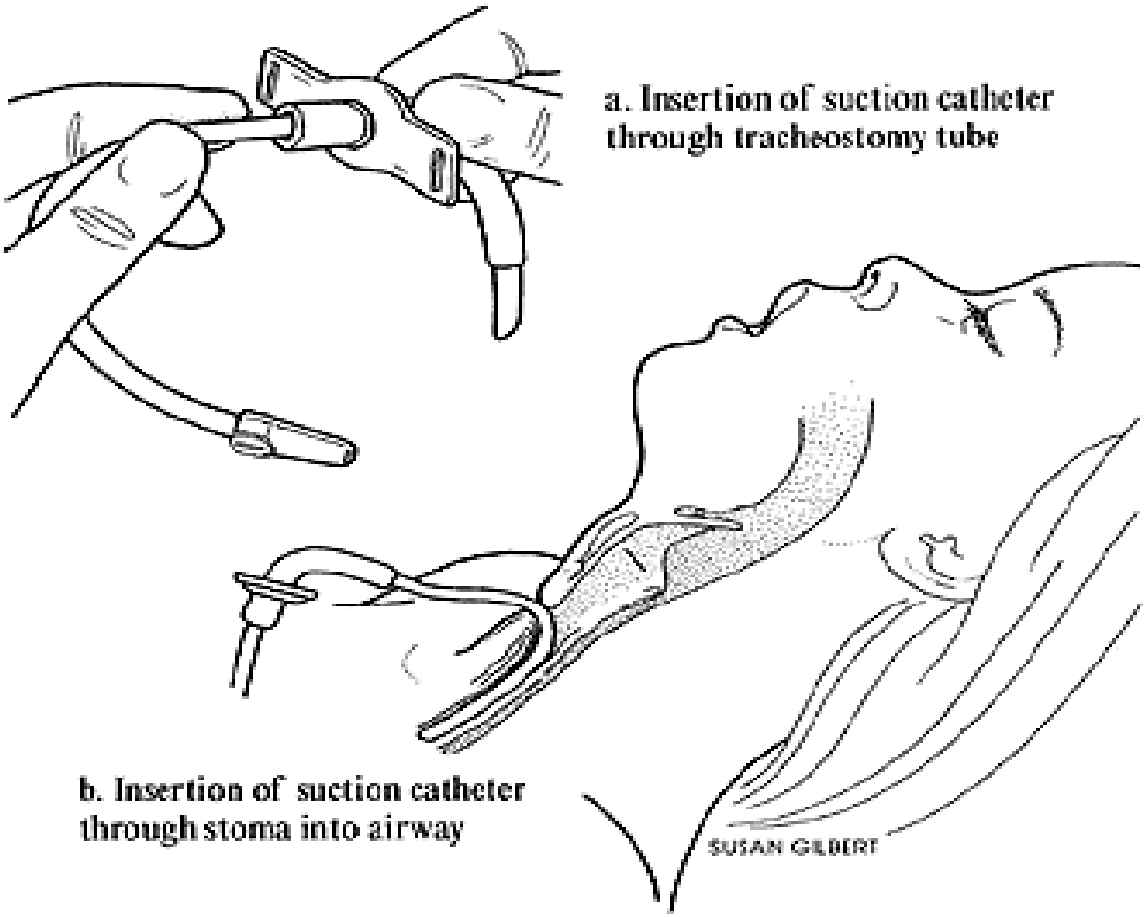
Direct Technique

Direct Technique

Facilitated Technique

- Deflate cuff if applicable
- Remove in same way as before
- Before placing new trach, pass a catheter through it
- Gently pass the catheter into the stoma advancing 3-6 cm
- Advance using catheter as a guide
- Do not use a bougie device as it is too rigid

Figure 56: Tracheostomy Tube Placement



Trach Care

- Confirm placement by normal methods
  - $EtCO_2$ adapter will fit
- If new tube is unable to be inserted or unavailable, try using a ET tube of equal or smaller ID only to the depth that the tracheotomy went
- If all above interventions fail
  - Oral intubation sometimes possible, remember to cover stoma
  - Mask to mouth or mask to stoma

Trach Care

Treat issues using

- D- Displaced, Dislodged or Damaged
- O- Obstructed (mucus, food, blood, secretions)
- P- Pulmonary problems
- E- Equipment failure (bent tubing, vent malfunctions, depleted oxygen supply)

Ventilators

Ven

Table 1: Ventilator Modes

Mode	Description
Assist Control (AC)	> A minimum number of breaths are delivered by the ventilator (e.g., 12/min) > Additional patient partial inspirations triggers ventilator to deliver a full breath > Can precipitate tachypnea and respiratory alkalosis
Synchronized Intermittent Mandatory Vent (SIMV)	> A minimum number of breaths are delivered by the ventilator > Additional patient partial inspirations do not trigger ventilator assistance > Can precipitate respiratory fatigue
Pressure Support Vent (PSV)	> No minimum number of breaths are delivered by the ventilator > Ventilator supports each breath initiated by the patient > Can lead to hypoventilation
Continuous Positive Airway Pressure (CPAP)	> Patient breathes on their own, but the ventilator delivers CPAP > Can help overcome ETT resistance > Can produce hypotension

Ventilators

- Breathing machines
- Again….parents and caregivers are well trained on these
- Most come cause for EMS to be summoned is malfunction.
  - Does the pt need to go to the ED?
  - Which one if you say yes

Ventilators

- Take machine with you or have parent bring.
- The patient will most likely need to be ventilated still via BVM
- If patient is able, and yes some are, allow them to vent themselves.
  - If not the be gentle with them and assist as they breathe.

Ventilators

ALARM	POSSIBLE CAUSES	INTERVENTIONS
Low Pressure/Apena	Loose or disconnected circuit Leak in circuit Leak around trach site	Ensure all circuits are connected Check trach balloon Ensure trach is well seated
Low Power	Internal battery depleted	Plug ventilator into power source
High Pressure	Plugged or obstructed airway Coughing/bronchospasm	Clear obstruction Suction tracheostomy Administer bronchodilator
Setting Error	Settings incorrectly adjusted	Manually ventilate patient TRANSPORT VENTILATOR AND PATIENT
Power Switchover	Unit switched from AC to internal battery	Press “Alarm silent” button after ensuring battery is powering ventilator

New "Toys"

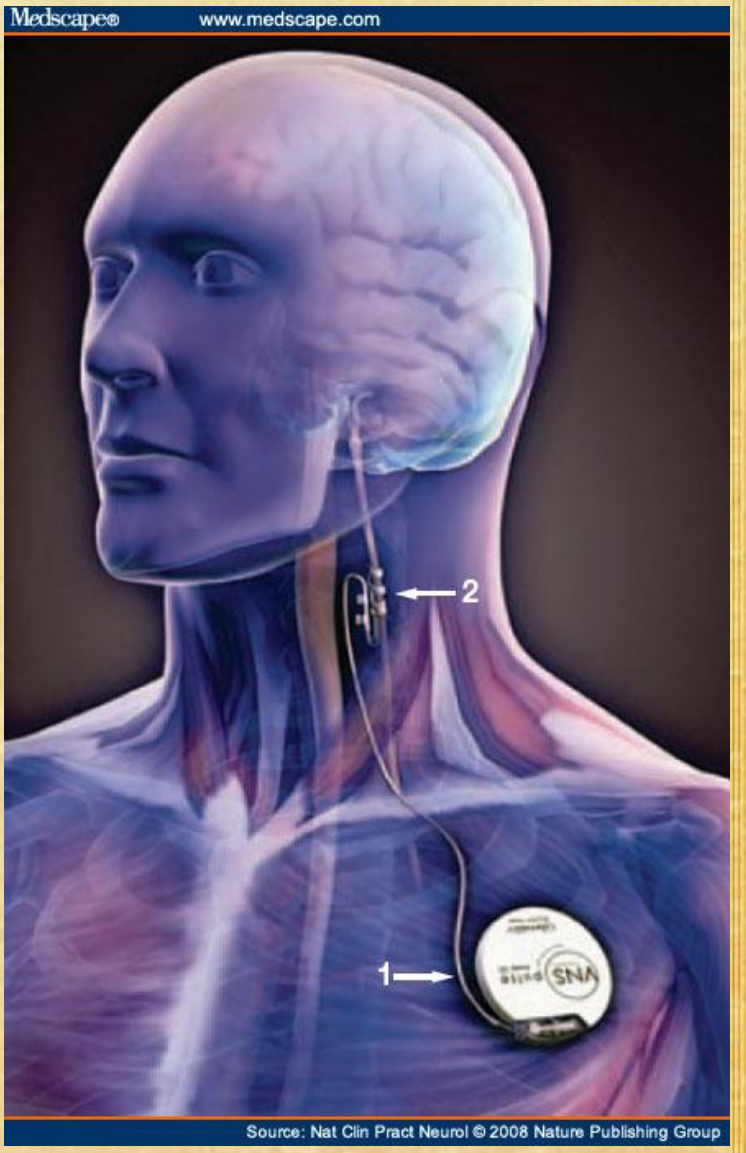
Vagal Nerve Stimulators (VNS)

- Seizure disorders
- Under chest ⟶ Left side of patients neck
- Used to dissipate seizure activity

Vagal Nerve Stimulators

- Questions to be asked
  - Any recent trauma
  - Noticed anything different with device
  - When was it implanted
  - When was it last checked
  - Current settings
  - Any changes in seizure activity

Vagal Nerve Stimulator



Vagal Nerve Stimulator

- Always sending electrical impulses
- Placing or "waving" magnet over device increases impulses
- Only works about 25% of patients to shorten seizure
  - Not a "on/off" switch

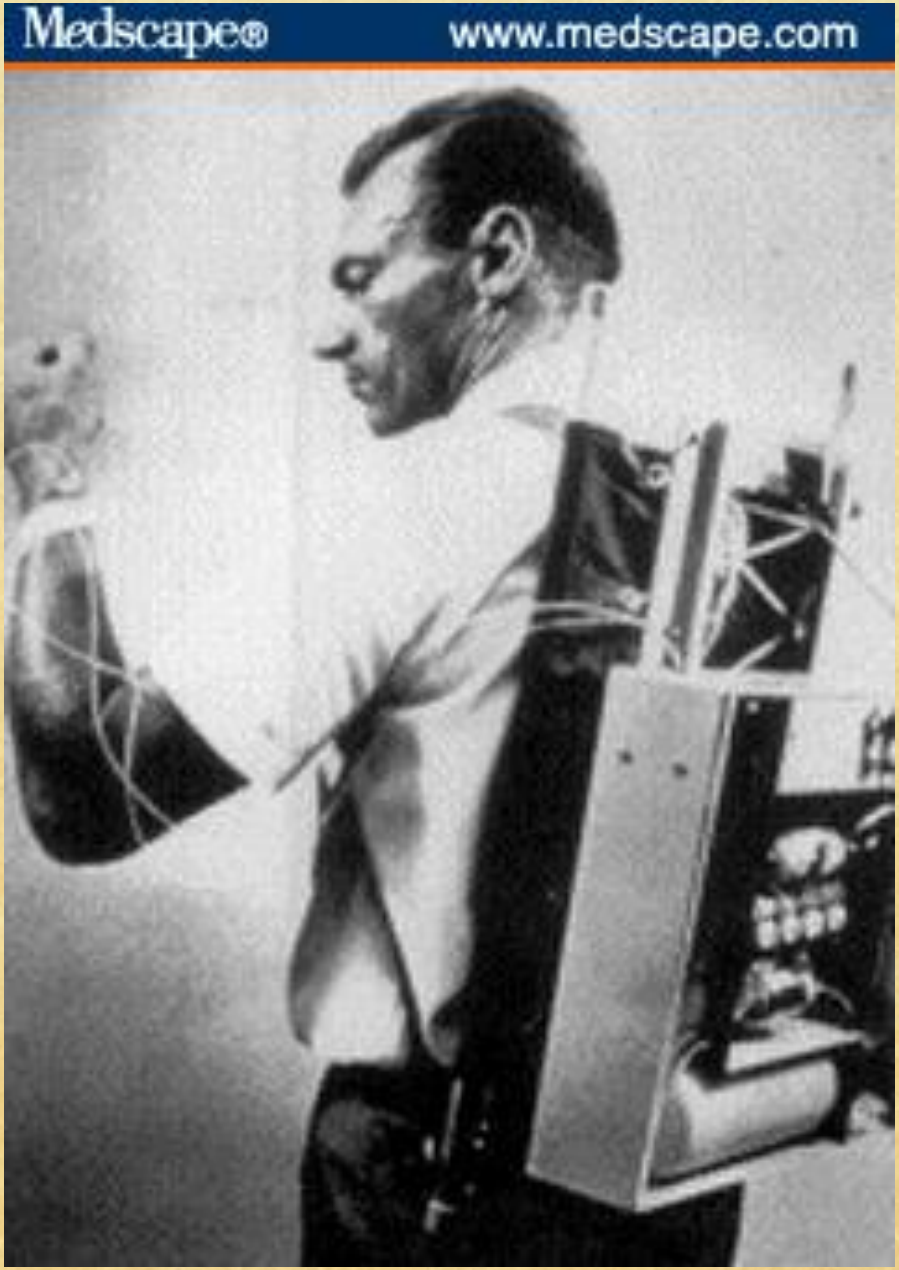
“This is a complex partial seizure that did not respond to VNS activation. After about the first minute I activated her VNS, she seems to almost come out of it but the seizure starts again and lasts an additional 3 minutes. I had to stop the video and give her ativan in her g-tube to stop the seizure.”

Diabetics

- Pumps
- Continuous monitors

Diabetics

- Trauma to insertion sites
- Loose catheters
- Pump malfunctions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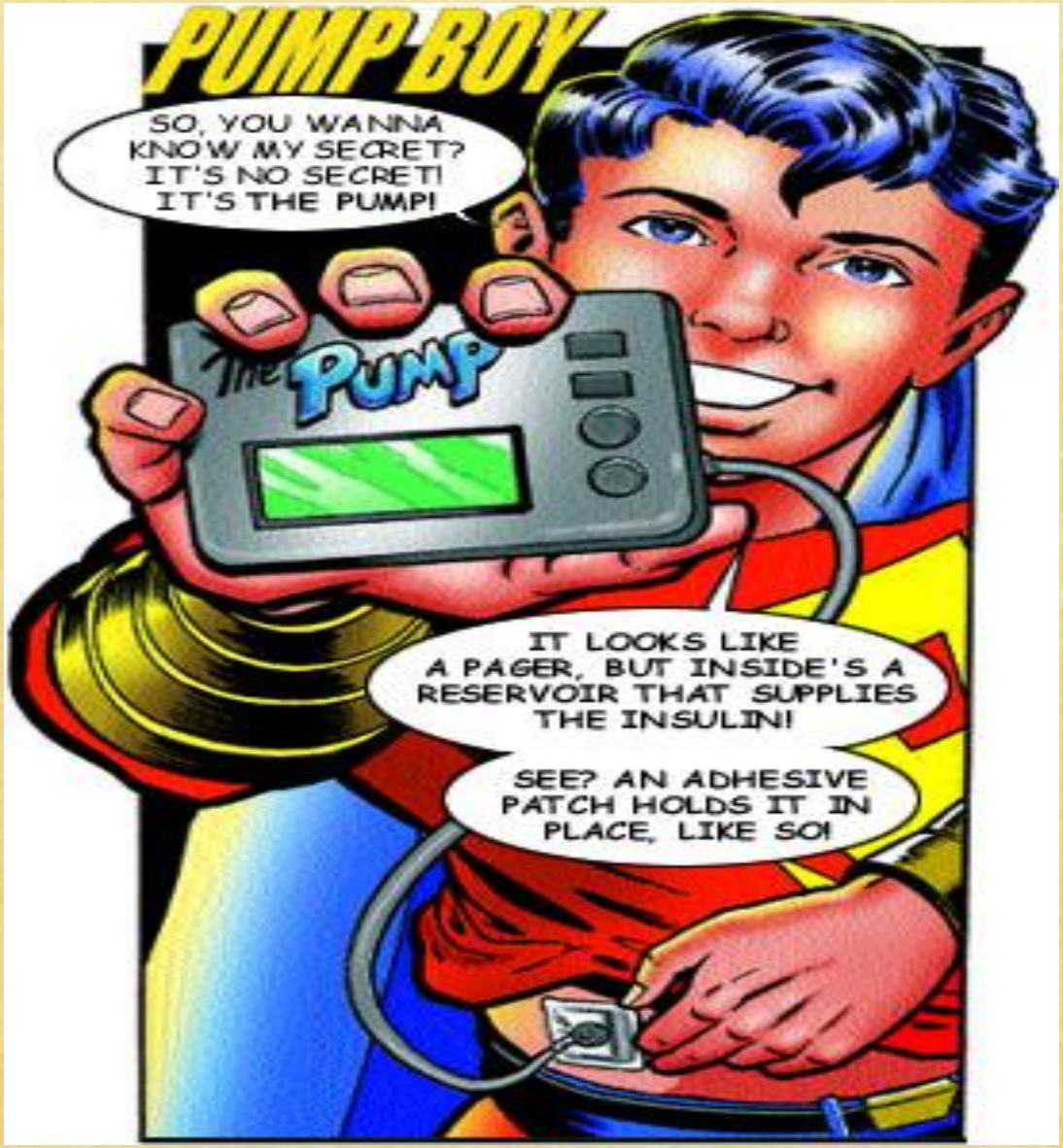
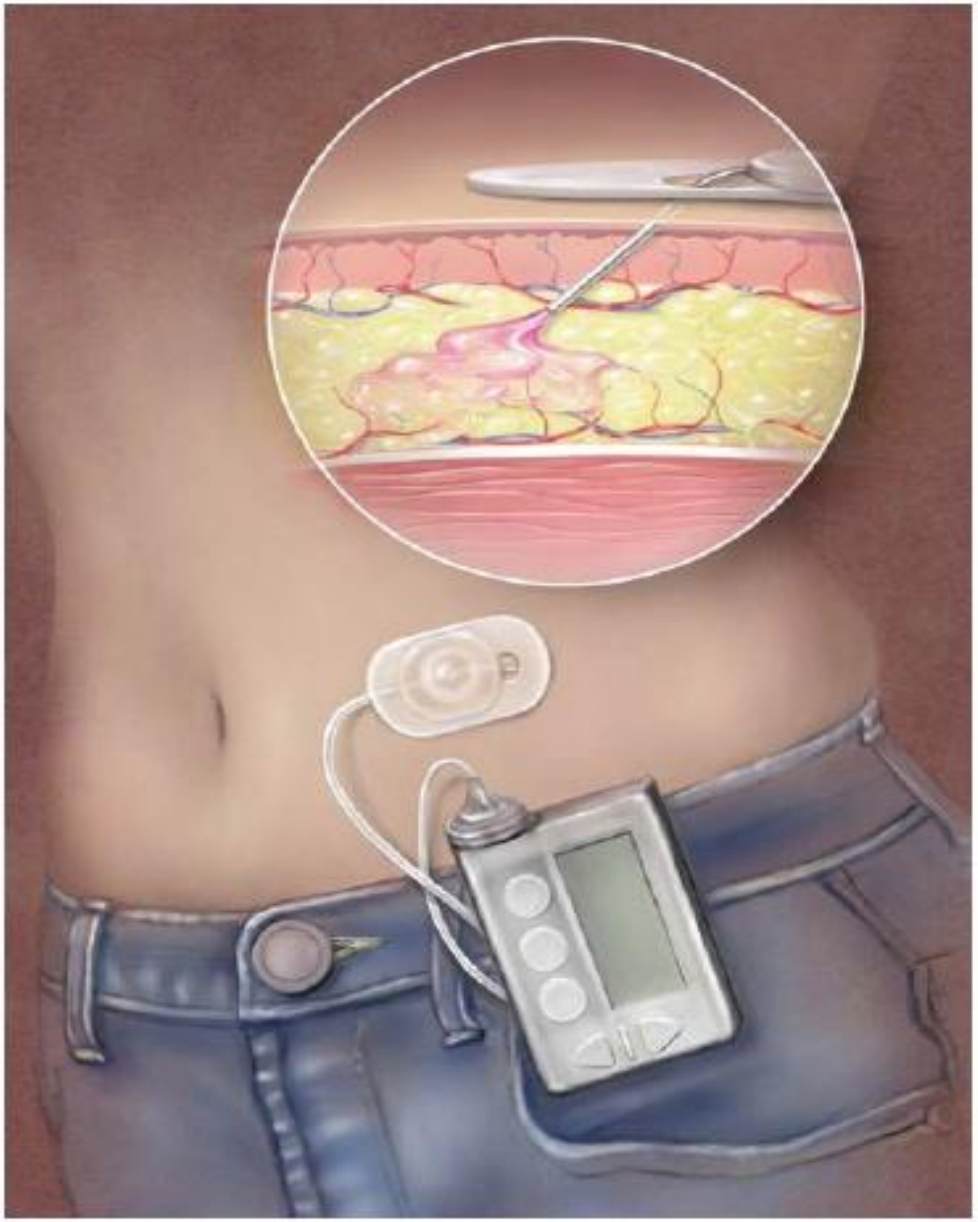

PUMP BOY
SO, YOU WANNA KNOW MY SECRET? IT'S NO SECRET! IT'S THE PUMP!
THE PUMP
IT LOOKS LIKE A PAGER, BUT INSIDE'S A RESERVOIR THAT SUPPLIES THE INSULIN!
SEE? AN ADHESIVE PATCH HOLDS IT IN PLACE, LIKE SO!



Here and on the cover: © Krystyna Srodulski

FIGURE 1. Continuous insulin infusion and a subcutaneous depot of insulin (inset) are the mainstays of CSII therapy.

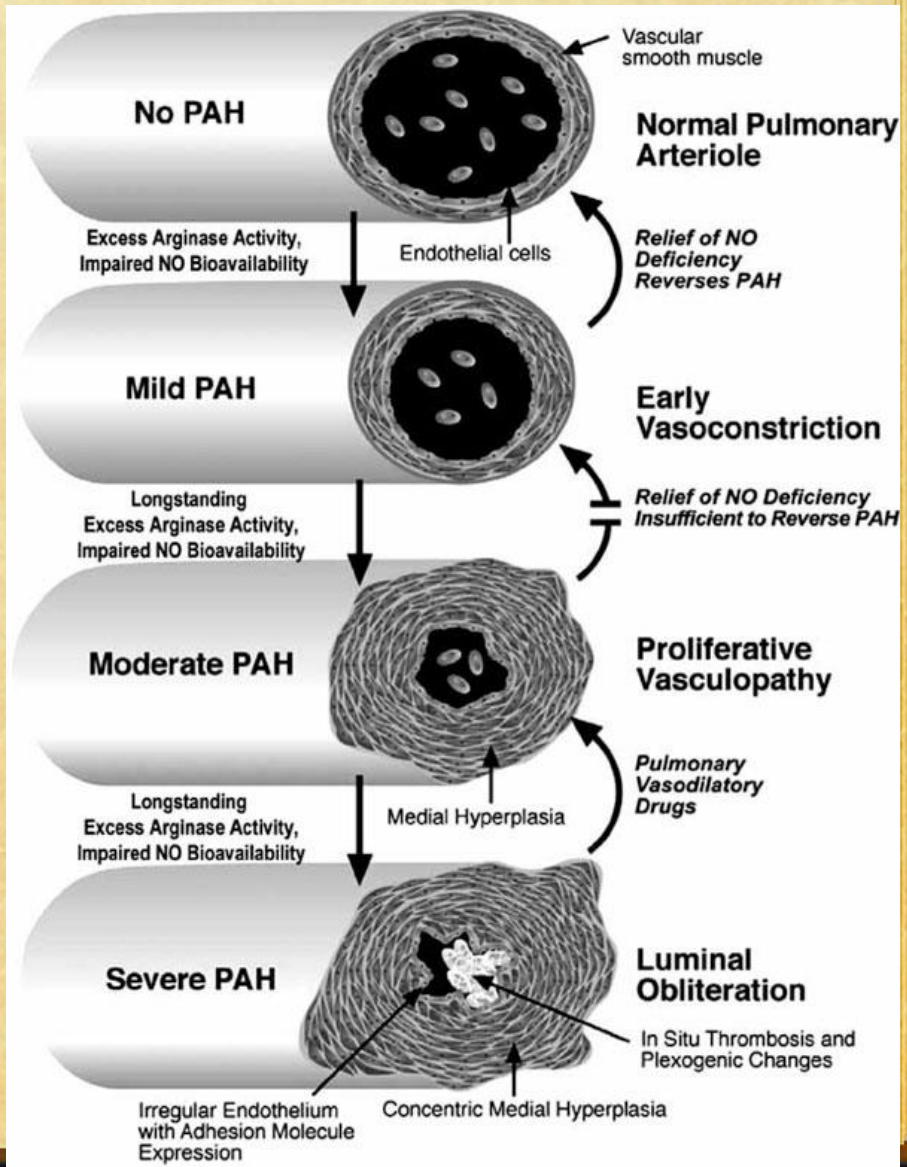
Diabetics

Pulmonary Hypertension

- High blood pressure in the arteries of the lungs

Pulmonary Hypertension

- Shortness of breath
- Fainting
- Brief Cyanosis



Pulmonary Hypertension

FAMILY CENTERED CARE

- Do not ever forget to listen
  - It's a learning opportunity for you and them
- Pediatric Centers/Hospitals
- Caregiver in back of ambulance?

Car Seats in ambulances

- A child should NEVER be allowed to sit on parents lap while in ambulance
- Car seats should be secured to stretcher or captains seat in rear of unit
- Never transport in lateral position
- Do not use car seat if involved in MVC
- Ask if they patients car seat is available as it is already fitted

Car seats in ambulances

Car seats in ambulances

Car seats in ambulances

Case Study #1

- Dispatched at 9PM to single family dwelling for a 5 year old with vomiting and headaches
- Mother meets you at door and rushes you in to child bedroom where you find above patient in the midst of a seizure.
- Parents advise you that the child has a CSF shunt and has had seizures in the past

Case Study #1

- General Impression
  - Seizure ends as you approach and you are told that it lasted 30 seconds
  - Pt laying on his side with eyes closed, limp, and very lethargic
  - Breathing: Visible chest rise
  - Circulation: Extremities and lips appear pale

  - SICK or NOT SICK
  - WHAT ARE YOUR MAIN PRIORITIES

Case Study #1

- Vitals
  - Airway-Patent with exception of some secretions
  - Breathing- 42 breaths, irregular with periods of apnea
  - Sa02 90%
  - HR: 110 during normal periods of breathing but decrease to 70 during apneic periods
  - B/P 134/88 with good capillary refill

  - Family relates temp of 102 for 24 hrs

Case Study #1

- Treatment plan?
- What's this patients problem?
- Intubation?

Case Study #2

- Dispatched to 3 year old having respiratory distress
- Upon your arrival you find the patient with a trach and on a home ventilator
- Father leads you into the room where the patient is in a hospital type bed on a home ventilator. You hear a rhythmic pattern and an occasional high pitched alarm. Both the mother and the child appear very anxious.
- Hx: Born at 26 weeks. Has severe lung disease and brain damage

Case Study #2

- Breathing appears to have minimal chest rise with suprasternal and subcostal retractions along with nasal flaring.
- Color is pale with cyanosis around lips and nail beds

- SICK vs NOT SICK
- What do you want to know

Case Study #2

- The patient is very anxious when you approach
- You hear no abnormal sounds
- As you move the patient over to stretcher the vent line get caught and the trach comes out
- WHAT NOW?


u has betraid my tiny trust
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Summary

- Use parents and caregivers as help. They usually know more than you
- Always think of how you would treat a patient without all the “Toys”.
- Treat the patient not the machine
- Use “Home” hospital if possible and appropriate
- Parents and care givers are well trained and if everything was normal with the patient… Why was EMS called?

NAEMT EPC COURSE

- 2 DAY OR 1 DAY HYBRID
- 16 HOURS CON-ED
- MEDICAL
- TRAUMA
- INTERACTIVE LEARNING STATIONS

Molly


I
believe
in
Molly


neovalung

EMS STACHETOBER

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Questions?

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