The role of intestinal urinary diversion in cases of complicated urinary incontinence

W27, 16 October 2012 09:00 - 12:00

Start	End	Topic	Speakers
09:00	09:05	Introduction	• Gamal Ghoniem
09:05	09:15	Indications and patients' selection for diversion in urinary incontinence	• Ayman Mahdy
09:15	09:25	The gastrointestinal segments: Pertinent anatomy and physiology	• Joanna Togami
09:25	09:40	General principles and selection of the gastrointestinal segment	• Ayman Mahdy
09:40	09:55	Patient preparation and Postoperative management	• Ahmed Elzwahry
09:55	10:15	Operative techniques and intraoperative considerations	• Gamal Ghoniem
10:15	10:30	Discussion	All
10:30	11:00	Break	None
11:00	11:15	The stoma in urinary diversion: techniques of construction, stoma related complications and management	• Joanna Togami
11:15	11:30	Complications of urinary diversion and their management	• Gamal Ghoniem
11:30	12:00	Discussion	All

Aims of course/workshop

Management of complicated and recurrent cases of urinary incontinence is a surgical challenge that frustrates patients and their caregivers. This is particularly true when urinary incotinence is associated with extensive lower tract damage, irreversible pathology of the lower urinary tract and/or failed multiple previous procedures. The use of bowel for urinary diversion might be the last resort in those cases. Our objective is to address the indications of intestinal urinary diversion in cases with complicated/recurrent urinary incontinence. We suggest it is of similar importance knowing the pertinent GI anatomy and physiology, the most commonly applied techniques and their complications and surgical tips from our own practical experience.

Educational Objectives

The use of intestine in urinary diversion continues to be a technique of growing interest especially after cystectomy procedures. This also can be applied in certain cases of urinary incontinence. Those include complicated or recurrent urinary incontinence which failed other less invasive options for treatment. Urologists and urogynecologists who treat urinary incontinence must be aware of treatment options available for their patients. Out of those options; we think it is crucial for incontinence specialists to be familiar with the GI tract and its use in urinary diversion. Those procedures are technically challenging and associated with high risk of major complications if not appropriately performed or done in poor candidates.

The role of intestinal urinary diversion in cases of complicated urinary incontinence

Introduction

Gamal M. Ghoniem, MD, FACS

Background

- Management of complicated and recurrent cases of urinary incontinence is a surgical challenge that frustrates patients and their caregivers.
- This is particularly true when urinary incotinence is associated with extensive lower tract damage, irreversible pathology of the lower urinary tract and/or failed multiple previous procedures.
- The use of bowel for urinary diversion might be the last resort in those cases. Our objective is to address the indications of intestinal urinary diversion in cases with complicated/recurrent urinary incontinence. We suggest it is of similar importance knowing the pertinent GI anatomy and physiology, the most commonly applied techniques and their complications and surgical tips from our own practical experience.

Objectives

- Our objectives:
  - Address Indications of intestinal urinary diversion in cases with complicated/recurrent urinary incontinence.
  - Review the pertinent GI anatomy and physiology
  - Discuss the most commonly applied techniques
  - Discuss their complications
  - Provide surgical tips from our own practical experience.

Speakers

• Gamal Ghoniem	University of California, Irvine	United States
• Ayman Mahdy	*University of Cincinnati*	United States
• Joanna Togami	Oschner Clinic, New Orleans	United States
• Ahmed Elzwahry	University of S. Carolina	United States

Indications and patients' selection for diversion in urinary incontinence

Ayman Mahdy,MD, PhD
Assistant Professor of Surgery
Director Voiding Dysfunction and Female Urology
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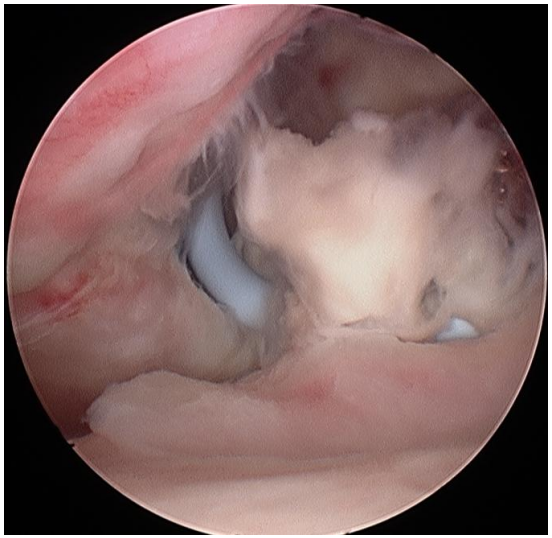
Radiation related urinary incontinene

- Urorectal or urovaginal fistulas:
  - Failed multiple attempts for repair
  - Large radiation induced
  - Concomitantly affected bladder or bladder outlet
- Impaired bladder compliance
- ISD
- Lower ureters



Neurogenic bladder

- Goals in neurogenic bladder managmenet:
  - Avoid complications
  - Achieve dryness
  - Efficient emptying
- Diversion may be an alternative to achieve those goals.

Other indications

- Non functional bladder and/or urethra due to major tissue loss:
  - Trauma
  - Graft/sling erosion
- Long term catheterization:
  - Contracted bladder
  - Eroded/damaged urethra

Patient selection

- Motivation
- Expectation
- Surgical candidacy
- Physical ability
- Underlying condition:
  - Progressive disease conditions e.g. Parkinsonism
  - Type of tissue pathology (radiation)
- Care givers
- Previous surgeries

Contraindications

- Absolute:
  - Renal function impairment
  - Hepatic dysfunction
- Relative:
  - Unhealthy bowel segment (use alternatives)
  - Previous irradiation
- Patient related

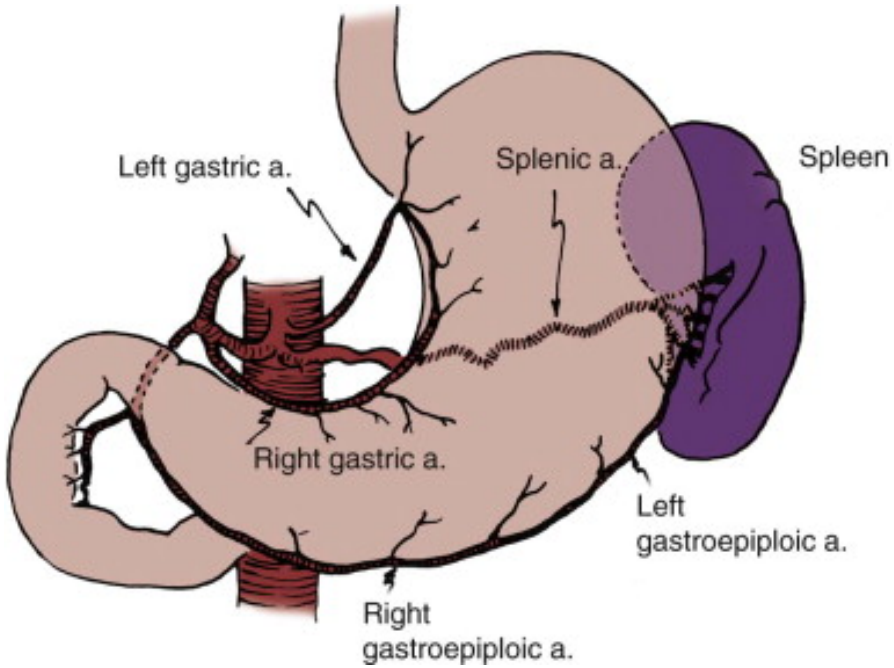
Urinary Diversion Anatomy, Metabolic Considerations

Joanna M. Togami, MD
Ochsner Medical Center
October 19, 2012
Beijing, China

Types of Diversion

- Non continent
  - Conduits which require an external pouching system
    - Ileum (most common, least complications)
    - Colon
    - Jejunum (highest incidence of metabolic derangements)
- Continent
  - Orthotopic—neobladders utilize ileum
  - Pouches—continence mechanism which utilizes the ileocecal valve and small bowel
    - Indiana (Florida) pouch
  - Ureterosigmoidostomies—urine drains into the sigmoid colon and is evacuated with feces
    - Highest incidence of adenocarcinoma

Stomach—Vasculature



Blood Supply of the Stomach

- Celiac axis
  - Left gastric a (lesser curvature)
  - Hepatic a→Right gastric a (lesser curvature) → Gastroduodenal (antrum and duodenum)→right gastroepiploic a
  - Splenic a→short gastric a (fundus and cardia)→left gastroepiploic a
- The gastroepiploics allow a pedicle of stomach to be mobilized into the pelvis based on either the right or left sides

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Stomach

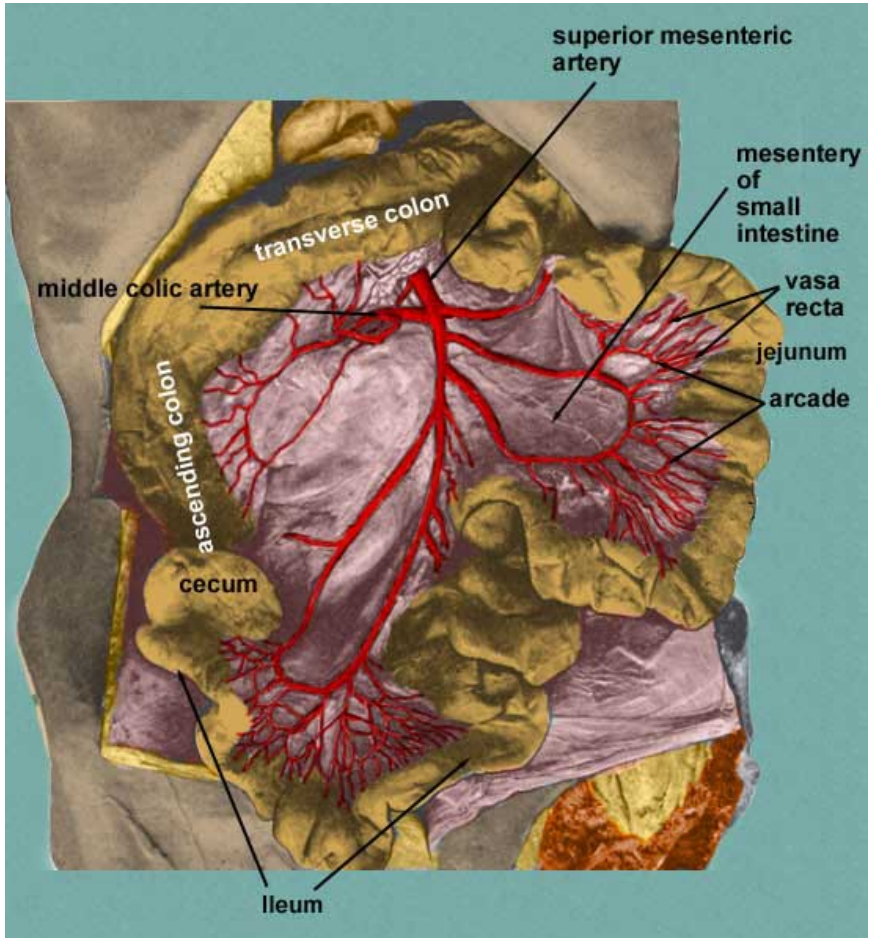
- Stomach wedge should not include
  - Significant portion of the antrum
  - Never extend into the pylorus
  - All the way to the lesser curvature
- Omentum is left attached to the gastroepieploic vessels as it helps to protect and secure them
- Stomach has a thick seromuscular layer that is easily separated for a submucosal ureteral implantation

Small Bowel

- 6.7 meter long (varies from 4.5 m to 9 m)
- Jejunum diameter is larger, single arterial arcades, vessels are larger in diameter
- Ileium more distal, smaller diameter, multiple arterial arcades vessels are smaller
- Pelvic irradiation affects two portions
  - Last 5 cm of the terminal ileum
  - 1.82 m from the ligament of Treitz has the longest mesentery which can descend into the pelvis

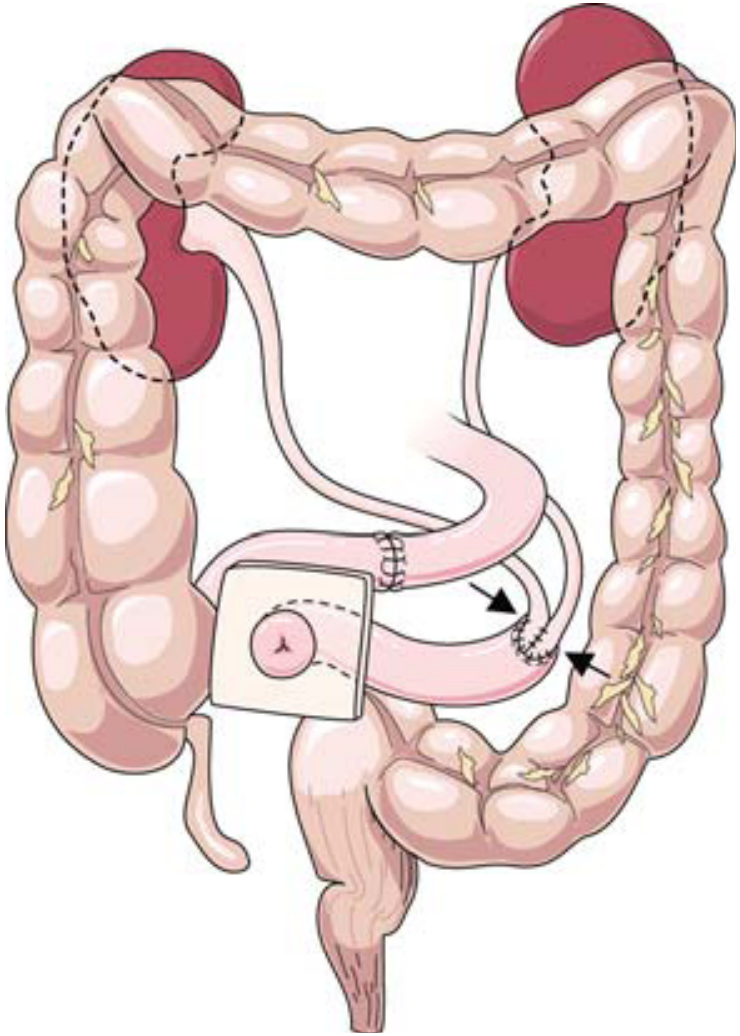
Small Bowel—Vasculature

- Blood supply is based off of the superior mesenteric artery and its intestinal branches
- 15 cm of small bowel can survive lateral to a straight vessel (vasa recta) in practice, do not clean more than 8 cm
- The vessels are end arteries, therefore, transection will cause that portion of the bowel to become ischemic and die



Ileal Conduit

- Simplest type of conduit diversion
- Associated with the fewest intraoperative and immediate postoperative complications
- Not advised to use in patients
  - Inflammatory small bowel disease
  - Short bowel syndrome
  - Irradiated bowel



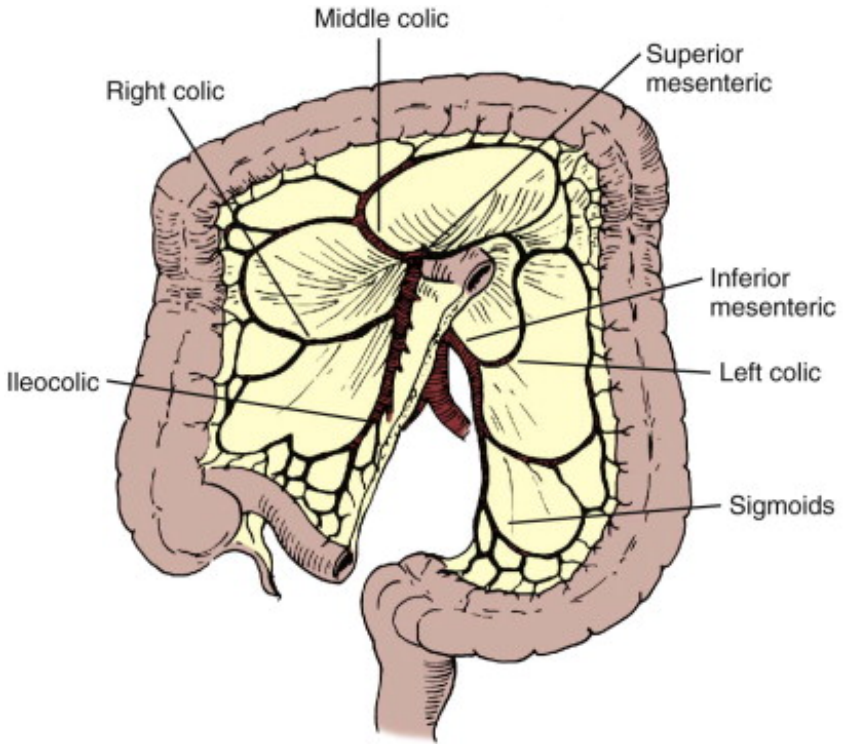
Sudakoff AJR 2005; 184: 131-138

Jejunum Conduit

- Largest diameter of the small bowel
- Longest mesentery
- Associated with hyperkalemic, hyponatremic metabolic acidosis
- The more proximal, the more likely the syndrome is to develop
- Contraindicated when another portion of the bowel is available
- Avoids irradiated bowel

Colon—Vasculature

- Superior mesenteric artery
  - Ileocolic, right and middle colic a
- Inferior mesenteric artery
  - Left colic, superior hemorrhoidal artery
- Internal iliac arteries
  - Inferior hemorrhoidal a via pudendal a
- Three potential problem sites
  - Sudeck's critical point
    - Junction of the sigmoid and superior hemorrhoidal arteries
  - Midpoint between middle colic and right colic arteries
  - Midpoint between the middle colic and left colic arteries (watershed area)



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Points of Fixation

- Cecum and transverse colon are free
- Peritoneal bands bind cecum and distal ileum
  - Distal ileum, cecum and retroperitoneum
  - Cecum to the posterior abdominal wall laterally
- Ascending and Descending colon are retroperitoneal
- Hepatocolic ligament
- Phrenocolic ligament
- Transverse colon attached to the stomach by the gastrocolic omentum
- Rectosigmoid is intraperitoneal distally becomes retroperitoneal then the rectum is subperitoneal

Transverse Colon Conduit

- Blood supply based on the right or middle colic arteries
- Contraindicated if hypogastric arteries have been ligated and the rectum has been left in situ
- Best if used in patients with irradiated bowel
- Excellent segment when intestinal pyelostomy needs to be performed
- Chronic diarrhea may be a consequence

Ileocolic Segment

- Based on the terminal branches of the superior mesenteric artery
- Stoma is placed in the right lower quadrant
- Ileocoloic conduit is advantageous when long segments of the ureter need replacement
- Chronic diarrhea may be a consequence

Metabolic Complications

- Factors that affect the amount of solute and type of absorption
  - Segement of bowel used
  - Surface area of the bowel
  - Amount of time urine is in contact with the bowel
  - Concentration of the solutes in the urine
  - Renal function
  - pH of the fluid

Stomach—Augmentation Cystoplasty

- Hypochloremic, hypokalemic metabolic alkalosis
- Alkalosis
  - More pronounced with renal failure secondary to impaired bicarbonate excretion
  - Dehydration ↑ aldosterone impairs renal bicarb excretion
  - Gastric segment increases bicarb absorption
- Symptoms—vomiting, lethargy, respiratory insufficiency, seizures, ventricular arrhythmias
- Treatment—H2 blockers or proton pump inhibitors, in severe cases, the gastric segment is removed
- Serum gastrin levels >120 ng/L
- Overdistention of the gastric segment increases serum gastrin levels

Ileal and Colon Conduit—Metabolic Complications

- Ileum and colon generally minor
- Hyperchloremic metabolic acidosis—Ammonium chloride is absorbed in exchange for carbonic acid
- ↓ kidney function increases the risk of metabolic acidosis
- Metabolic challenges of an ileal conduit are less than pouches because of a shorter bowel segment used and decreased urine exposure
- Symptoms—muscle weakness, bone demineralization
- Treatment
  - Sodium bicarbonate 1-2 grams three times a day
  - Sodium citrate 1-3 grams four times a day
  - Inhibitors of cyclic AMP mediated chloride ion transport
    - Nicotinic acid 0.5-2 g daily
    - Chorpromazine 25-50 mg four times a day

Ileal Conduit
Electrolyte Abnormalities

- Hypokalemia, hypocalcemia, hypomagnesemia
- Caused by intestinal losses and renal wasting
- Symptoms muscle weakness mimics Guillain-Barré syndrome
- Treatment
  - Potassium citrate 1.6 g two to four times a day
  - Calcium supplements 0.5 g to 1.0 g

Jejunum Conduit

- Hyponatremia, hypochloremia, hyperkalemia, azotemia and acidosis
- Bowel: Increased sodium chloride secretion (water follows) with reabsorption of potassium and H+ ions
- Kidney: Hypovolemia and hyperkalemia increases renin secretion and aldosterone production. Kidney reabsorbs Na and secretes K
- Bowel: Concentration gradient of a urine with dilute Na and high K causes more Na losses and K reabsorption in the jejunum, perpetuating the abnormalities
- Symptoms—lethargy, nausea, vomiting dehydration, muscle weakness and fever
- Severity depends on the segment of jejunum, more proximal, the more likely for syndrome development

Calculus Formation

- After 20 years of follow up 20% with ileal conduits will have renal calculi
- Hyperchloremic metabolic acidosis increased calcium phosphate or calcium oxalate stones
  - Increased urinary phosphate, sulfate and magnesium
  - Decreased urinary citrate
- Foreign materials in the conduit (sutures or staples) and mucus can cause a nidus for stone formation
- Chronic colonization/infection especially urease producing bacteria predispose to getting stone

Vitamin B12

- Vitamin B12 absorption occurs in the terminal ileum
- Body stores keep the patient free of deficiency for 3-5 years
- Megaloblastic macrocytic anemia
- Irreversible neurologic defects
- Treatment is monthly B12 injections

Bone Demineralization

- Osteomalacia—decreased in mineralized bone and increased osteoid component
- Chronic metabolic hyperchloremic acidosis is buffered by bone minerals. Calcium, carbonate and sodium results in demineralization
- Acidosis impairs renal activation of vitamin D
- Intestinal absorption of calcium and vitamin D can be impaired due to loss of bowel
- ↓ renal function worsens the demineralization
- Symptoms—pain in weight bearing bones, osteomalacia
- Treatment—treat metabolic acidosis, vitamin C, supplemental vitamin D, calcium

Hepatic Metabolism

- More common in pouches than conduits
- Increased ammonia reabsorption increases the ammonia load to the liver
- Ammonia part of the ornithine cycle to create urea
- Infection with urease splitting organisms increase ammonia, endotoxins affect hepatic transport and metabolism
- Symptoms—altered sensorium,
- Treatment—antibiotics, drainage of the diversion, limited protein intake, lactulose, oral neomycin to decrease the nitrogen load

Renal Function

- Urinary obstruction (stenosis of the ureterointestinal anastamosis), recurrent infection, urinary lithiasis
- Exact impact of urinary diversion on renal function is not known but estimated loss of GFR is 15%-25% with 11 year follow up
- Best monitored with both creatinine and renal ultrasound
- Additional tests—nuclear scans or diuretic renograms

Bowel Dysfunction
Malabsorption

- Diarrhea
  - Resection of large segments of the preterminal ileum
    - ↓ bile salt & fat absorption—95% are absorbed normally
    - Bile salts in the colon act as mucosal irritants
    - Steatorrhea
  - Resection of the ileocecal valve
    - Bacterial overgrowth of the small bowel
    - Decreased absorptive capacity of the large bowel
    - More common in neurogenic patients
- Treatment
  - Cholestyramine 4 g to 8 g twice a day
  - Increased dietary fiber intake
  - Loperamide 4 mg to 16 mg daily

Abnormal Drug Kinetics

- Most problematic are drugs absorbed in the GI tract and secreted unchanged by the kidney
- When chemotherapy is given in patients with continent diversions, consideration for an indwelling catheter at the time of administration
- Drugs that are reabsorbed—phenytoin, theophylline, lithium, methotrexate
- May need to be kept in mind when giving patients the medication. Monitor as appropriate

General principles and selection of the gastrointestinal segment

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Director Voiding Dysfunction and Female Urology
UC

General considerations

- Anatomy and physiology of different bowel segments
- Patient characteristics:
  - Underlying pathology causing incontinence
  - Renal function and metabolic status
  - Baseline gastrointestinal function
- Type of diversion planned:
  - Continent or incontinent

Ileum

- Pros:
  - Most commonly used
  - First choice if no contraindications
  - Abundant and redundant mesentery:
    - Rich blood supply
    - Easy mobilization
- Cons:
  - Malabsorption
  - Pelvic irradiation
  - Metabolic acidosis

Ileum

- Continent:
  - Natural sphincter: neobladder
  - Continent stoma
- Incontinent:
  - Ileovesicostomy
  - Ileal conduit
- Avoid terminal ileum (Vitamin B12)

Ileum

- Ileovesicostomy:
  - Unable or unwilling to self catheterize
  - Lo w capacity bladder
  - Detrusor hyperreflexia
  - Poor compliance
- Not a good choice for patients with impaired detrusor contractility

Colon

- Pros:
  - Large diameter
  - No significant malabsorption
  - No significant metabolic complications
- Cons:
  - Excessive mucous production
  - Hypokalemic metabolic acidosis
- Good choice:
  - In pelvic irradiated patients
  - Diseased ileum

Stomach

- Not widely used
- No mucous production
- Less risk for infection
- Hematuria dysuria syndrome

Jujenum

- Rarely used
- Hypochloremic, hyperkalemic metabolic acidosis.

The role of intestinal urinary diversion in cases of complicated urinary incontinence

Preoperative preparation and postoperative Care

Ahmed El-Zawahry, MD
Ayman Mahdy, MD
Joanna Togami, MD
Gamal Ghoneim, MD

Planning surgery

- Pre-Operative
- Operative
- Post operative
- Management of complications
- Follow up

Preoperative

- Patient (assessment)
- Procedure (Proper surgery)
- Physician (technique)

PATIENT

- **MEDICAL MORBIDITIES**
  - CVS
  - Respiratory
  - Bleeding disorders
  - Endocrine
- **PREVIOUS TREATMENT**
  - Neurologic (cognitive, dexterity)
  - Nutritional factors
  - Other surgeries, diseases and treatments

Nutrition

Effect of Surgery

- Metabolic alterations
- degradation of total body protein
- increase in systemic metabolism.

RESULTS In

- Harmful catabolism when prolonged or severe.
- Death if nutritional and cardiopulmonary reserves are exhausted.

Effects of Malnutrition

- Infection
- Poor wound healing
- Wound dehiscence
- Longer hospital stay- Indirect effect

Screening of Malnutrition

- Diet and loss of appetite
- Weight Loss – unintentional
  - 6% Wt loss- -> increased risk of complications

    Roy et al , JPEN 1985
- Circulating proteins
  - **Albumin**
    - important predictor of 30-day mortality
    - Half life 21 days

Screening of Malnutrition

- **Prealbumin**
- **Others:**
  - Transthyretin
  - Retinol binding protein
  - transferrin

Urinary Tract

- **Upper tract:**
  - Kidney function
  - Stones
  - Other confounders (can affect Outcomes)
- **Lower Tract:**
  - Incontinence, type , Severity
  - Bladder function
  - Sexual function
  - Postmenopausal or hypoestrogenic atrophic vagina.

Physician Role

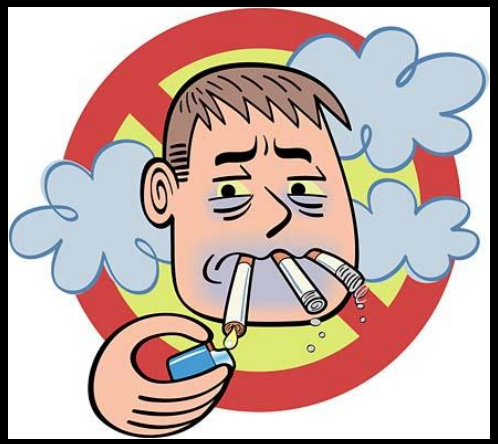
- Good H and P
- Good clinical exam- body habitus
- Proper assessment of
  - Patient
  - Urinary tract
  - Procedure
- Appropriate surgery choice
- Patient counseling.

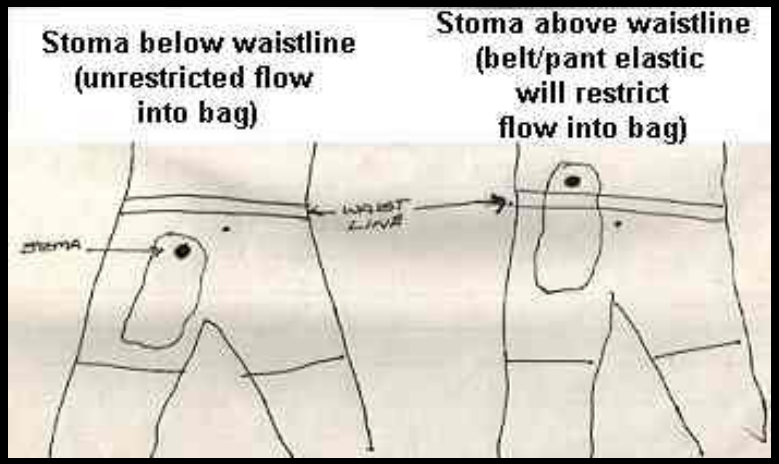
Patient counseling

- Types of surgeries and preferences
- Expectations
- Preoperative preparation
- Surgery details
- Postoperative recovery
- Teaching to catheterize (if needed)

Patient counseling

- Smoking cessation
- Adequate proper nutrition
- Cardiopulmonary optimization.
- Stomal marking and care





Perioperative optimization

- Antibiotics Prophylaxis
- Bowel preparation
- Nutrition (enteral or parentral/ early vs late)
- Skin preparation
- Ureteral stenting

Antibiotics Prophylaxis

Second or third generation **cephalosporin**

OR

Aminoglycoside

Metronidazole

OR

Clindamycin

Ampicillin/ sulbactam

OR

Fluoroquinolones

Antibiotics Prophylaxis

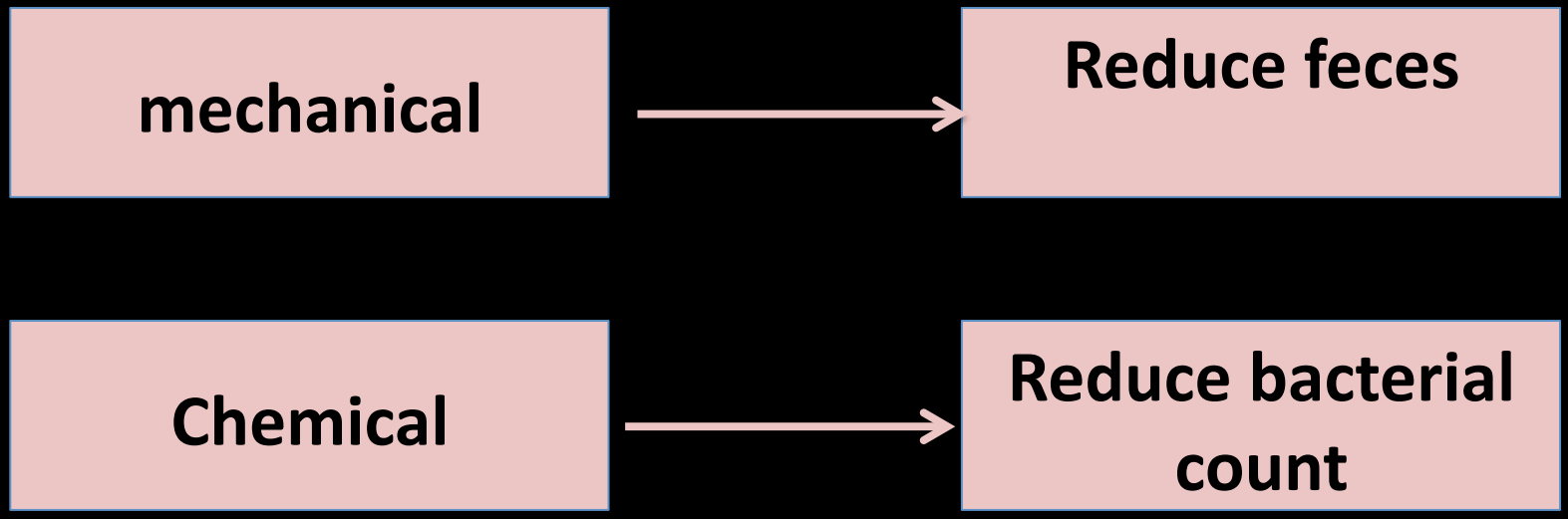
- Start 60 min prior to skin cut
- 120 min for fluoroquinolone
- Should not continue for more than 24 hours for prophylaxis
- More than 24 h → for therapeutic reasons

Skin preparation

- Chlorhexidine-alchohol
- Povidone-Iodine scrub
- Povidone-alcohol
  - **Chlorhexidine-alcohol** has been shown to have
    - Overall surgical site infection rate compared to Povidone-Iodine (9.5% vs 16.1%)

      Darouiche et al, NEJM 2010.

Bowel preparation



- Do We need mechanical bowel preparation?
- Do we need chemical bowel preparation?

Postoperative Nutrition

- Early vs late nutrition
- Enteral vs parentral
- **Fast Track** (Pruthi et al, J Am coll Surg 2010)
  - Minimal Bowel prep (mag citrate and fleet en.)
  - no NGT
  - Chewing gum
  - Clears on POD2
  - Metclopramide IV
  - Minimize narcotics and use Ketorolac

Postoperative NG tube

- **Do We need NGT?**
- **Prophylactic nasogastric decompression after abdominal surgery**

  Nelson et al , Cochrane Database Syst Rev. 2007

Routine nasogastric decompression does not accomplish any of its intended goals and so should be abandoned in favor of selective use of the nasogastric tube.

The role of nasogastric tube in decompression after elective colon and rectum surgery: a meta-analysis.

Wensheng et al , International J of Colorectal disease 2011

- routine NGT decompression did no good to the time to return gastrointestinal function, but increased the morbidity of pharyngolaryngitis and respiratory infection significantly. Routine NGT was not recommended for patients after elective colon and rectum surgery.

Ureteral Stenting

- Controversial
- Minimize urine leak
- Avoid early obstruction
- Support anestomosis
- Inflammation → facilitate stricture
- Nidus for infection
- Additional procedure with its complication

Ureteral stenting

- Patient with ureteral stent vs no stent had
  - Early return of Bowel Function
  - Metabolic acidosis was shorter duration
  - Post operative stricture in 3 vs 0
    - Mattei et al, J Urol 2008.

Conclusion

- Optimizing outcomes of surgery require
  - Proper preoperative counseling
  - Good selection of the patients
  - Proper selection of the surgical procedure
  - Preoperative general assessment
  - Preoperative urinary tract evaluation
  - Proper surgical technique
  - Post operative care including early ambulation, early nutrition, early removal or no NGT, ? Stenting.

Use of Bowel for Lower Urinary Tract Reconstruction

Gamal M. Ghoniem, MD, FACS

Indications:

- **Bladder replacement or Diversion**
  S/P radical cystectomy
  end-stage bladder
- **Bladder Augmentation**
- **Ureteral replacement**

Types

- 1. Conduits

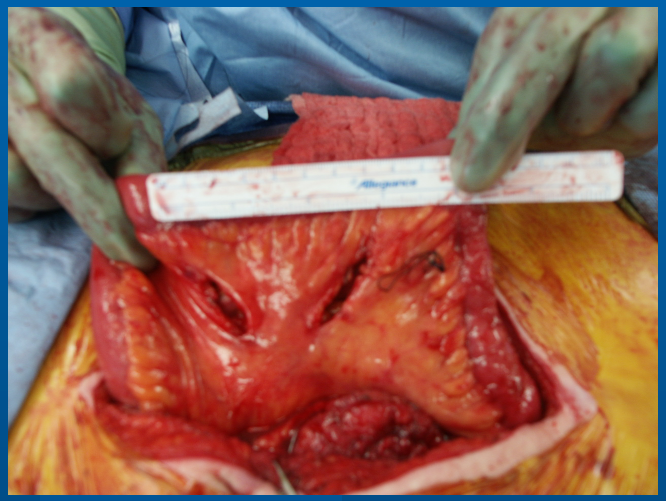
  Ileal, Jejunal, Colon, transverse, Ileocecal

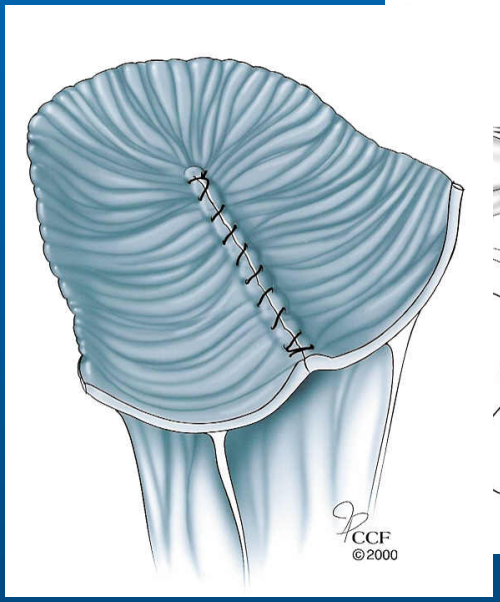
  require external collecting appliances

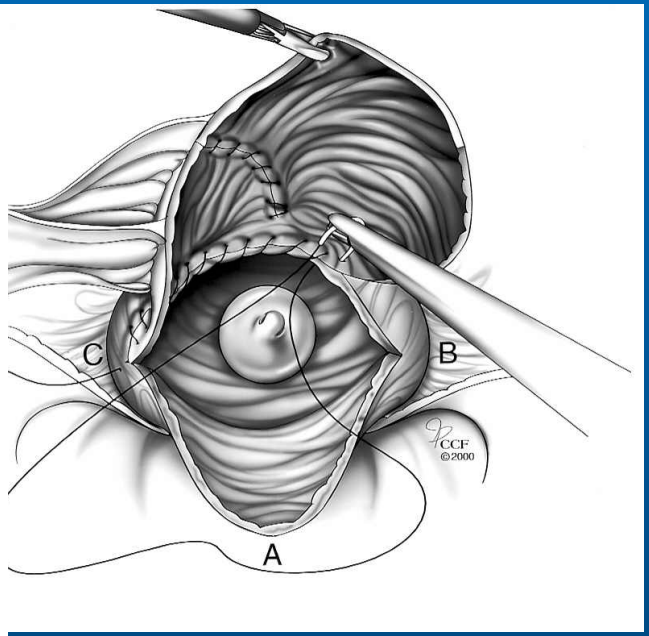
Types

- 2. Continent diversions
  - **a- Excretion of urine by evacuation**
    - ***ureterosigmoidostomy, rectal bladder, sigmoid hemi-Koch***
  - **b- Orthotopic voiding pouches**
    - ***Hautman/W, Studor***
  - **c- Pouches requiring CIC**
    - ***Indiana***
  - **d- Bladder Augmentations**

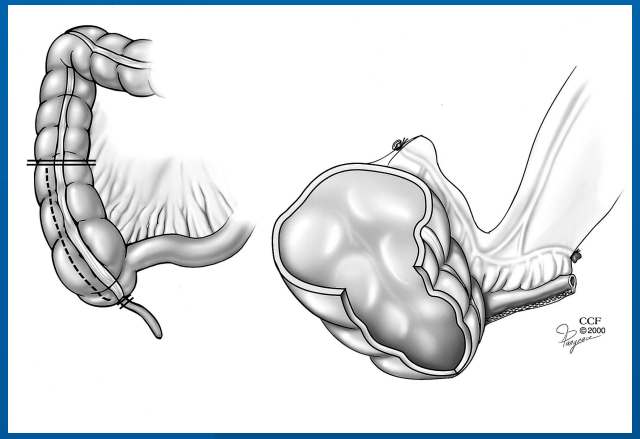
Ileocystoplasty

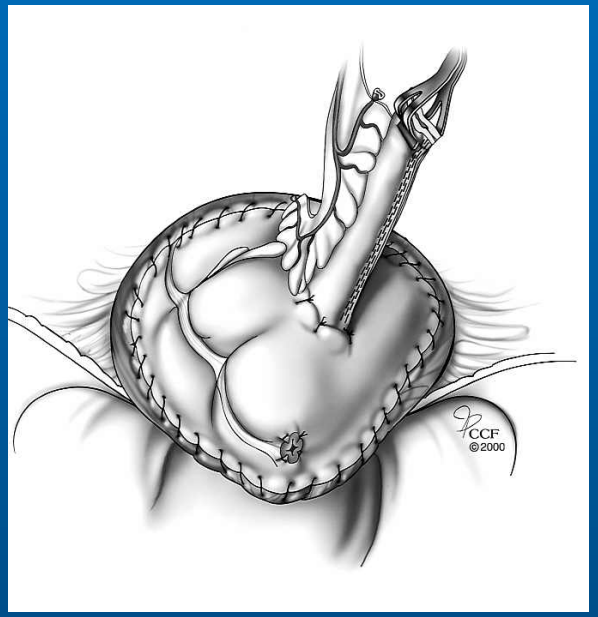




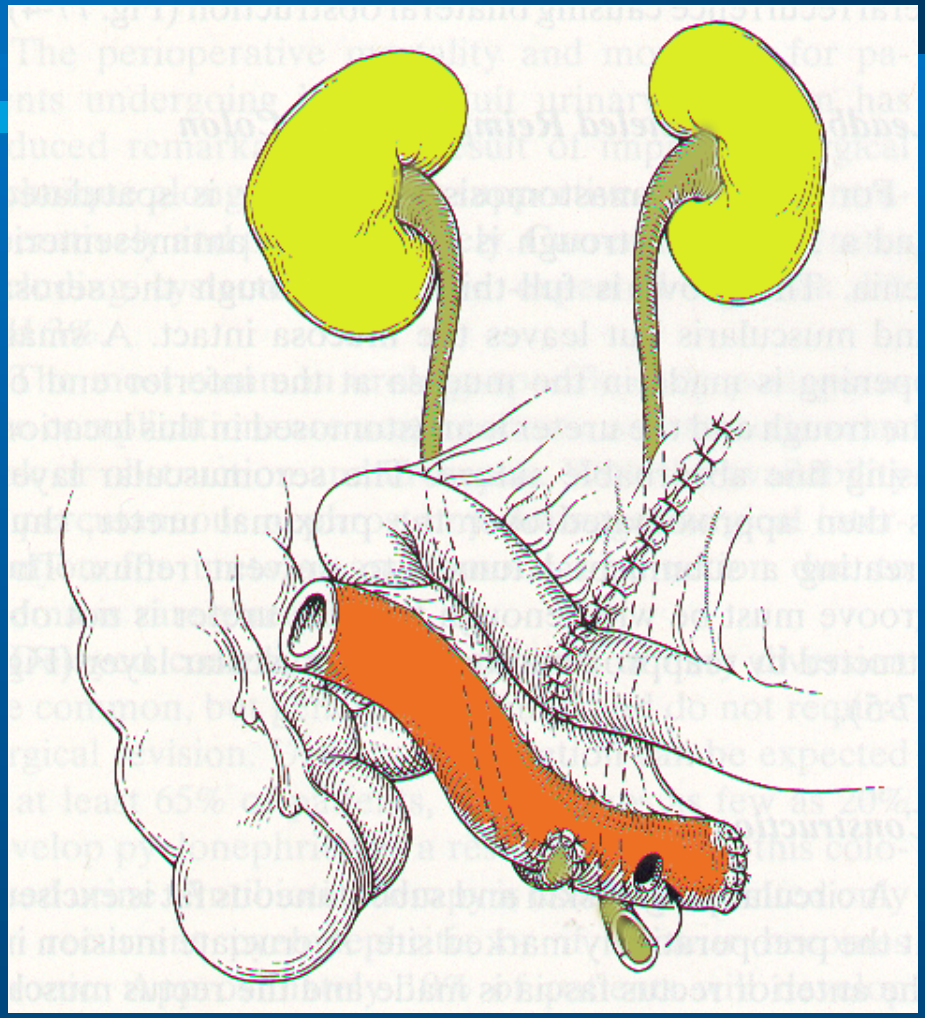


Cecocystoplasty with continent stoma +/- B.N. closure

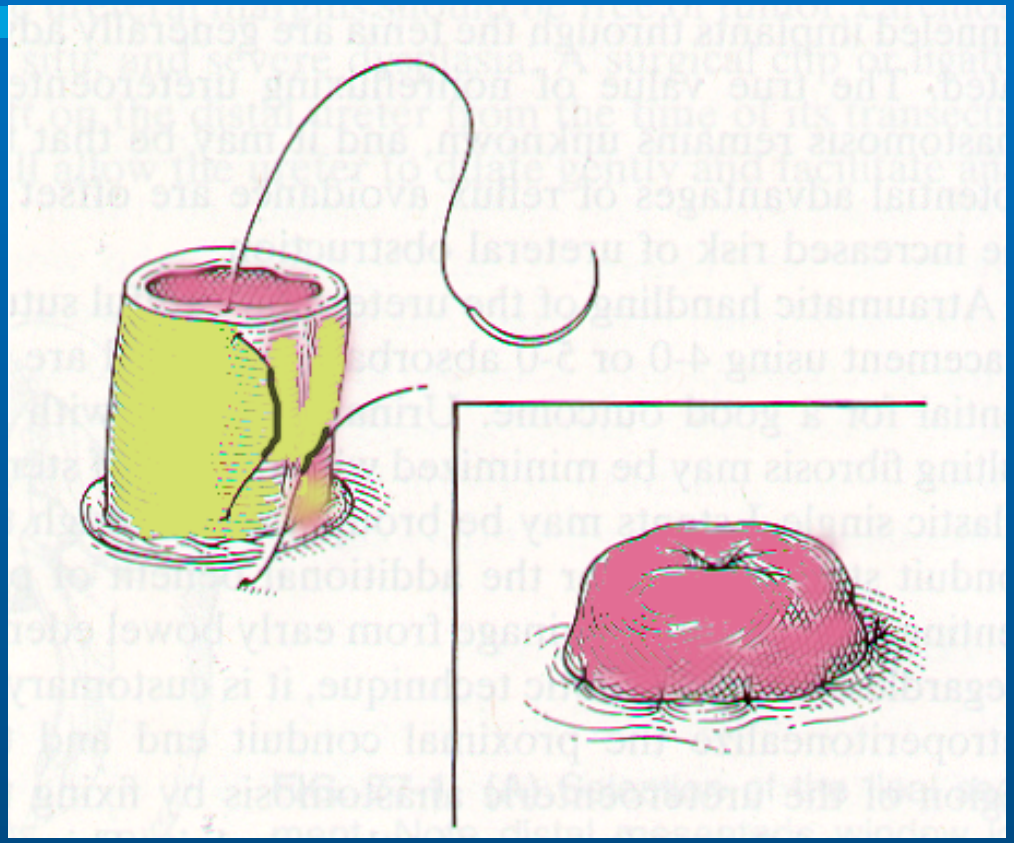




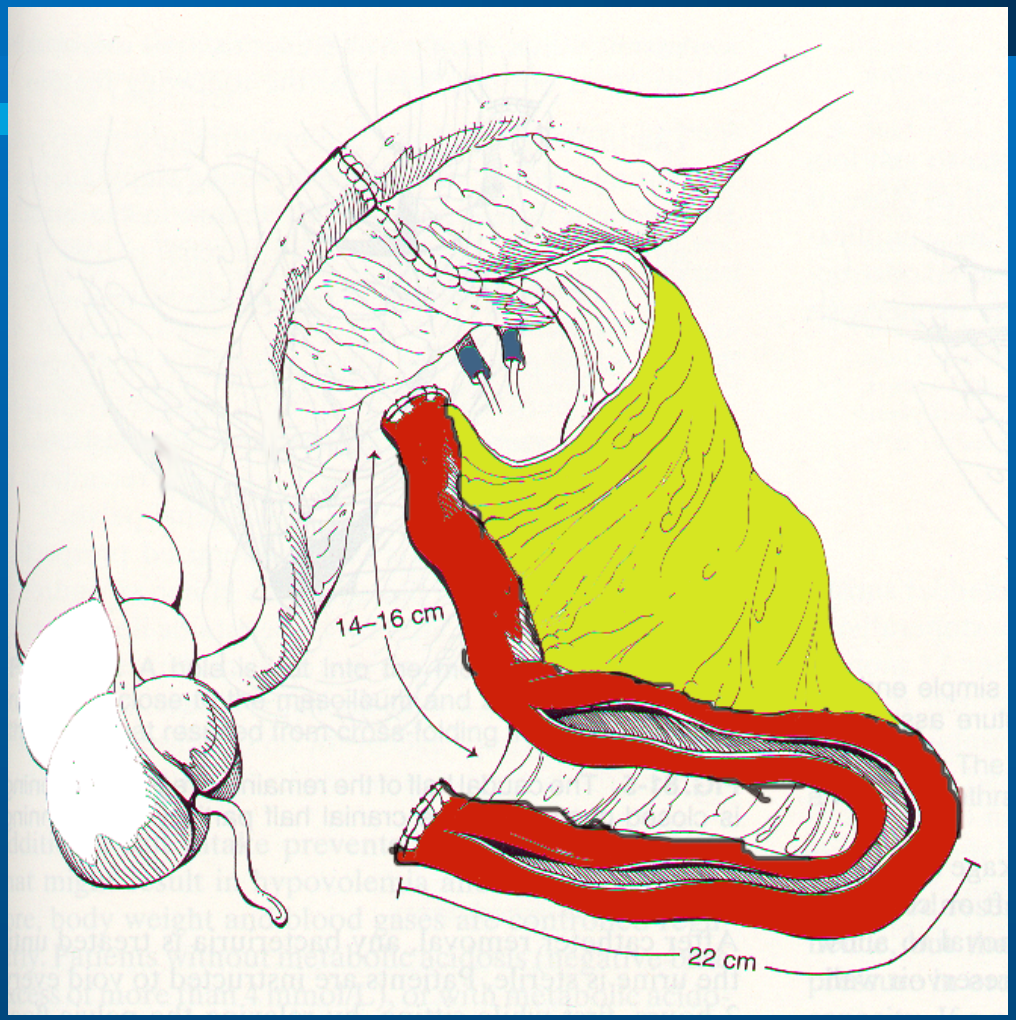
Bricker Ileal Loop Diversion



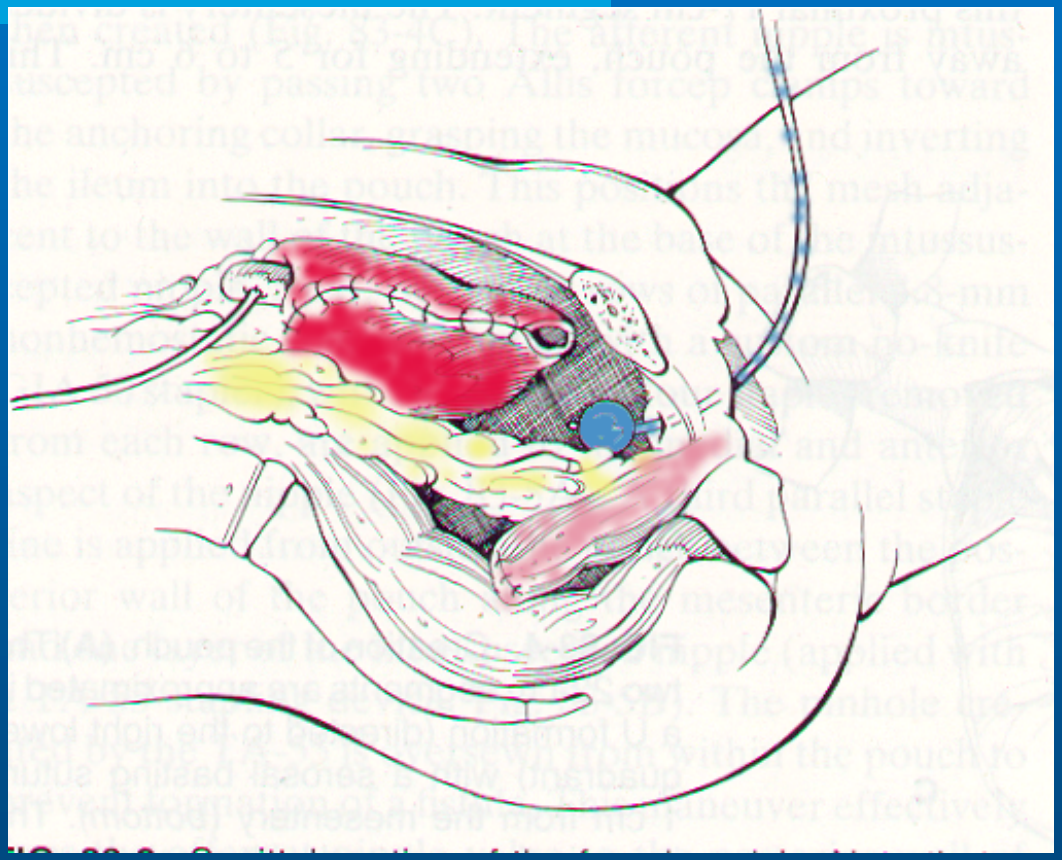
Rosebud Stoma



Studor Urinary Diversion



Orthotopic Diversion in Females



Selection of Intestinal Segment

Segment	Uses	Pros	Cons
Stomach	GI disease, low renal function	Less permeable, less mucus, less UTI	Pain/ Dysuria, dumping, anemia
Jejunum	Usually not used	none	Severe electrolyte imbalance
Ileum	Most common	Mobile, small dia, constant blood supply	anemia (B12), diarrhea
Colon	common	Use in pelvic XRT	Diarrhea, bacterial colonization

Complications

- Fistulas
- Infection
- Bowel obstruction
- Intestinal stenosis
- Stomal complications
- Ureterointestinal anastemosis
- Pyelonephritis
- Metabolic
- Cancer

Metabolic Complications

Metabolic Complications

	Na	Cl	K	HCO3	Acidosis	Alkal
Stomach	-	↓	↓	↑	-	+
Jejunum	↓	↓	↑	↓	+	-
Ileum	↑	↑	-	↓	+	-
Colon	↑	↑	↑	↓	+	

Comparison of Ileal, Transverse and Sigmoid colon as conduits

1968 – 1997 (average 6 y)	I.C.	S.C.	T.C.
#	283	336	78
Early complications ….Reoperatiopn	16.6% 9%	7.1% 5%	7.6% 4%
Late complications ….Intervention	28.3% 12.7%	34.5% 20.4%	40.8% 13.9%

Stein, Schonherr, Hohenfellner, Thuroff, abstract # 659
AUA meeting, 2004, S.F.

Pregnancy & Augmentation

Gamal M. Ghoniem, MD, FACS

Introduction

- **Pregnancy in patients with complex GU reconstruction became more common**
- **In a patient with bladder neck surgery (reconstruction, AUS, suspension) is to have CS**

Herschorn S, Hewitt, RJ. Patient prespective of long-term outcome of augmentation cystoplasty for neurogenic bladder. Urology 1998; 52: 672-8

Pregnancy and Augmentation Cystoplasty

- Women with congenital anomalies and neurogenic bladder who had augmentation cystoplasty and reach puberty are increasing.
- The most common complication in these patients during pregnancy is UTI

Pregnancy and Augmentation Cystoplasty

- Any cases of UTI must be treated promptly to prevent premature labor and fetal morbidity
- Renal function must be controlled carefully;
  - Serum Creatinene
  - Serum Uric acid to detect pre-eclampsia

Augementation Cystoplasty & Delivery

- Fenn N et al; suggest Cesarean section for delivery to avoid disruption of the continence during vaginal delivery (1-3)
- Fontaine E et. al, reported 3 cases who had ileocystoplasty combined with a modified fascial sling, delivered vaginally and continence was unchanged. Bladder should be empty (4)

1- Fenn N. et al Clam enterocystoplasty and pregnancy. Br. J Urol 1995; 75:85-6

2- Hill E et. Al; Management of pregnancy after augm,entation cystoplasty. J Urol 1990;144:457-9

3- Kennedy W et al; Pregnancy after orthotopic continent urinary diversion. Surg Gynecol Obstet 1993; 177:405-9

4 -Fontain E et al; Pregnancy and vaginal delivery after augmentation cystoplasty. Br J Urol 2003; 91:893-894

Augmentation Cystoplasty & Cesarean Section

- If CS is indicated for any obstetric reason attempt should be made to:
  - do so electively
  - avoid the cystoplasty blood supply
  - a urologist with particular knowledge of the anatomy of the cystoplasty should be present

Augmentation Cystoplasty & Cesarean Section

- The neobladder may have to be taken down before opning the uterus
- The mesentery of the neobladder may be pushed to the side by the uterus, or it may be drapped over it (2)

Augmentation Cystoplasty & Cesarean Section

- **The mesenteric blood supply can be interrupted and it may be not obvious at surgery or immediately afterward**
- **Revision of the enterocystoplasty might be needed if the enteric segment contract as the bladder capacity will be reduced (5)**

5-Kearse S et al; Functional characteristics of enteroplasty after interruption of the meseteric blood supply. J Urol 19993;150:593-596

Conclusions

- Pregnancy and vaginal delivery after augementation cystoplasty is possible
- Urologists & Obstetricians should be aware of the potential complications of pregnancy and delivery
- If Caesarian section is indicated a urologist should be present.

Urostomy Formation
&
Complications

Joanna M. Togami, MD
Ochsner Medical Center
October 19th, 2012
Beijing, China

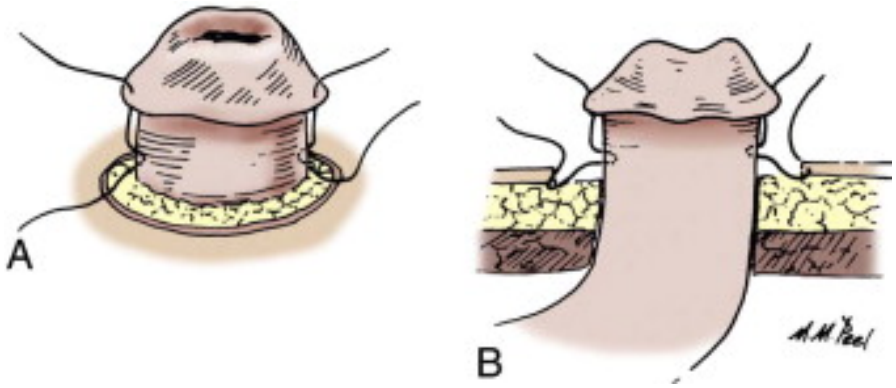
Successful Stomas

- Success of ostomy management is dependent on a secure, reliable, odor proof system
- Protruding stoma
  - Better appliance fit
  - Less incidence of stomal stenosis
  - Fewer peristomal skin complications
- Most complications of stomas are the result of technical errors in the construction

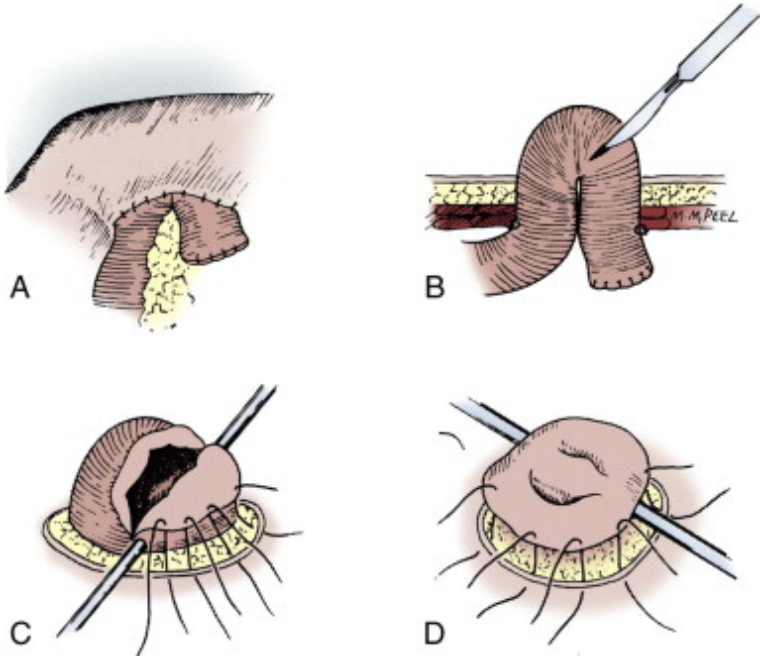
Technique

- Marking before surgery by an enterostomal therapy nurse has been shown to decrease the complications by half
- Located at the peak of the infraumbilical fat roll
- Bring through a circular skin incision
- Placement through the belly of the rectus muscle prevents parastomal hernias
- Stretch the peritoneum to allow for the loop and its mesentery
- Scoring of the mesentery
  - To straighten the concave loop (2.5 cm from the ends)
  - Gain greater length on the loop with short mesentery

Types of Stomas



Nipple Stoma (Rosebud)



Loop End Ileostomy (Turnbull)

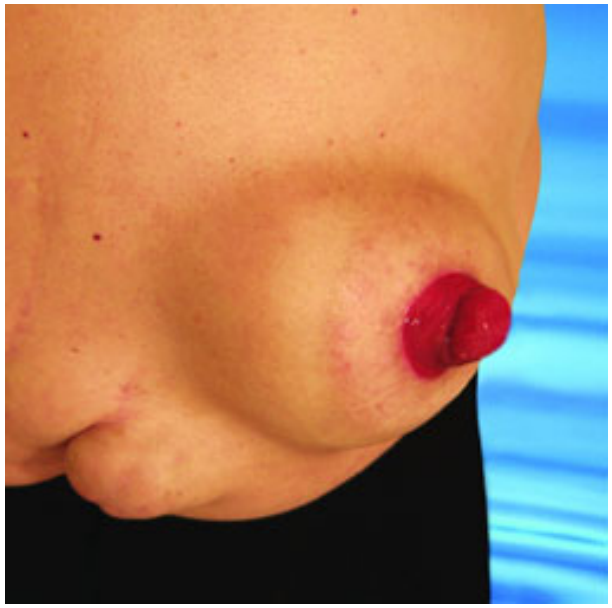
- Nipple stomas are secured by the serosa to serosa suture to evert the stoma
- Loop end stomas are helpful in obese patients, with a thick abdominal wall and thick, short ileal mesentery

Campbell-Walsh Urology 10th Ed. Chapt 85

Stoma Complications

- Early complications
  - Stoma necrosis lack of blood flow
  - Parastomal seroma, infection
- Late complications
  - Parastomal hernia
  - Stoma prolapse
  - Stoma retraction
  - Local skin irritation
  - Stoma stenosis

Parastomal Hernia



http://www.allaboutbowelsurgery.org

- Occurs in 4.5%-6.5% of ileal conduits
- Contributing factors
  - Obesity, wound infection, chronic cough, steroids, malnutrition, abdominal swelling
- Symptoms
  - Pain, poor-fitting appliance, bowel strangulation, poor cosmesis
- Treatment
  - Support belts
  - Surgical repair
    - Repair at the site high rate of recurrence (76%)
    - Relocation has a decreased rate of recurrence (33%)
    - 72% develop hernias at the old site or incision

Stomal Prolapse

- Bowel telescopes through the opening
- Occurs more commonly with colon
- Occurs if the opening in the abdominal wall is larger than the conduit, muscle weakness, increased abdominal pressure
- Complications—stomal irritation, bleeding, necrosis, and gangrene

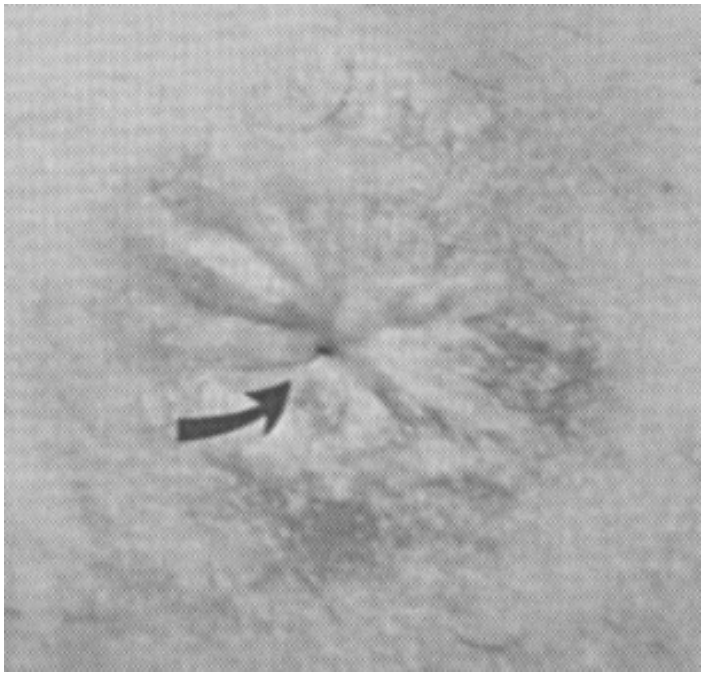
http://www.allaboutbowelsurgery.org

Stomal Prolapse—Treatment

- Reduction and application of belt support
- Sugar therapy to decrease the swelling
- Increase size of the faceplate
- Apply a flexible faceplate
- Surgery

http://www.allaboutbowelsurgery.org

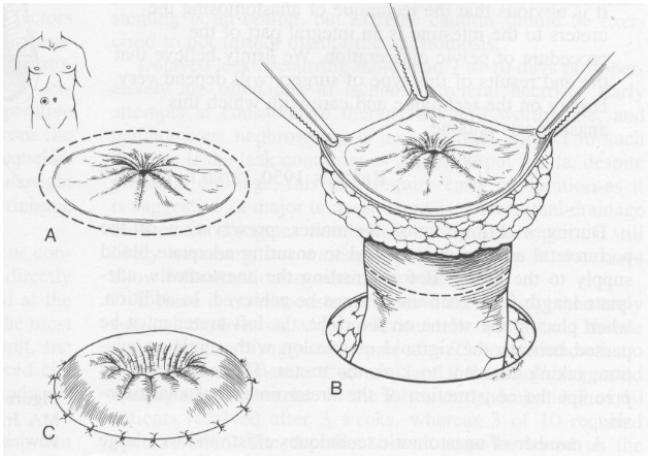
Stomal Stenosis

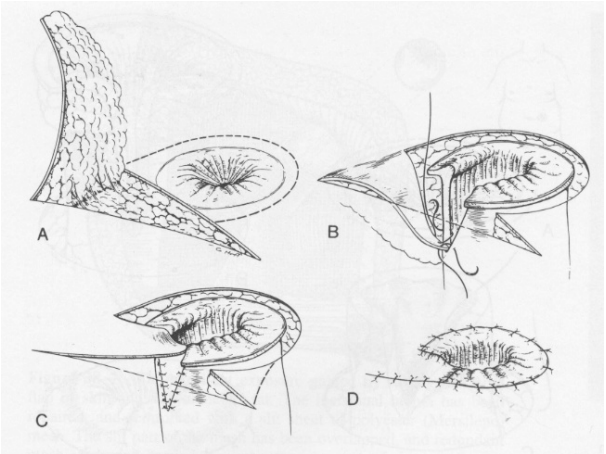


Complications of Urologic Surgery 3rd Ed.

- Incidence 2.8%-19%
- Risks muscular constriction, decreased blood supply, alkaline urine, increased skin reaction around the stoma, obesity, post operative abdominal distention
- Symptoms—skin ulceration from poorly fitting device
- Prevention
  - Device should be no more than 1/16 to 1/8 inch larger than the stoma to minimize skin contact

Stomal Stenosis Treatment





Complications of Urologic Surgery 3rd Ed.

- Can be done at the level of the skin
- The entire stoma is freed and the affected portion removed and the stoma is re fashioned
- Incomplete stenosis with rotation flap

Stoma Retraction

- Stoma is drawn or pulled back below the skin level
- Etiology
  - tension of the support structures of the bowel (mesentery)
  - necrosis of the tip of the stoma
  - chronic irritation
  - excessive weight gain
- Convex pouching systems
- Belts

http://www.allaboutbowelsurgery.org

Detachment

http://www.securicaremedical.co.uk/ostomy-advice.asp

- Separation of the stoma mucosa from the skin
- Mechanism
  - poor wound healing
  - retraction of the stoma
  - problems during surgery
  - immunocompromise
- Treatment
  - good wound care
  - It may burn or be painful during this time
  - With extensive involvement, surgery may be required

Lacerations

- Lines across the stoma may be from an ill fitting faceplate which cuts into the stoma, rubbing of the stoma on the bag
- Shallow or deep
- Lack of pain because the bowel does not respond unless stretched
- Treatment—modification of the pouching system

Bleeding

- Early post op bleeding
- Luminal bleeding
  - Crystals, irritation from inflammation
  - Crohn's disease
  - Polyps in colon conduits
  - Portal hypertension
- Hematuria
  - Recurrence of transitional cell carcinoma
- Medications—warfarin, aspirin, Plavix

Skin Irritation

- Irritation from an alkaline urine causes encrustation, stoma tissue changes, eventually stoma stenosis
- Bacterial and fungal infections may occur
- Symptoms—Skin redness, erosions, maceration
- Severe cases can cause a pseudoverrucous lesion

Skin Irritation

- Vitamin C 500 mg four times a day
- Acetic acid washes (put on a 4 x 4 and allow to sit on the stoma) twice a day
- Treatment is altering the pouching system to allow the skin to heal
- Early local skin care and acidification of urine can prevent

Mechanical Irritation/Skin Trauma

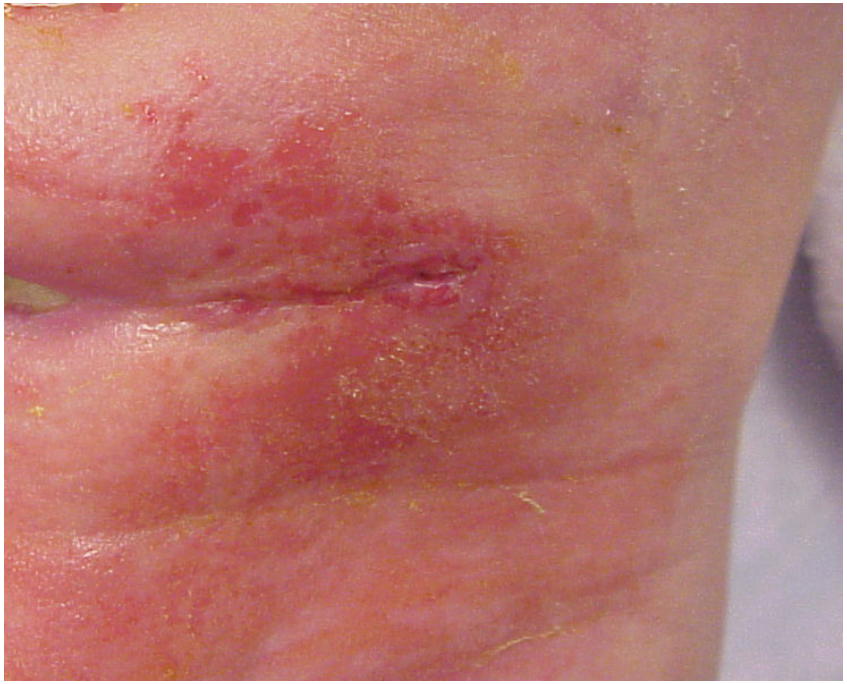
- Injury to skin
  - Occurs from pressure, rubbing, or tearing
  - Friction from rubbing against the faceplate, clothing
  - Stripping occurs when the faceplate is removed and can take off the top layers of the skin
- Symptoms—irritation, erosions, scales, patches, crusts and ulcers
- Treatment—wound care and eliminating the source of trauma
- Details—increased wear time, using skin barriers and reducing irritant exposure

Infections

- Caused by bacteria, viruses, fungus
- Folliculitis—infection of the hair follicle
  - Redness in the hair follicles
  - Hair removal, antibiotics

http://allaboutbowelsurgery.org

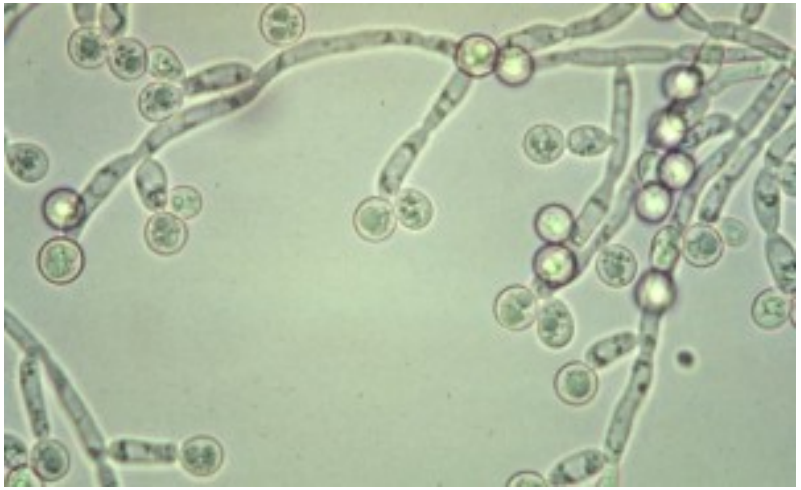
Infections—Cellulitis



- Infection of the skin and sub surface layers
  - Symptoms—red, swollen, warm and may be intensely painful
  - Treatment—identify the organism and treat with antibiotics

Medscape Stomas of the Small and Large Intestine Treatment & Management

Infections—Fungal



- Most common is *Candida albicans*
  - Bright red itchy rash
  - Treatment—drying the skin and applying anti fungal powders, barrier creams

http://dermnetnz.org/dermatitis/napkin-dermatitis.html

Pre existing Skin Diseases

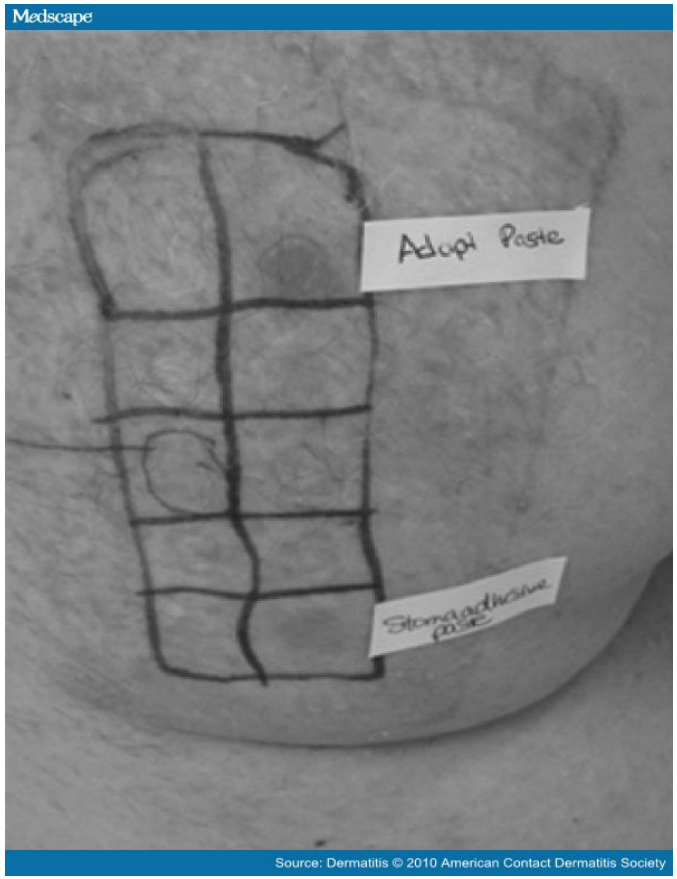
- Most are diagnosed by a dermatologist
- Psoriasis is an autoimmune disease that appears to have angry red plaques and scaling
- Seborrheic dermatitis
  - Symptoms—scaly, red rash and involves areas away from the stoma as well as the peristomal skin
- Eczema—disease which is found in places other than the stoma
  - It is marked by an itchy rash

Allergic Contact Dermatitis

- Rare immunologic reaction to a specific product or part of the pouching system
- Subsequent contact with allergen triggers antibody release
- The skin is red where it has been in contact
  - Symptoms—red, swollen, eroded and weepy skin
  - Sometime it can itch, sting, burn and bleed

http://hardinmd.lib.uiowa.edu/dermnet/dermatitisallergic6.html

Allergic Contact Dermatitis



Medscape Stoma Dermatitis: Prevalent but Often Overlooked: Allergic Contact Dermatitis Case Reviews

- Diagnosis—dermatologist will skin test to identify the specific ingredient
- Treatment
  - Removing the offending agent
  - using an alternative product
- Most modern supplies are designed to be hypoallergenic

Conclusion

Complications of urinary diversion and their management

Gamal M. Ghoniem, MD, FACS15

minutes/exclude stoma

General Complications

- Like any major abdominal procedure, augmentation cystoplasty has cardiovascular, thrombo-embolic, respiratory and gastrointestinal complications.

Complications

- Fistulas (skin, bowel, urethra)
- Infection
- Wound dehiscence
- hernia
- Bowel obstruction
- rupture
- Intestinal stenosis
- Stomal complications
- Ureterointestinal anastemosis
- Pyelonephritis
- Metabolic
- Cancer

How to prevent Complications

- ✓ Procedure should be performed by a **high-volume surgeon/center**
- ✓ **Low-pressure,** compliant reservoir
  - ✓ **Use ileum** whenever possible
  - ✓ **Maximum detubularisation**
  - ✓ Use a **stented, freely refluxive** ileoureterostomy
- ✓ **High complications rate**
- ✓ **Familiarity** with diversion techniques
- ✓ **Close follow-up**

Other complications:

- Altered MS
  - Secondary to ↓Mg, drug intoxication, abnormal ammonia metabolism.
- Abnormal drug absorption
- Osteomalacia
  - Secondary to acidosis
- Infection
- Stone formation (usually struvite)
- Intestinal motility abnormalities
- Cancer development
- Abnormal growth and development in kids

Metabolic Complications:

- Ileum or colon
  - Hyperchloremic metabolic acidosis
- Jejunum
  - Hyponatremic, hypochloremic, hyperkalemic metabolic acidosis and azotemia.
- Stomach
  - Hypochloremic metabolic alkalosis

Metabolic Complications

- Reabsorption of ammonia and ammonium chloride by the intestinal segment produces hyperchloremic metabolic acidosis that is manifested by patient weakness, fatigue, polydepsia and anorexia. The severity of hyperchloremic metabolic acidosis depends on the period of contact between urine and the intestinal segment, the area of gut used, and the absorptive charactertirs of the gut segments.
- Chronic metabolic acidosis causes mobilization of calcium carbonate from bone. The carbonate combines with hydrogen while the calcium is excreted in urine. Mitchell and Piser noted that acidosis was rare if the patient's renal function was normal. Patients with acidosis should receive bicarbonate therapy.
- In cases of gastrocystoplasty, gastric mucosa acts as a barrier to chloride and acid resorption. However, the secretory nature of the gastric mucosa may result in hypochloremic metabolic alkalosis, hypergastrinemia,[2] hematuria-dysuria syndrome, and peptic ulceration of the bladder. The symptoms of hematuria and dysuria respond well to H_2 blockers and hydrogen ion pump blockers.

Mucous

- Intestinal segments continue to produce mucus after being augmented to the urinary bladder, and the mucus can impair bladder drainage. Colonic segments produce 50% more mucus than ileum.
- Mucus can predispose to infection, stone formation, and bladder obstruction and can contribute indirectly to bladder perforation.
- Routine bladder irrigation to prevent mucus accumulation and related complications are recommended.
- Oral ranitidine can decrease mucus production, while acetylcysteine can dissolve excess mucus.

Stone Formation

- Risk factors:
  - clean intermittent catheterization (CIC)
  - urinary stasis in the augmented bladder
  - bacteriuria with urease-producing bacteria
  - hypocitraturia
  - mucus and the presence of intravesical foreign bodies such as staples, synthetic mesh.
- To avoid stone formation:
  - It is necessary to empty the bladder completely
  - Irrigate the bladder routinely to avoid mucus accumulation
  - Avoid the use of permanent sutures synthetics or staples in surgery
  - treat any infection with a urea-splitting organism.

If stones are detected, it is necessary to remove them completely, either endoscopically or by open surgery.

Urinary Tract Infections

- Asymptomatic bacteriuria following enterocystoplasty is common due to the use of CIC, the presence of mucus, and a large residual urine.
- Symptomatic urinary tract infection is reported between 8-23% depending on the different gastrointestinal segments used for bladder augmentation.
- Not every episode of asymptomatic bacteriuria needs treatment. Treatment should be considered in symptomatic bacteriuria that includes pain, hematuria, incontinence, increased mucus, foul-smelling urine or if the urine culture indicates a urea-splitting organism.

Perforations

- Bladder perforation is a rare complication. It may be secondary to:
  - traumatic catheterization
  - detrusor hyperreflexia
  - local ischemic necrosis at the site of junction between the bowel and the bladder
  - chronic urinary tract infection with transmural infection of the bowel wall.
- The patient usually presents with abdominal pain, distension, fever, nausea, vomiting, and decreased urine output. Patients with neurogenic dysfunction may present later in the course of illness due to their impaired sensation abilities.
- Contrast cystography, ultrasonography, and computed tomography can confirm the diagnosis.
- Conservative management should be considered in a stable patient with sterile urine. It consists of catheter drainage, antibiotics, and serial abdominal examination, and has a success rate of 87%.[45] The definite treatment is surgical exploration and repair.

Malignancy Transformation

- The development of malignancy in an augmented bladder is rare and is usually associated with urine stasis, chronic inflammation, and recurrent urinary tract infection.
- Malignancy needs a long latent period (>10 years) to develop in an augmented bladder.
- The tumor usually develops in the region of the anastomosis between the bowel and the bladder.

Notes

Record your notes from the workshop here