

MS4 Boot Camp

Case Study to investigate Central Lines and NG tubes!

Scenario

Karly is a 6 y/o who presents to ER. Parents state she has no past medical history. Recent events include abdominal distension, abdominal pain, vomiting that has become bilious.

In ER: PIV placed, labs are drawn, anti-emetics administered and IVF started.

...she's still vomiting uncontrollably.

Parents want to know what are we going to do to help this poor child?

What do you think the next plan of action should be?

Insert a Naso-Gastric tube

This will help decompress her stomach and relieve vomiting.

Salem Sump



- Dual lumen tube
 - > Large lumen for suction
 - > Smaller lumen for venting/equalizing pressure
- Multiple suction eyelets
- More rigid than the NG tubes used for feeding.
- Dual Lumens allow for easy intermittent and continuous suction to decompress/empty stomach contents.
- Being more rigid prevents the tube from collapsing when suction is applied
 - > (this is what can happen if a less rigid NG tube feeding tube is used)

Choosing the size

- Range from 6-18 French (2.0-6.0mm)
- Formula for the pediatric population
 - add 16 to the patient's age in years and then divide by 2
 - (Found on Medscape)

$$[6 \text{ y} + 16]/2 = 11 \text{ French for Karley}$$

They come in even sizes, so we went with the 10 French

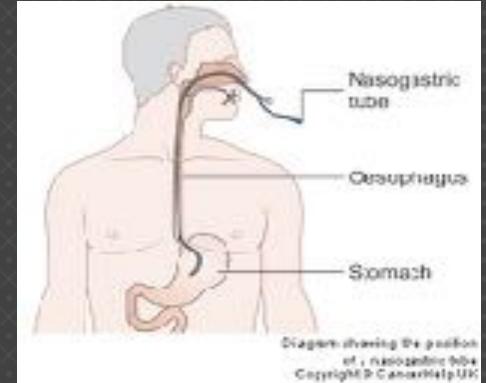
- Large enough to do it's job, but small enough to fit in the patient and be placed with minimal trauma

Parents now start to ask you how this tube is placed, what do you tell them?

“Dropping” the tube

- Gather Supplies
 - > NG tube
 - > Water soluble lubricant
 - > Tapes (duoderm/tegaderm) & scissors
 - > Marker
 - > stethoscope
 - > Empty 5cc syringe
- Prep family & patient
- Check your hospitals policy on how to verify placement.
- Possibilities: auscultation, measurement, aspiration of gastric contents, pH testing, KUB
- Stop if respiratory distress occurs
- Be prepared for gagging, vomiting, and lots of patient movement. It is uncomfortable. You can allow older patient to take sips of water to help tube go down easier.

“Dropping” the tube



- Measure & Mark tube

Nose → earlobe → $\frac{1}{2}$ way between xiphoid and umbilicus

- Have tapes ready to secure tube
- Apply lube to end of tube to help it slide down easily
- Insert tube and advance to marking
 - (Pull out stylet when you are using a feeding tube)
- Secure with tape
- Check placement

Karly is found to have intestinal malrotation and volvulus

- ◉ Goes to the OR, LADD's procedure is done and a portion of her intestines were resected due to necrosis.
 - ◉ This procedure is performed to alleviate intestinal malrotation. The procedure involves surgical division of **Ladd's** bands, widening of the small intestine's mesentery, performing an appendectomy and correctional placement of the cecum and colon.
- ◉ A perforation resulted in Karly making a second to the OR.
 - Now on triple antibiotics
- ◉ Recovering in ICU: NPO and on bowel rest

We need to support her nutrition with TPN/lipids.
What do we need to do this?

Karly needs more than just a PIV

- ◉ TPN and Lipids can only be administered through a central line due the long term nature of TPN and lipids and to the high risk of tissue damage if it infiltrates into the tissue.
- ◉ The options
 - > Broviac Central line
 - > PICC line
 - In both of these lines you can choose a double or single lumen.

We need to discuss with parents the differences and which one would most benefit Karly.

Broviac CVL

- Placed in OR
 - > surgeon
- Tunneled & Cuffed
 - > More permanent than PICC
- Usually in chest
 - > Can be femoral (though we do not prefer this due to risk of contamination)

PICC

- Can be placed while patient is sedated or non-sedated
 - > By PICC team nurse or Interventional Radiologist
- NOT internally secured
 - > Uses sutures or securement device
 - > Less Permanent
- Usually in the arm

Both Broviac and PICC

- Central lines
 - In all CVLs the tip of catheter sits in the main vessel, vena cava, just above the heart.
- Can administer TPN/Lipids through them
- Able to draw blood without “sticking” patient
- **The main risk is Infection!!!**

Single vs. Double Lumen

- More lumens = increased risk for infection
 - > More flushing creates more of an opportunity for pathogens to be introduced into the bloodstream.
- But they may NEED more than one
 - > Ex. Needing frequent blood products
- Key is making sure the need for access outweighs the risk of infection

What should we choose for Karly?

She got... a double lumen PICC

- ◉ Central Access needed quickly
 - > PICC placement can be coordinated rather easily & quickly and does not require OR space.
 - > She needed small sedation to remain still
- ◉ Would be used for recovery only
 - > Relatively short period
- ◉ Her critical condition during portions of recovery necessitated multiple lumens
 - > 24 hr TPN and lipids
 - > Multiple antibiotics required as result of sepsis from bowel perforation
 - > Multiple blood products administered
- ◉ The down side to this is that when it was time to go home and all she needed was TPN at night time, parents had to care for 2 lumens instead of 1 which is an increased risk of BSI

Karly leaves the ICU!

She is stable on TPN/Lipids. Salem sump with minimal output, so we are able to pull it out. Weeks later she is cleared by surgery to begin formula feeds via an NG tube that will infuse continuously at slow rate.

**Parents and patient are concerned because of how large the last tube was
...what should we tell them?**

Feeding tubes are different!

- They are more comfortable
 - > Material is flexible
 - > They are single lumen
- We can choose smaller tubes
 - > 6 Fr is sufficient for regular formula feeds
 - > 8 Fr for thicker formula or formula with fiber



Karly's parents are okay with the plan.
8 French NG tube in placed and formula feeds begin. Karly tolerates these at the slow infusion rate.

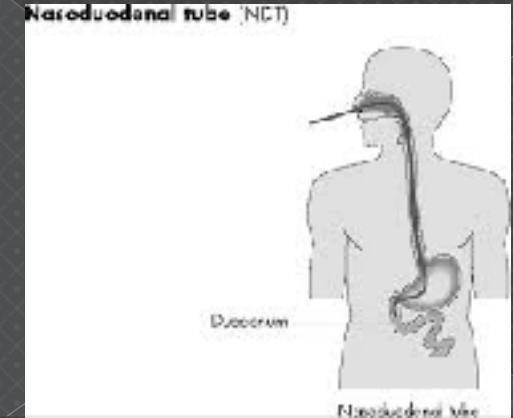
Day of discharge comes and...

Karly ended up going home PICC line, TPN/
Lipids, and NG tube feeds. And she continues
to heal at home 😊

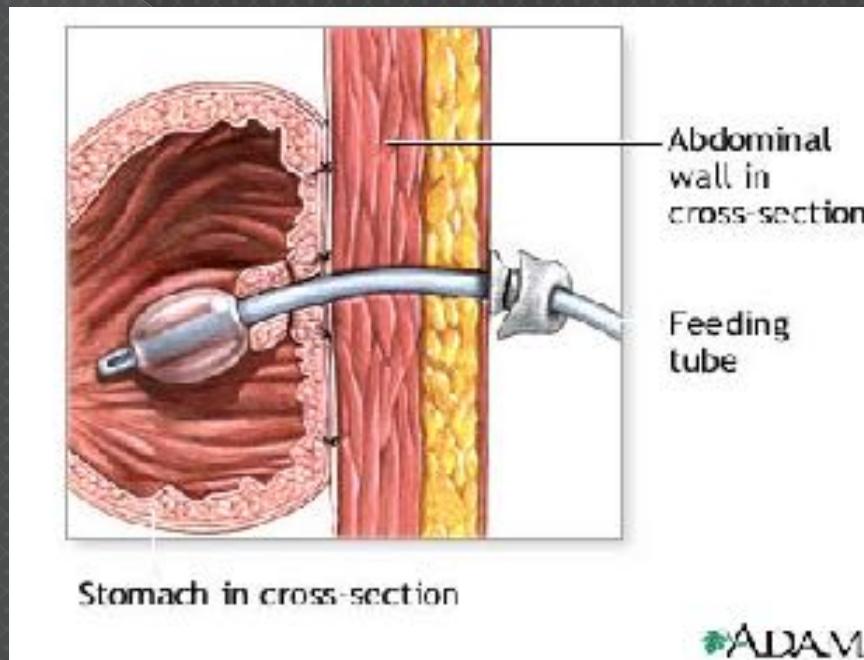
A Few things we missed...

Other Feeding Tube Stuff

- Golytely infusions “clean outs”
 - *(Use for constipation cases)
 - > Use larger sized NG tubes (8-12french)
 - > Large volumes of solution given quickly
 - > For temporary use
- ND tubes and NJ tubes
 - > Longer & Weighted
 - > Can attempt ND placement on the floor, but it must be verified with xray
 - > NJ tubes must be placed in Flouro
 - > No bolus feeds



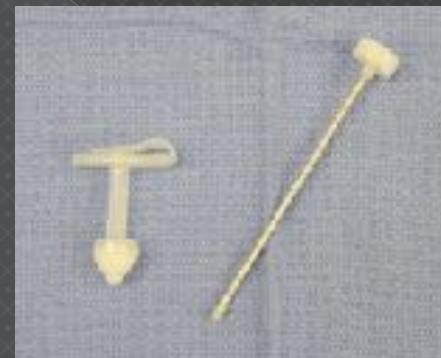
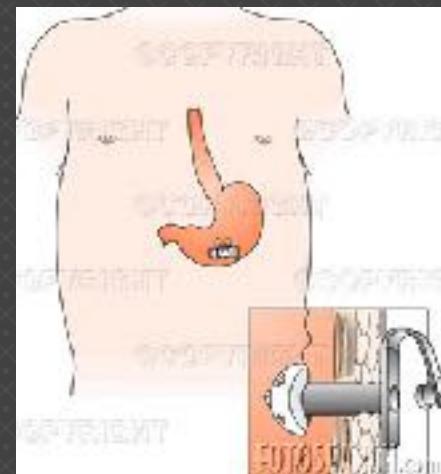
Percutaneous Tubes/Buttons



Different types of G/GJ Tubes



Different Types of Buttons



Complications....

- > Leaking:
 - First check the fill volume.
 - Again: 5-7cc sterile water
 - Could be a slow leak in the balloon
 - Order a Stoma Measuring Device to ensure that you have the right size button
 - Kids grow!
 - Wound/Ostomy is a great resource for trouble shooting.
- > Infections:
 - Look for redness and swelling
 - Purulent drainage
- > If these tubes/buttons ever come out, they usually close very quickly. It is important to get something in the stoma as quick as possible.
 - We teach parents to not put anything in the stoma if the stoma is less than 3 months old. As a doctor you can do this but will need to get a dye study to make sure that the button/tube is not in the percutaneous space since the stoma is not completely healed.

Central Lines: Infection Prevention

- HAND WASHING!
- Location of the line
 - Keep the line up and away sources of infection
 - > Chest
 - > Femoral
 - > IJ
- # times accessed per day
 - > Labs
 - > Timing of IV medication
 - > Changing from IV to PO asap

Central Line Dressings

- Sterile Dressing Change
- All thin portion should be under tape to prevent the line from breaking.
- Line should never point toward or hang near source of contamination
 - > Diaper
 - > Ostomy
 - > Trach

BAD EXAMPLE!

- ◉ What is wrong with this picture?
 - The dressing is very small
 - It does not cover the thick portion of the line
 - It is pointing straight down
 - Next to the g-button
 - Close to the diaper



Central Line Complications

- Blood stream infections
 - > Fever (100.4f for CMCD)
- Assess site
 - > Redness, swelling, warmth, drainage, tears, bleeding
- Occlusions
 - > Unable to draw blood
 - > Unable to flush
 - May need TPA
- Dislodged PICC's
 - > Xray to verify
 - > May not use until cleared for use

Cuffed PICCs



- These are newer types of lines that we have been seeing more and more often in intestinal failure patients less than 12 mo requiring TPN. They are being used to save larger vessels in the chest.
 - These lines are exactly the same as tunneled CVC lines (Hickman/Broviac).
 - They are cuffed and do not require an external securement device such as a Stat-Lock.

IVAD: Intravenous Access Device or Port

- IVADs are found commonly on the Heme/Onc floor
- Ideal for this particular patient population because they are only to be used INTERMITTANTLY.

IVAD: Intravenous Access Device or Port

- Functions exactly as a Broviac or PICC does
 - Exceptions:
 - Has to be accessed with a 1" needle
 - Must be accessed with a new needle weekly if for continual use
 - Monthly if only being used for intermittent medications (ie: chemo)
 - When not in use, the needle can be “pulled out” or de-accessed, allowing the patient freedom from an external medical device

Questions?

Lindsey Flom, RN BSN
Patient/Family Educator
D8-Inpatient Gastroenterology