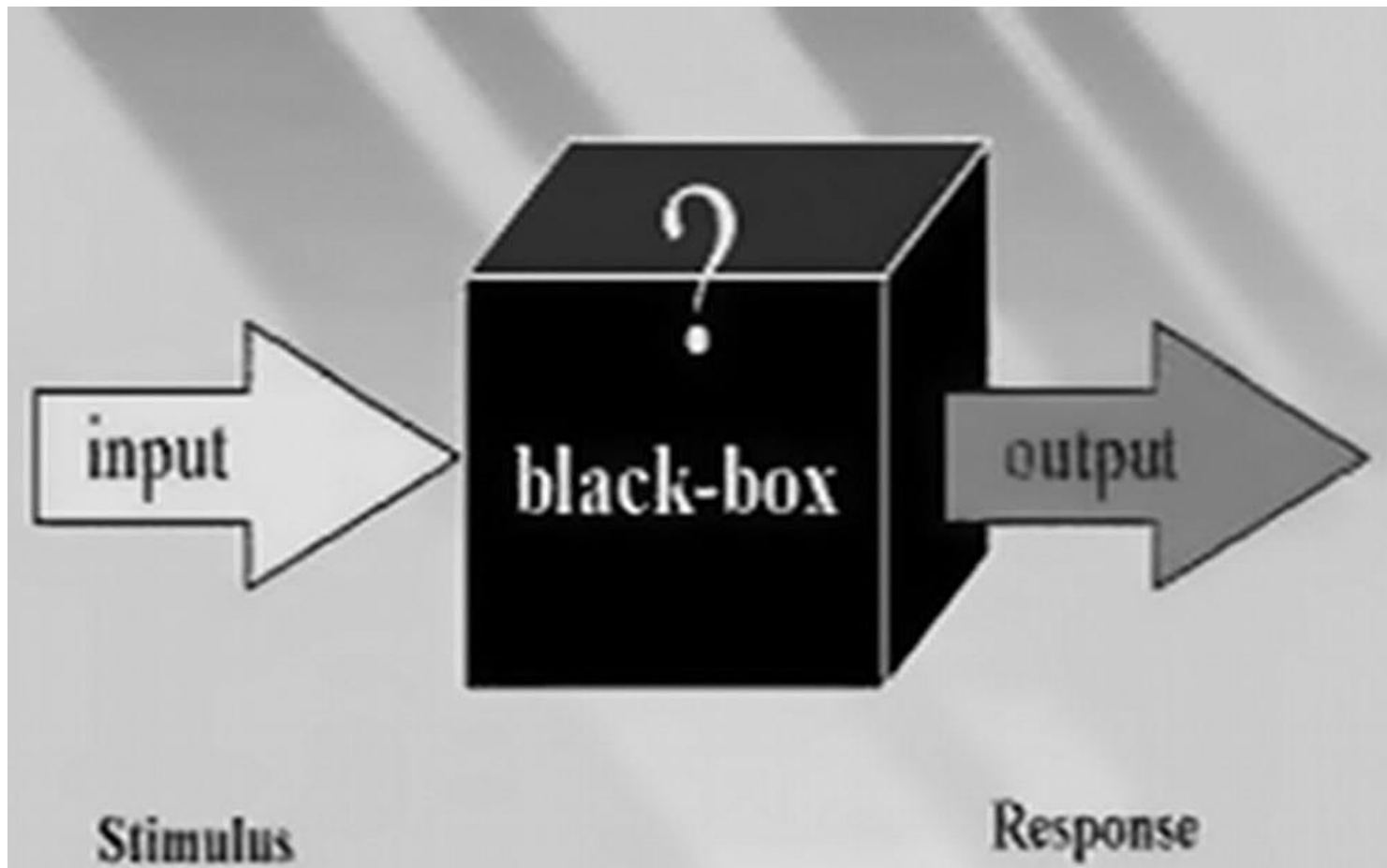


Tubes, Lines, and Drains for the MS3 Surgery Clerkship

Chris Freeman, MD
University of Cincinnati Department of Surgery

A Patient's Volume Status Matters!



A Patient's Volume Status Matters!

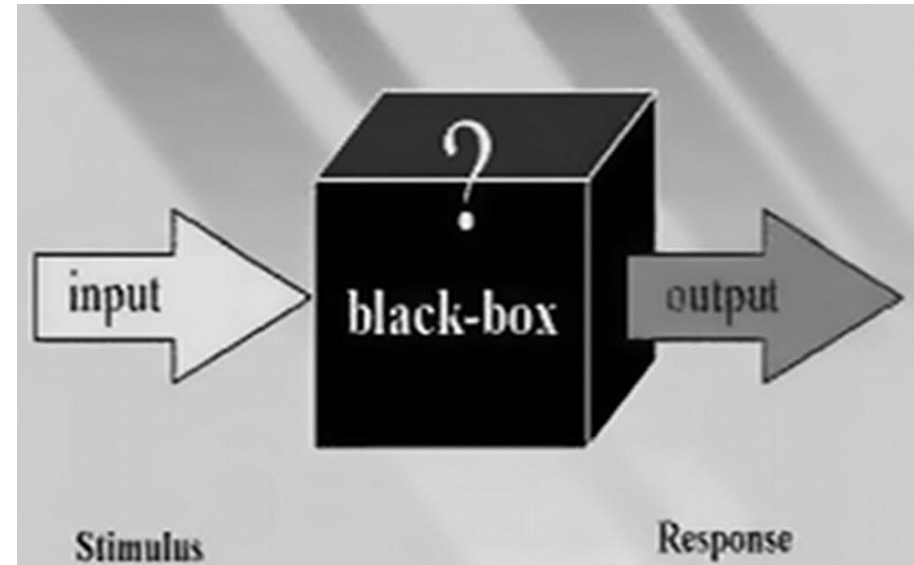
Hypovolemia



Hypervolemia



Euvolemia



INPUT

vs.

OUTPUT

- Volume
 - Crystalloid, colloid
- Medications
 - IV, gtt's, PO
- Nutrition
 - PO, TPN

- Urine
- Stool
 - BM, ostomy output
- Emesis
- Gastric/enteric contents
- EBL
- Fistula output
- Drains

What Goes In...

VASCULAR ACCESS

- IV
- TLC
- Vas Cath
- Trauma catheter
- Dialysis/Trialysis catheter

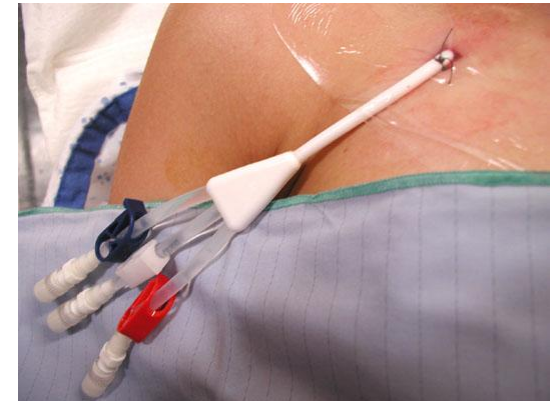
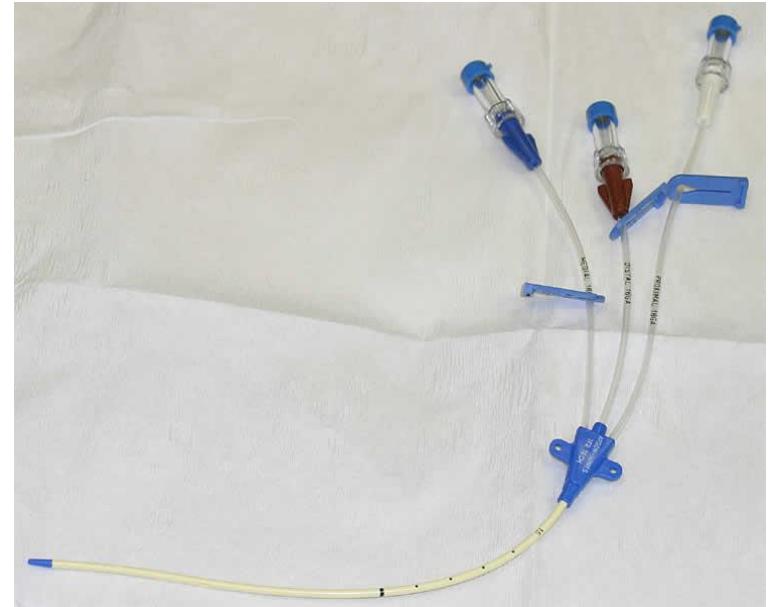


Cincinnati

What Goes In...

VASCULAR ACCESS

- IV
- Triple lumen catheter – TLC
- Vas Cath
- Trauma catheter
- Dialysis/Trialysis catheter



What Goes In...

VASCULAR ACCESS

- IV
- TLC
- Vascular Catheter
- Trauma catheter
- Dialysis/Trialysis catheter



What Goes In...

VASCULAR ACCESS

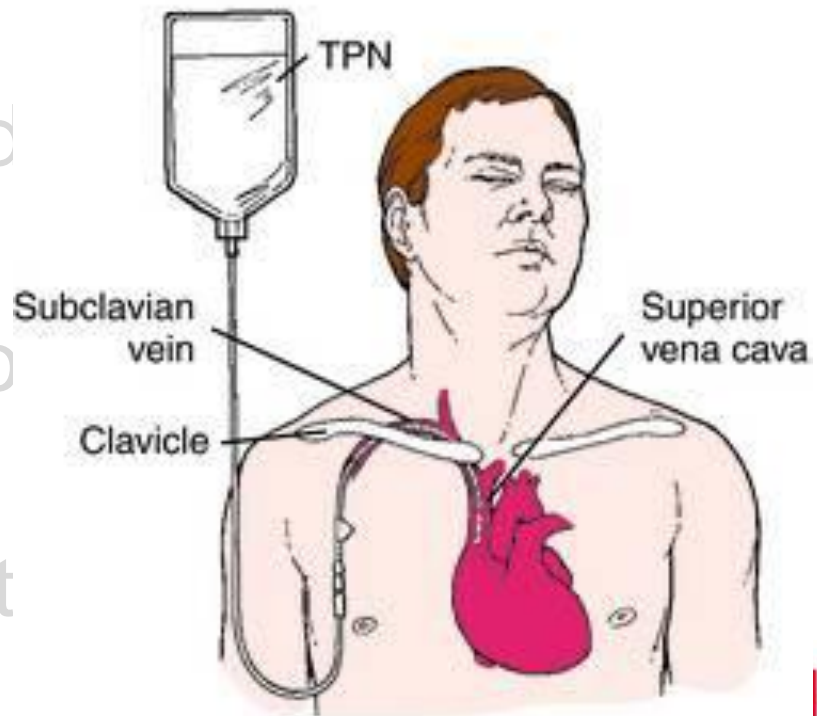
- IV
- TLC
- Vas Cath
- Trauma catheter
- Dialysis/Trialysis catheter



What Goes In...

NUTRITIONAL DELIVERY

- TLC for TPN
- Feeding Tube (Fred NG)
- Percutaneous Endo (PEG) tube
- Open gastrostomy t



What Goes In...

NUTRITIONAL DELIVERY

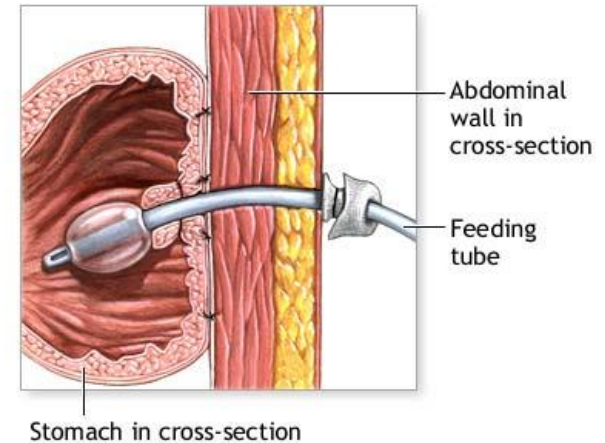
- TLC for TPN
- Feeding Tube (Freddy Miller) (NOT an NG tube)
- Percutaneous Endoscopic Gastrostomy (PEG)
- Open gastrostomy tube



What Goes In...

NUTRITIONAL DELIVERY

- TLC for TPN
- Feeding Tube (Freddy Miller NG)
- Percutaneous Endoscopic Gastrostomy (PEG) tube
- Open gastrostomy tube



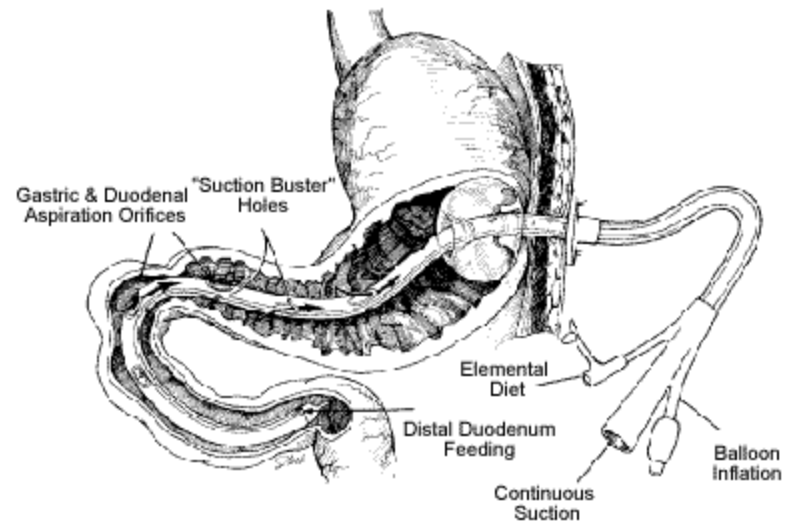
ADAM.



What Goes In...

NUTRITIONAL DELIVERY

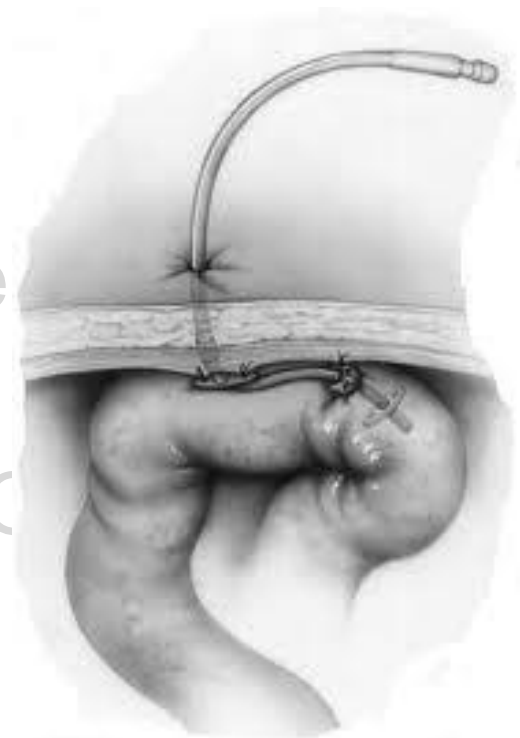
- TLC for TPN
- Feeding Tube (Freddy NG)
- Percutaneous Endoscopic (PEG) tube
- Open gastrostomy tube (G tube)



What Goes In...

NUTRITIONAL ACCESS

- TLC for TPN
- Feeding Tube (Freddy Mille NG)
- Percutaneous Endoscopic G (PEG) tube
- Jejunostomy tube (J tube)



What Goes In...

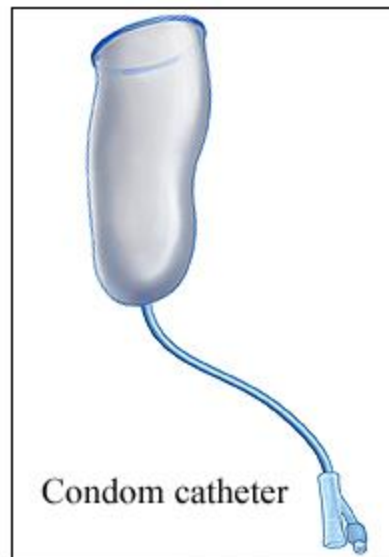
MEDICATIONS

- Port-A-Cath



...Must Come Out

- Foley/Condom Catheter

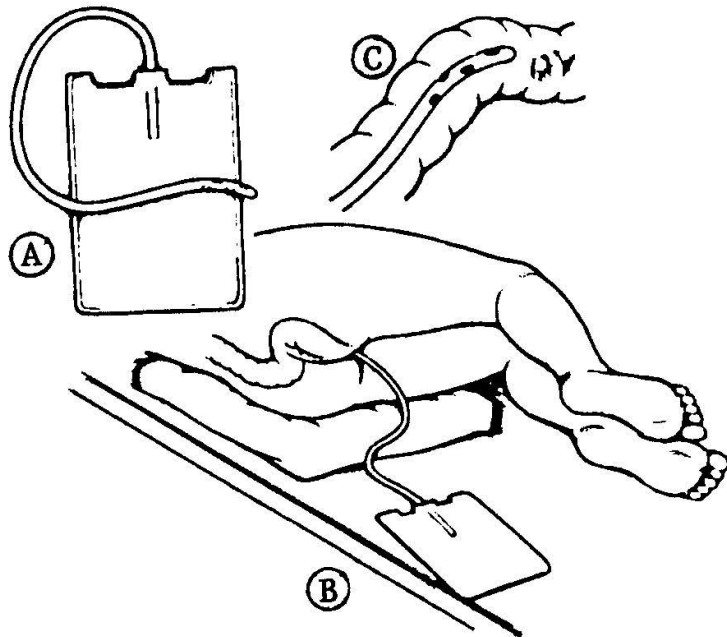


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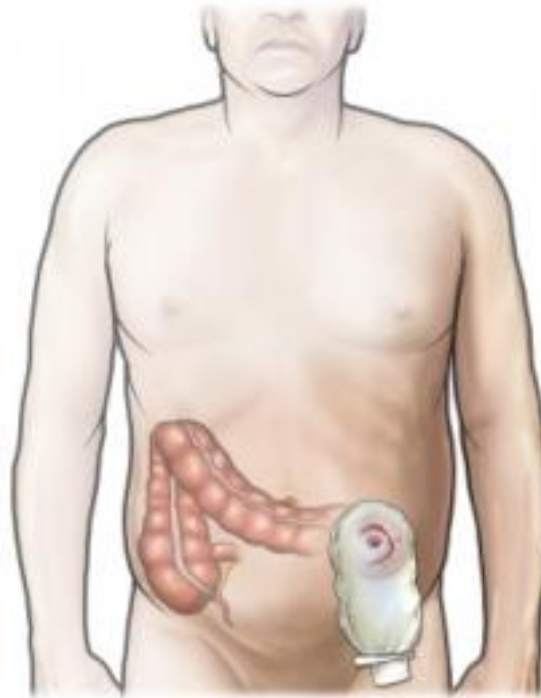
...Must Come Out

- Foley/Condom Catheter
- Zazzi/Rectal tube



...Must Come Out

- Foley/Condom C
- Zazzi
- Ostomy bag



Colostomy pouch



...Must Come Out

- Foley/Condom Catheter
- Zazzi
- Ostomy bag
- **Nasogastric (NG) tube**
- Drains

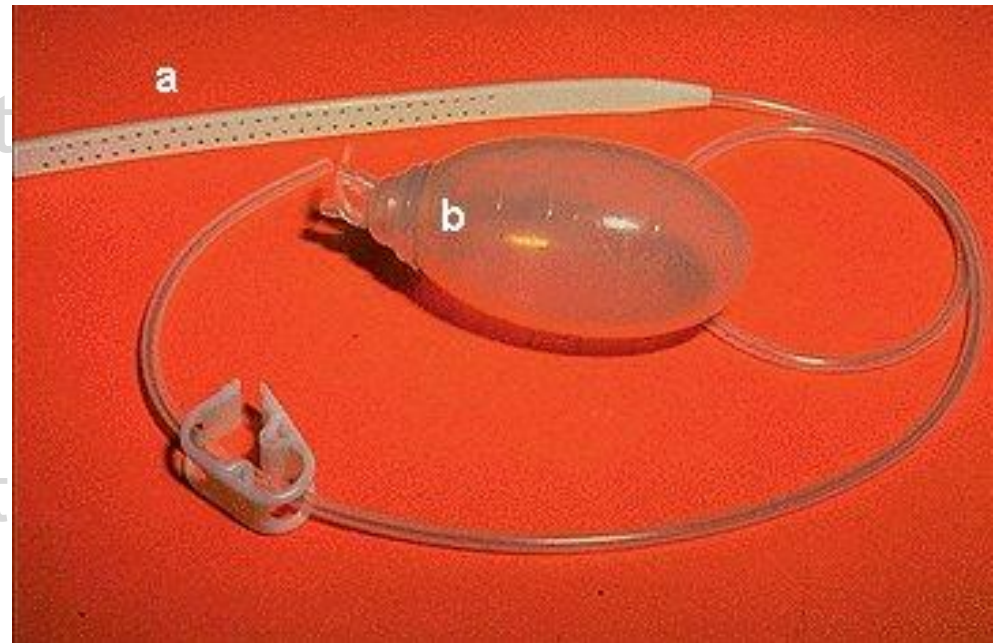


- ...
- Foley/Con
- Zazzi
- Ostomy ba
- **Nasogastr**
- Drains



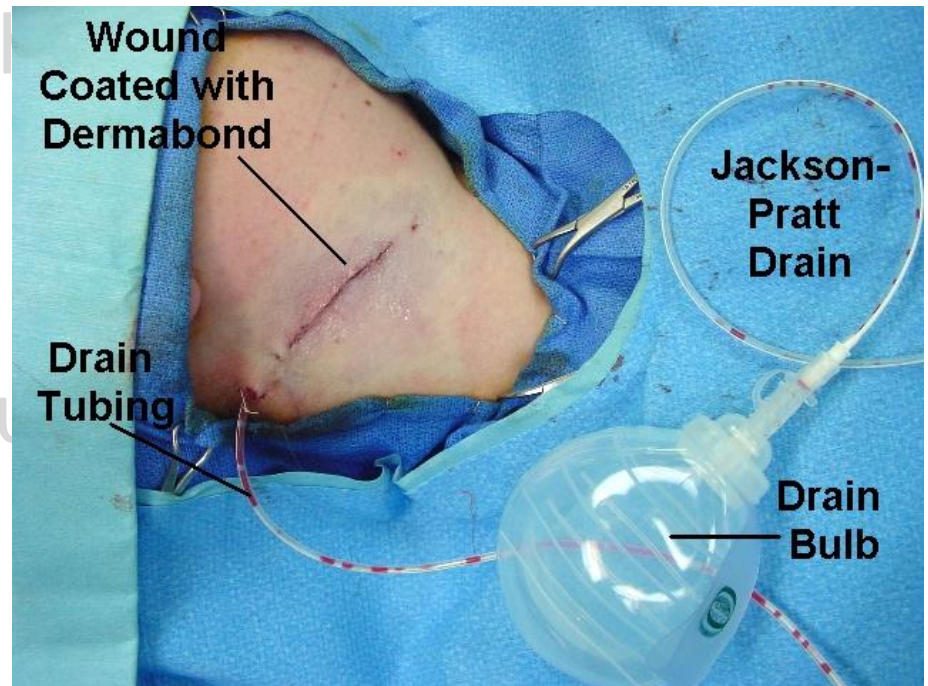
...Must Come Out

- Foley/Condom Cath
- Zazzi
- Ostomy bag
- Nasogastric (NG) tube
- Drains
 - Jackson Pratt (JP)



...Must Come Out

- Foley/Condom Cath
- Zazzi
- Ostomy bag
- Nasogastric (NG) tube
- Drains
 - Jackson Pratt (JP)



...Must Come Out

- Fole
- Zaz
- Osto
- Nas
- Drains
 - Jackson Pratt (JP)



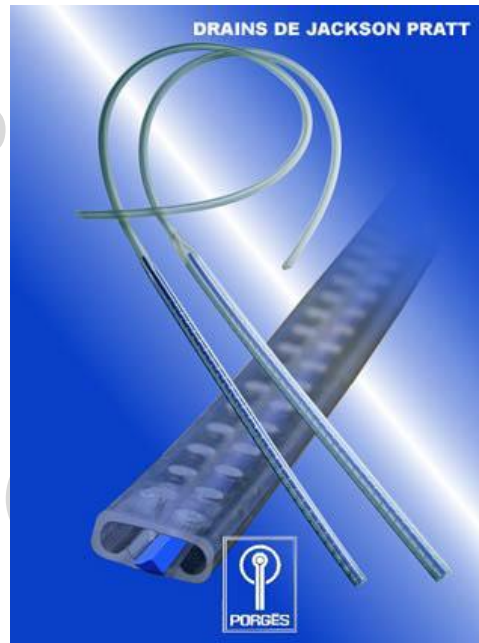
...Must Come Out

- Foley/Condom Cath
- Zazzi
- Ostomy bag
- Nasogastric (NG)
- **Drains**
 - Jackson Pratt (JP)



...Must Come Out

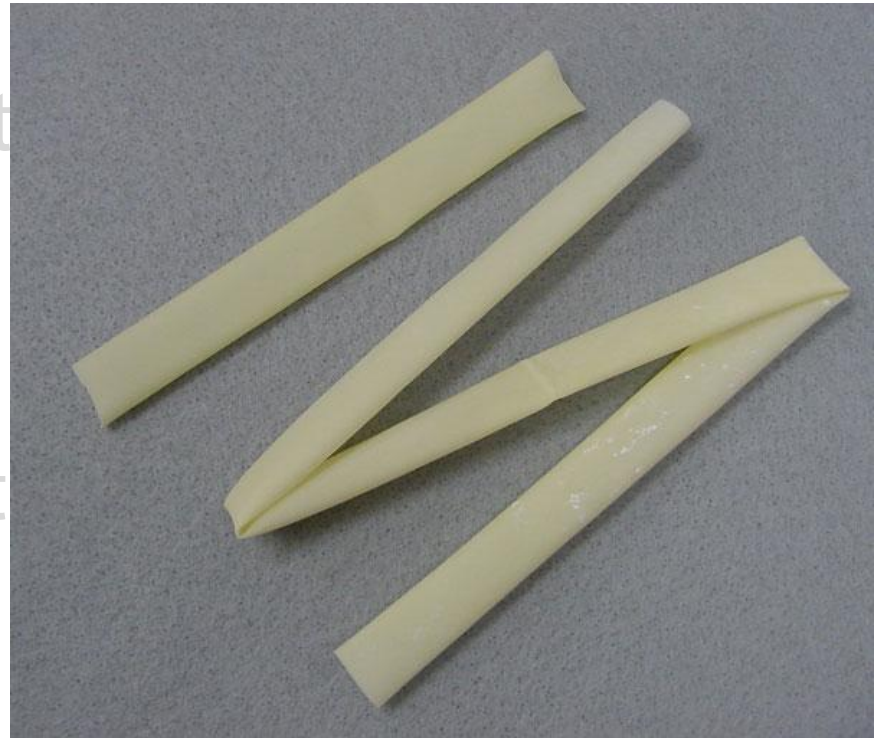
- Foley/Condo
- Zazzi
- Ostomy bag
- Nasogastric
- Drains



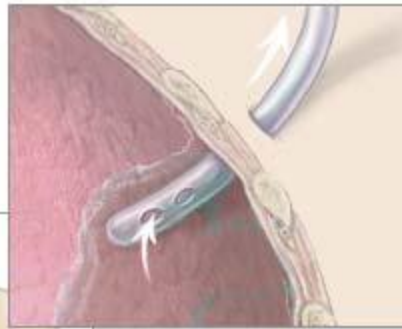
– Jackson Pratt (JP) vs Blake (Channel)

...Must Come Out

- Foley/Condom Cath
- Zazzi
- Ostomy bag
- Nasogastric (NG) t
- **Drains**
 - Penrose

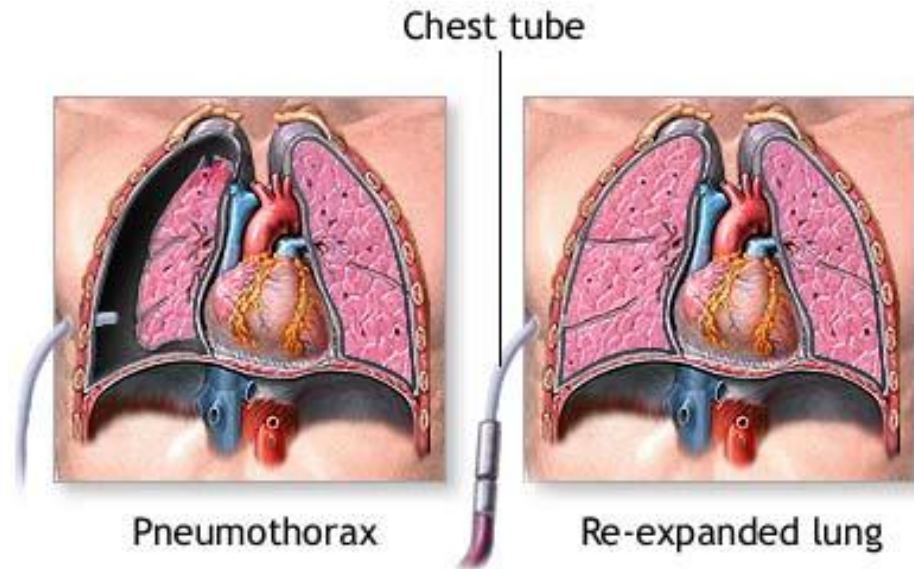


...Must Come Out



Chest tube
drains fluid from
pleural space

ADAM.



Pneumothorax

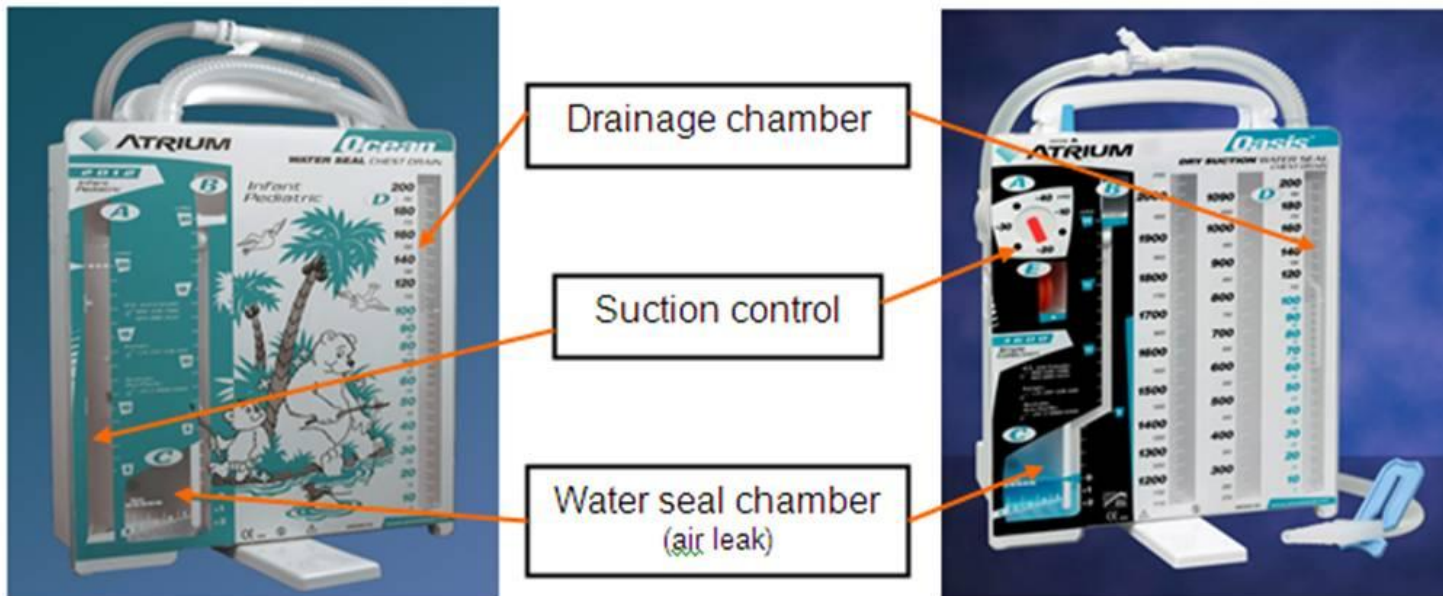
Re-expanded lung

ADAM.

- Chest tube

...Must Come Out

Chest drain system



- Chest tube

Crystalloid Fluid Options

	USAGE	CONTENT	pH
Normal saline (0.9% NS) (isotonic vs hypertonic saline)			
Lactated Ringers			
Normosol			
D5W 0.45%NS with 20 mEq KCl (hypotonic saline)			

Crystalloid Fluid Options

	USAGE	CONTENT	pH
Normal saline (0.9% NS) (isotonic vs hypertonic saline)	Resuscitation	154 mEq Na, 154 mEq Cl (i.e., 154 mmol/L; 285 mOsm/L)	5.5
Lactated Ringers			
Normosol			
D5W 0.45%NS with 20 mEq KCl (hypotonic saline)			

Crystalloid Fluid Options

	USAGE	CONTENT	pH
Normal saline (0.9% NS) (isotonic vs hypertonic saline)	Resuscitation	154 mEq Na, 154 mEq Cl (i.e., 154 mmol/L; 285 mOsm/L)	5.5
Lactated Ringers	Resuscitation	130 Na, 109 Cl, 28 lactate, 4 K, 3 Ca (273 mOsm/L)	6.5*
Normosol			
D5W 0.45%NS with 20 mEq KCl (hypotonic saline)			

Crystalloid Fluid Options

	USAGE	CONTENT	pH
Normal saline (0.9% NS) (isotonic vs hypertonic saline)	Resuscitation	154 mEq Na, 154 mEq Cl (i.e., 154 mmol/L; 285 mOsm/L)	5.5
Lactated Ringers	Resuscitation	130 Na, 109 Cl, 28 lactate, 4 K, 3 Ca (273 mOsm/L)	6.5*
Normosol	Resuscitation	140 Na, 98 Cl, 5 K, 3 Mg, 27 acetate, gluconate 23	7.4
D5W 0.45%NS with 20 mEq KCl (hypotonic saline)			

Crystalloid Fluid Options

	USAGE	CONTENT	pH
Normal saline (0.9% NS) (isotonic vs hypertonic saline)	Resuscitation	154 mEq Na, 154 mEq Cl (i.e., 154 mmol/L; 285 mOsm/L)	5.5
Lactated Ringers	Resuscitation	130 Na, 109 Cl, 28 lactate, 4 K, 3 Ca (273 mOsm/L)	6.5*
Normosol	Resuscitation	140 Na, 98 Cl, 5 K, 3 Mg, 27 acetate, gluconate 23	7.4
D5W 0.45%NS with 20 mEq KCl (hypotonic saline)	Maintenance	Dextrose (5%), 77 Na, 77 Cl, additives...	4.4*