Balancing Act: Urogynecological Surgeries and Bladder Function

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Disclosure

- Commercial Interest
  - None
- Off Label Usage
  - None

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Objectives

- Review the most common surgical procedures for pelvic organ prolapse and urinary incontinence.
- Discussed the etiology and management of postoperative urinary retention.

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Pelvic Organ Prolapse
The Facts

- Lifetime risk of POP surgery is 7% by age 80.
- Repeat surgery (for POP or UI):
  - 13% by 5 years
  - 29% over a patients lifetime
- Anterior vaginal prolapse is most common and most likely to recur.
- Major risk factors for POP: Age, vaginal parity, obesity, prior hysterectomy.

Olsen, Obstet Gynecol 1997

Clark, AJOG 2003

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Traditional anatomical site prolapse classification

- Urethrocele: Prolapse of the anterior vaginal wall involving the urethra only
- Cystocele: Prolapse of the upper anterior vaginal wall involving the bladder
- Enterocele: Small bowel hernia through vaginal walls
- Rectocele: Prolapse of the posterior vaginal wall involving the rectum

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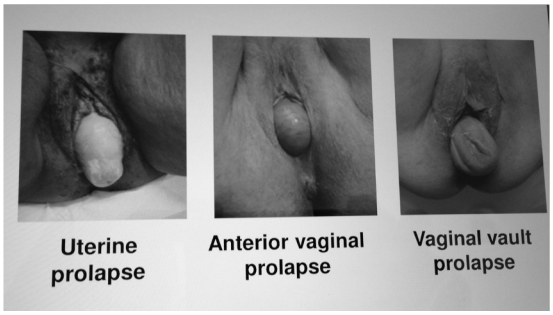
Are these the same?



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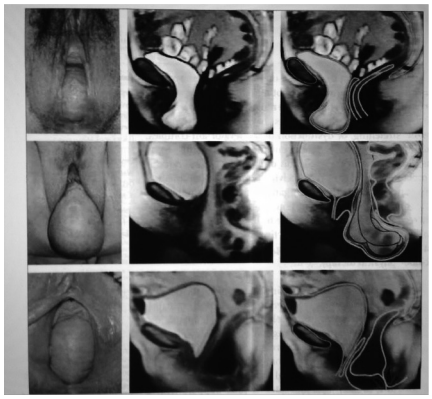

Jelovsek, Lancet 2007

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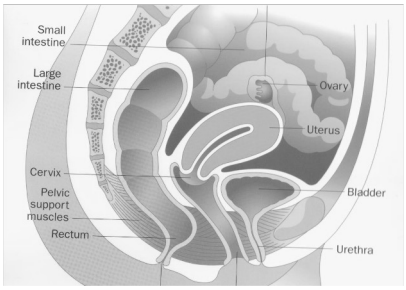
Normal Pelvic Anatomy



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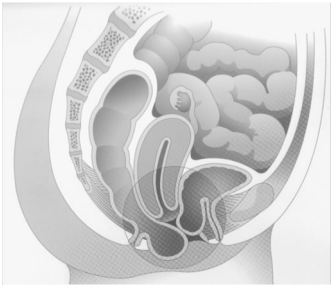
Pelvic Organ Prolapse



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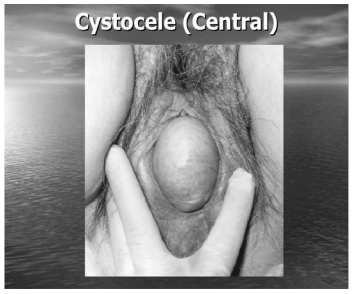
Cystocele



Rectocele

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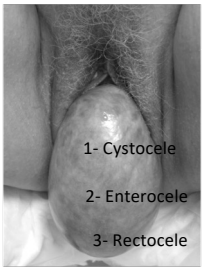
UV Prolapse

Vault prolapse



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Goals of Vaginal Reconstruction

- Improvement of Symptoms
- Restore Anatomy
- Maintain or restore normal bowel and bladder function
- Maintain vaginal capacity for sexual intercourse
- Durability

REQUIREMENTS

- Understand the normal anatomic support
- Understand the normal physiologic function of the vagina, bladder and rectum

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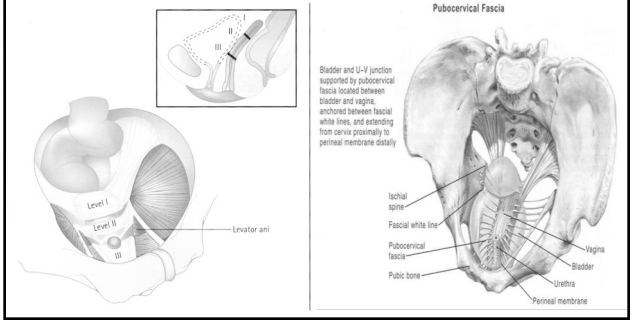
Normal Support of Pelvic Viscera



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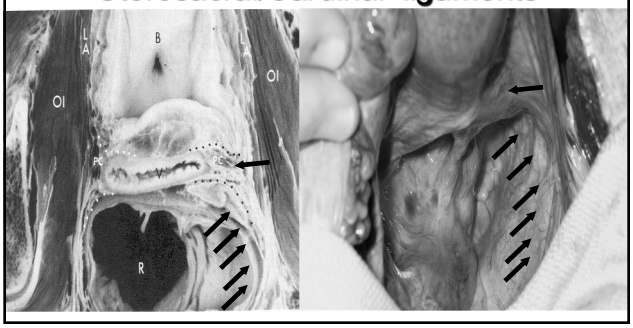
Level I Support – Vaginal Apex Uterosacral/Cardinal ligaments



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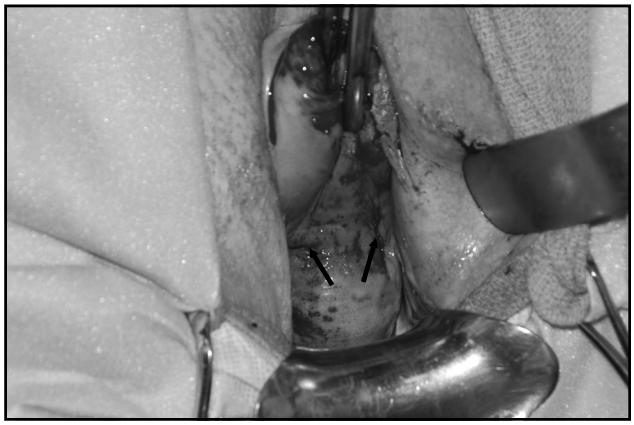

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Procedures to correct apical prolapse and enterocele
Level I Support

- Vaginal (native tissue repair):
  - McCall culdoplasty, Uterosacral ligament suspension (USLS), Sacrospinous ligament fixation (SSLF), Iliococcygeus VVS, Colpectomy and Colpocleisis.
- Sacrocolpopexy:
  - Laparotomy/open (ASC), laparoscopic (LSC), robotic-assisted.

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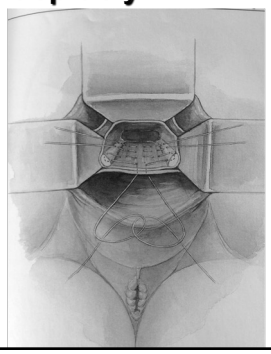
McCall culdoplasty

- Cul-de-sac plicated between the uterosacral ligaments
- Internal and external McCall sutures are placed
- External suture incorporates vaginal wall
- Ideal for ALL Vag Hys



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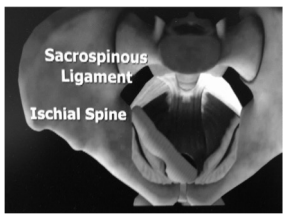
Sacrospinous ligament fixation

- May be accessed anteriorly or posteriorly
- C-SSL complex
- Miya hook or Capio
- 2 fingerbreaths medial to ischial spine
- Uni or bilateral
- Extraperitoneal



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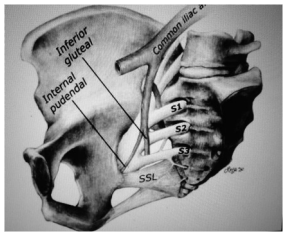
Complications of SSLF

- Bleeding: Inferior gluteal vessels, hypogastric venous plexus, internal pudendal vessels.
- Buttock pain: 10-15%, self limited.
- Recurrent anterior wall prolapse (6-28%)



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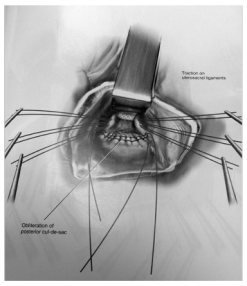
Uterosacral ligament suspension

- "Intraperitoneal"
- Appropriate packing, exposure
- 2-3 delayed absorbable sutures
- Highest suture at ischial spines
- Distal plication



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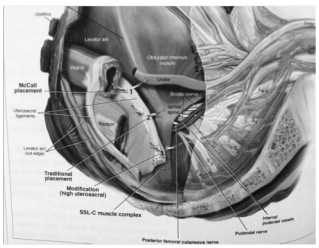
Complications of USLS

- Ureteral injury or kinking (2-11%, most obstructions relieved intraop)
- Neuropathic pain in the buttock, thigh or perineum (4%)



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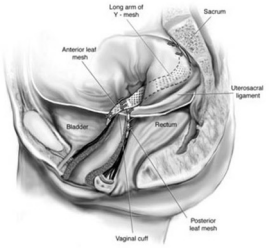
Sacrocolpopexy

- Suspends the upper vagina to the sacral promontory with synthetic mesh.
- Open, laparoscopic or robotic assisted.



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Sacrocolpopexy

- 14% rate of mesh erosion when done with TAH (supracervical hyst preferable, but discuss R/B)
- Previously thought to have one of the highest long-term success rates (78-100% Nygaard, Obstet Gynecol 2004).
- Laparoscopic approach assoc. with less blood loss and shorter hospital stay vs open.
- Laparoscopic vs robotic: Similar outcomes at 1 year. Robot = ↑ OR times, $$$, pain with activity 3-5 weeks post-op.

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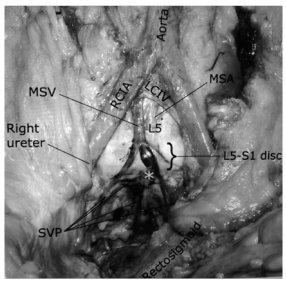
Sacrocolpopexy complications

- Bleeding
- Mesh erosion (3.4%)
- Bowel obstruction (1.1%)
- Prolapse recurrence



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Obliterative procedures for POP

- LeFort partial colpocleisis
  - Uterus preserved; best if symmetric complete procidentia
- Complete colepectomy and colpocleisis
- Distal levatorplasty and perineorrhaphy

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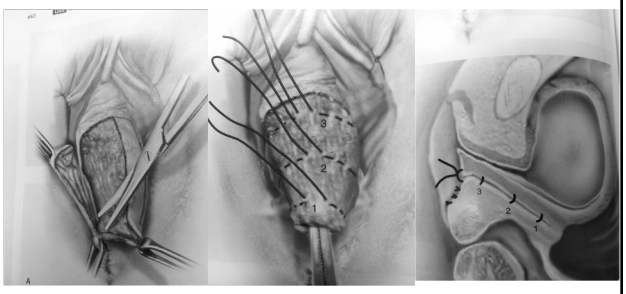
Colpectomy and colpocleisis



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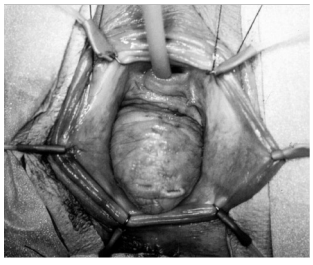
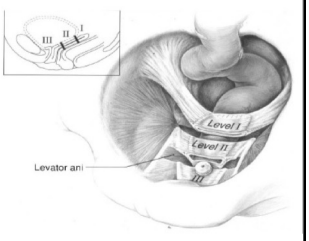
Mid-Vaginal support
Level II Support – "Pubocervical "Fascia""





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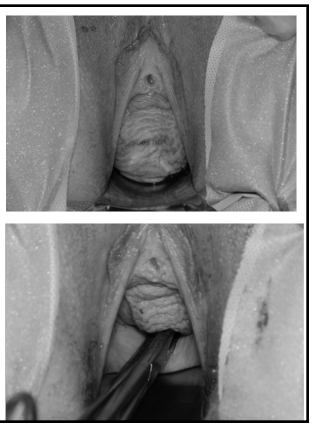
- 60% of anterior vaginal wall descent is explained by apical descent.



Summers et al. Am J Obstet Gynecol. 2006 May; 194(5): 1438–1443.

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Procedures to correct anterior prolapse Level II Support

- Anterior colporrhaphy
- Anterior vaginal repair with graft
  - – Absorbable, biologic, permanent
- Paravaginal repair
  - – Open, laparoscopic, vaginal

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Anterior Colporrhaphy

- Objective is to plicate the layers of vaginal muscularis and adventitia overlaying the bladder (pubocervical fascia) to reduce the protrusion of the bladder and vagina.
- Lateral dissection ?
- Placement of sutures ?
- Additional layers (natural or synthetic) ?

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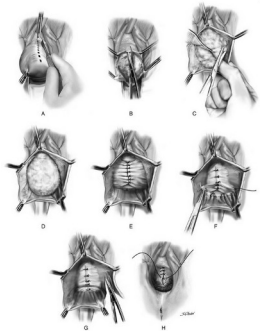
Anterior colporrhaphy



- Hydrodissection
- Midline vaginal incision to the level of the midurethra or bladder neck.
- Sharp dissection of the pubocervical fascia mobilizing the cystocele off the vaginal wall.

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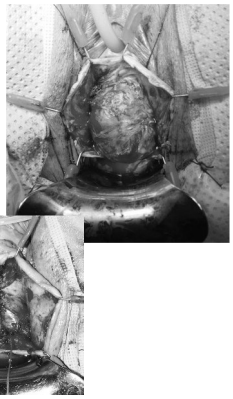
Anterior colporrhaphy

- 0 delayed absrobable sutures placed in the vaginal tissue (muscularis and adventitia) medial to the vaginal flaps.
- Midline plication without tension.
- One or two layers, purse-string and plication.
- Trimming of vaginal epithelium.



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Procedures to correct posterior prolapse Level II-III Support

- Traditional posterior colporrhaphy
  - Midline fascial plication
- Site-specific rectocele repair
- Transanal rectocele repair
- Posterior repair with graft augmentation
- Perineorrhaphy
- Sacrocolpopexy with posterior mesh extension

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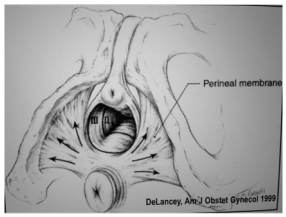
Anatomic support posterior wall

- Level 2-3 support
- Perineal body
- Vaginal muscularis
  - Rectovaginal fascia ?
- Levator ani attachment
- The rectal wall



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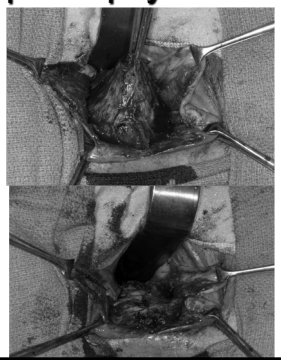
Posterior colporrhaphy

- Midline fascial plication
- Anatomic success 83% (73-96%)
- Post-op dyspareunia 18% (Baseline dyspareunia high in POP pts)
- Bowel symptoms (splinting, incomplete emptying) improve in 2/3



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Summary POSTERIOR compartment

- Bowel symtoms
  - 2/3 improve or resolve
  - 11% develop new symptoms
  - 50% will have one or more persistent symptom
- Post-op dyspareunia: 18%
- Traditional fascial plication > objective outcomes than site-specific repair
- No benefit from mesh or xenografts
- Transvaginal supperior to transrectal approach

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Summary ANTERIOR compartment

- Anterior colporrhaphy (AC) success rates 30-90%
- Subjective success rates of AC significantly better than anatomic success.
- Biologic grafts compared to AC: Improved anatomic outcomes with no change in subjective outcomes.
- Consistent level 1 higher anatomic outcomes for PPM vs AC. But no diff. in QOL or reoperation rates for prolapse.
- Mesh group: ↑OR times, ↑blood losss, 10% erosion.

Maher et al, 5th ICI, 2013

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Summary APICAL compartment

- Sacrocolpopexy vs SSLF
  - Lower rate for recurrent vault prolapse
  - Less dyspareunia
  - Longer OR time
  - Longer time to recovery
  - More expensive
- Traditional vaginal repairs
  - Highest reoperation rate for prolapse recurrence
  - Lowest rates of complications that require intervention
  - Lowest total reoperation rate

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Conclusions

- There is sufficient evidence to support recommendations for some, but not all, decisions regarding the route of POP surgery. for selection of the route of surgery.
- Procedures should be tailored to the patient and her specific defects as well as functional derangements.
- Need to consider risk factors for failure, medical condition of the patient, risk of abdominal surgery in obesity or the frail elderly, and prior failed procedures for POP.

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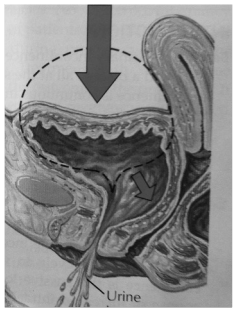
Stress Incontinence

- Loss of urine during increased abdominal pressure (coughing, lifting, exercise)
- Failure of the urethra to maintain watertight seal
- Basic mechanisms:
  - Poor urethral support
  - Intrinsic sphincter deficiency



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SUI Surgery: History

- First urethral sling described by VonGiordano (gracilis muscle).
- Fascia lata sling (Price, 1933).
- Rectus fascia sling (Aldridge, 1942).
- Bladder-neck suspension (Marshall et al., 1949)
- Needle suspension procedures (Pereyra, Raz, Stamey)
- Modified retropubic suspension (Burch, 1961)
- Pubovaginal sling, autologous graft (McGuire and Lytton, 1978)

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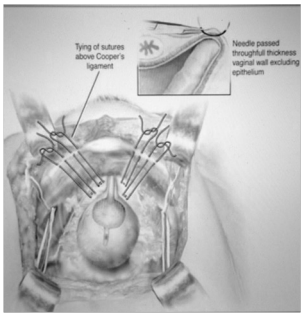
Burch Colposuspension



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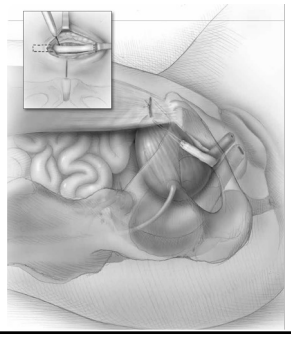
ARFS (Pubovaginal sling)



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Midurethral sling

Original Article

An Ambulatory Surgical Procedure Under Local Anesthesia for Treatment of Female Urinary Incontinence

U. Ulmsten, L. Henriksson, P. Johnson and G. Varhos
Department of Obstetrics and Gynecology, Akademiska Sjukhuset, Uppsala University, Uppsala, Sweden

- Ulmsten, 1996
- Minimal dissection
- Specific prolene tape
- Tension-free at midurethra
- No fixation

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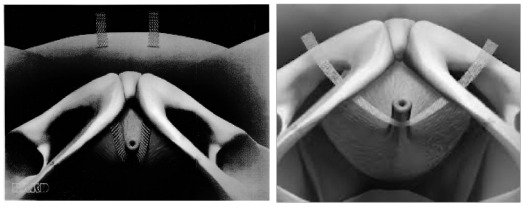
Retropubic or Obturator



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Systematic review and meta-analysis: Retropubic vs Obturator MUS

- 21 RTC's
- No difference between objective and subjective cure rates.
- Decision based on surgeon comfort and expertise.
- Account for adverse events:
  - RP: ↓sling erosion, groin/leg pain, vaginal perforation.
  - TOT: ↓OR time, fewer bladder/urethral perforations, less perioperative pain, fewer UTI's, less OAB symptoms.

Schimpf, M et al. For the Society of Gynecologic Surgeons Systematic Review Group. 2013.

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Post operative urinary retention (POUR)

- Impaired voiding after procedure despite a full bladder that results in elevated post void residual (PVR > 150 mL)
- Incidence 4-13%
  - C-section/epidural 23-28%
  - Pelvic surgery 2-43%
- Slow stream, straining to void, feeling of incomplete bladder emptying, suprapubic pressure, double voiding, postural voiding.

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Risk Factors for POUR

- Age over 50 years (doubles the risk)
- History of preexisting urinary retention
- Concurrent neurologic disease
- Administration of >750 ml of IV fluids
- Duration of surgery > 2 hours
- Intraoperative anticholinergic medications (eg, atropine, glycopyrrolate)
- Use of regional anesthesia
- History of prior pelvic surgery
- Incontinence surgery or radical pelvic surgery

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Causes of POUR

- Bladder (detrusor) dysfunction
- Urethral obstruction
- Failure of pelvic floor relaxation

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Etiology of postoperative voiding dysfunction in women

Detrusor	Urethra/pelvic floor
▪ Failure to sense bladder filling • Anesthesia/narcotics • Nerve injury ◦ Surgical ◦ Acute overdistention injury • Missed cystotomy	▪ Mechanical obstruction of the urethra • Incontinence procedures • Pelvic organ prolapse • Urethral perforation/foreign body • Constipation/pelvic mass
▪ Failure to contract bladder • Anesthesia/narcotic • Nerve injury • Preexisting voiding dysfunction	▪ Functional obstruction of the urethra • Failure to relax the pelvic floor

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Abnormal bladder (detrusor) function

- Preexisting voiding dysfunction
  - Preop PVR > 150 mL
- Anesthetic agents
  - Higher with spinal/epidural vs general
- Nerve injury from surgery
  - Radical hysterectomy or low anterior resection
  - Risk is the same for total vs supracervical or open v laparoscopic.

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Abnormal bladder function Cont/…

- Cystotomy
- Bladder overdistention injury
  - Defined as >120% of normal bladder capacity for 24 hrs or more.
  - Bladder wall ischemia occurs as early as 30 minutes during acute overdistention.
  - Reperfusion injury causes ongoing bladder dysfunction.

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Urethral obstruction

- Transient obstruction: packing, edema
- Sling obstruction
  - Slow urinary stream, incomplete bladder emptying, elevated PVR.
  - Incidence 4-8%
  - Risk is higher with fascial slings > Burch > retropubic > transobturator
- Urethral foreign body
  - Pain, slow stream and interrupted voiding
  - Suture or eroded sling

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Constipation

- Mass effect
- Decreased bladder pressure and increased urethral tone (rectal-vesico urethral reflex)

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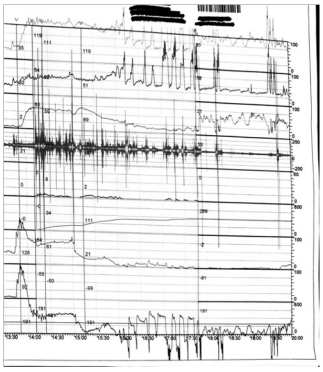
Valsava voiding



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Voiding trials

- Retrograde
  - Retrograde fill with 300 ml or capacity
  - Void within 15 min
  - Success defined as PVR <100 mL or ability to void two-thirds or greater than total bladder volume.
- Spontaneous voiding trial
- Ultrasound assessment limitations: Body habitus, surgical incision, presence of ascites.

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Management

- Prevent constipation
- Maximize ability to void (no bed pad)
- Exclude cystotomy
- Indwelling Foley vs CIC
- Medications do not appear to be helpful in this setting (Buckley BS, Lapitan MC. Drugs for treatment of urinary retention after surgery in adults. Cochrane Database Syst Rev. 2010 Oct 6;(10):CD008023. doi: 10.1002/14651858.CD008023.pub2. PMID: 20927768)
- Tamsulosin ? (Chapman GC, Sheyn D, Slopnick EA, Roberts K, El-Nashar SA, Henderson JW, Mangel J, Hijaz AK, Pollard RR, Mahajan ST. Tamsulosin vs placebo to prevent postoperative urinary retention following female pelvic reconstructive surgery: a multicenter randomized controlled trial. Am J Obstet Gynecol. 2021 Sep;225(3):274.e1-274.e11)

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Persistent postoperative voiding dysfunction

- Evaluate for hypertonic pelvic floor
- Evaluate for prolapse
- Incision of midurethral sling
  - Timing is unclear
    - 1-2 weeks after MUS
    - 1-2 months after fascial slings

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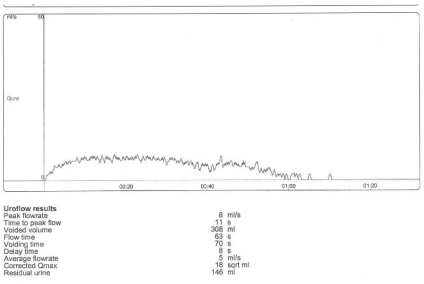
Role of urodynamic testing



Uroflow results	
Peak flowrate	8 ml/s
Time to peak flow	11 s
Voided volume	308 ml
Flow time	63 s
Voiding time	70 s
Delay time	8 s
Average flowrate	5 ml/s
Corrected Qmax	18 sqrt ml
Residual urine	146 ml

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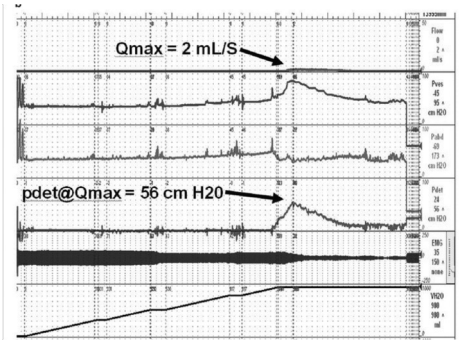
Bladder outlet obstruction



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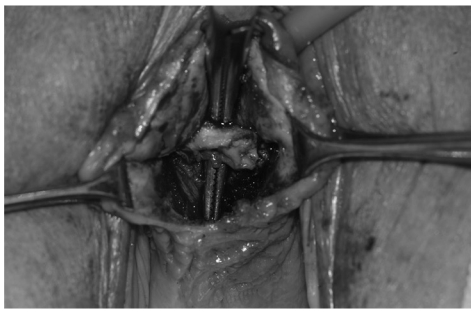
Postoperative voiding dysfunction



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Postoperative voiding dysfunction

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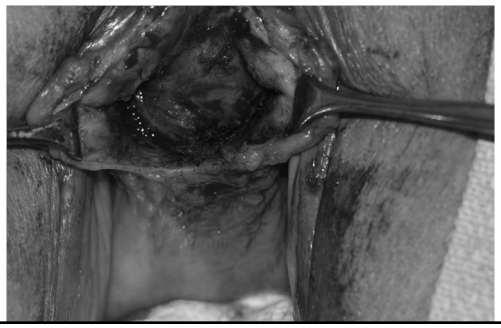
Postoperative voiding dysfunction



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Complications of untreated retention

- Overdistention injury
- Detrusor overactivity and incontinence

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Thanks!
Gracias!

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