Urinary Incontinence

• Any involuntary loss of urine
• Demonstrated objectively
• Social or hygienic problem
• US - $10 billion annually
• Stress incontinence
  – Prevalence 8-33%
  – Treatment success variable definition (validated questionnaire, pad test, urodynamic, “improvement”)

Pathophysiology of SUI

Pelvic floor muscle training

• Reduces SUI but infrequently cures
• Biofeedback has no additional benefit
• Non-invasive and low risk
• Refer therapist for PFMT

Weight loss

• 1 RCT: patients with BMI > 36
• 8% reduction in BW vs control (1% reduction)
  – More patients with weight loss showed significant reduction (>70% reduction) in incontinence episodes at 6 months
  – Difficult to maintain weight loss
Duloxetine

- Balanced serotonin and norepinephrine reuptake inhibitor
  - Stimulate pudendal motor neurons and increase striated sphincter contractility
- 1 RCT showed significant reduction in UI episodes (50% vs 27%)
  - Nausea is the commonest side effect
- Europe – approved for SUI
- US FDA – NOT approved

Urethral bulking agent

- "Minimal invasive" treatment for Intrinsic Sphincter Deficiency
- Lower success rate c/w open surgery
- Risks of allergy (collagen), migration (Teflon), erosion, retreatment
- Collagen, almost historical (approved in 1993)
  - Allergic 4% (skin test)
  - Reabsorption and retreatment
- Macroplastique and Coaptite (synthetic)
  - Durable
  - No migration
- Macroplastique for ISD
  - RCT of Macroplastique vs Collagen
    - Improvement/ Cure at 12 months: 61.5%/ 36.9%
      (Macroplastique) vs 48%/ 24.8% (Collagen)
  - RCT of Pubovaginal sling vs Macroplastique
    - Objective cure at 6 months: 81% after sling vs 9% after Macroplastique

Anterior Repair (Colporrhaphy)

- Vaginal approach to tackle urethral hypermobility and cystocele
  - Kelly’s plication + cystocele repair
- 2x failure rate (29-38%) compared to retropubic suspension procedures (14-21%) at up to 5 years
- NOT recommended as primary treatment of SUI

Anterior repair
Bladder neck needle suspension

- Suture on needle passer passed from vagina to anterior abdominal wall
- Try to correct urethral hypermobility
- Failure rate high (29%) compared to retropubic suspension (16%) at 1 year


Open retropubic suspension

- Burch (anterior vaginal wall to ileo-pectineal ligament)
- MMK (bladder neck to pubic symphysis)
  - 1 year: 85-90% success
  - 5 year: 70% dry
- Burch has fewer surgical failure
- Effective to treat urethral hypermobility ("Gold standard")

Lapitan et al Cochrane Database Syst Rev. 2009; 2: CD002912

Laparoscopic Burch Colposuspension

- Lap vs Open Burch Colposuspension
  - Slightly worse cure rates in laparoscopic group
  - Fewer complications and shorter hospital stay in laparoscopic group

Dean et al Cochrane Database Syst Rev. 2009; 2: CD002912

Mid-urethral Synthetic Slings

- 1990s Petros and Ulmsten et al
  - Integral theory
  - "Physiologic backboard" is created by fixation of the mid-urethra to pubic bone
  - Mid-urethral support

Mid-urethral support

Retropubic TVT vs SPARC

- TVT Gynecare – bottom-up approach
- SPARC (AMS) – top-down approach
  - Cochrane review 3 RCTs
  - At 12 months follow-up
    - TVT has higher subjective cure rates (85% vs 77%)
    - TVT has higher objective cure rates (92% vs 87%)
  - Ogah et al Cochrane Database Syst Rev. 2009; 4: CD006375

Transobturator TOT vs TVT-O

- Minimize complications related to vascular and enteric structures c/w retropubic approach

  - TOT – outside-in
  - TVT-O – inside-out
    - Similar subjective and objective cure rates
    - TVT- O has less bladder injuries and voiding dysfunction
  - Latthe et al BJOG. 2007; 114:522-531

Retropubic vs Transobturator approach

‘May take RCT of 30,000 women to show the difference’


Retropubic vs Transobturator

- 2010 multi-center trial with 12-month follow-up
  - Equivalent objective success
  - Transobturator approach has more leg weakness/groin numbness
  - Richter et al NEJM 2010; 362:2066-2076

Retropubic vs Transobturator

- Small trial (208 patients) with varying degrees of SUI
  - Mild SUI: TVT-O and TVT have same outcomes
  - Severe SUI: all were cured by TVT but only 66% were cured with TVT-O
  - Araco et al Int Urogynecol J. 2008; 19:917-926
Mini-slings

- Single vaginal incision
- Self-fixating tips to obturator muscles
- TVT vs Mini-sling
  - Mini-sling has a much higher rate of persistent stress incontinence at 6 weeks and 6 months

Burch vs TVT

- Small trials only
  - Similar success
- TVT
  - Shorter operative time/ hospital stay/ costs
  - More bladder/ vaginal perforation

- Burch
  - 8x more likely to develop pelvic organ prolapse
  - only in conjunction with other pelvic procedure e.g. abdominal sacrocolpopexy

Lap Burch vs TVT

- Similar subjective cure rates
- Better objective cure rates for slings
  - Much simpler for mid-urethral sling

Mid-urethral Slings for ISD

- Abdominal leak point pressure < 60cm water
- TVT vs TOT at 6 months follow-up
  - 21% in TVT group has persistent incontinence
  - 45% in TOT group has persistent incontinence
- TVT is a better option for patients with ISD

Pubovaginal Sling PVS

- Designed to treat Intrinsic Sphincter Deficiency
- For Urethral Hypermobility: Burch vs PVS
  - Higher success for PVS
  - More voiding dysfunction/ obstruction/ urge incontinence
- For Urethral Hypermobility: PVS vs TVT
  - Similar success
  - Higher bladder injury rates after TVT
  - Higher rates of voiding dysfunction after PVS: needs longer hospitalization and higher self-catheterization rate

Pubovaginal Sling PVS

Kennelly et al J Urol. 2010; 184: 594-600
Brubaker et al NEJM 2006; 354: 1557-1566
Dean et al Cochrane Database Syst Rev. 2009; 2: CD002912
Schieritz et al Obstet Gynecol. 2008; 112: 1253-1261
Rehman et al Cochrane Database Syst Rev. 2011; 1: CD001754
Albo et al NEJM 2007; 24 (356): 2143-2155
Brubaker et al NEJM 2006; 354: 1557-1566
Synthetic mid-urethral slings are minimally invasive, safe and effective for female SUI with high leak point pressure (Urethral Hypermobility)

Cameron et al
Open Access Journal of Urology 2011:3
109-120

Different complication profiles

For Intrinsic Sphincter Deficiency, trial of pubovaginal sling vs mid-urethral sling is needed

Cameron et al
Open Access Journal of Urology 2011:3
109-120

Male SUI

• Mainly iatrogenic
• Post-Radical Prostatectomy: 2-43%
  – Frequently quoted figures at 12 months
    • 0 pad: 90%
    • 0-1 pad: 10%
    • > 1 pad: 1%
• Radiotherapy: 1-16%
• TURP 1-3%


Male SUI

• No universally accepted evaluative methods
  – Subjective pad usage
  – 24-hour pad tests
  – “eye-balling”

Besides surgery

• Penile clamps
• Urethral bulking agents
• Catheters
Before surgery

- Significant history
  - Urothelial carcinoma, urolithiasis, urethral stricture, bladder neck contracture
- Exclude infection and retention
- Normal bladder capacity and compliance
- No other urethral/ bladder pathologies
- Hand and mental capacity
- At least 6-12 months after initial events

Male Slings

- Bone-Anchored Sling
  - Direct compression of bulbar urethra
- Retrourethral Transobturator Sling
  - Angulation of bulbar urethra
- Adjustable Retropubic Sling
- Quadratic Sling

Bone Anchored Slings

- Cure 37-67%
- Improvement 10-40%
- Prognostic factors
  - Pre-op severity of incontinence
  - Prior radiation therapy
- Complications
  - Infection 2-15%, erosion 0-3%, removal 0-13%
  - De novo urgency 0-14%, pain 0-73% (resolves in 4 months)

Retrourethral Transobturator Slings

- Cure 52-74%
- Improvement 16-27%
- Complications
  - Temporary retention of urine < 2 weeks: 0-24%
  - Urethral injury: 0-3%
  - Pain: 0-34%
  - Sling removal: 0-4%

Retrourethral Transobturator Slings

- Salvage after failed AUS
  - Cure 79%
  - Improvement 21%
- Salvage after failed slings
  - Cure 35%
  - Improvement 55%

Adjustable Retropubic Sling

- Success 54-79%

- Need adjustment 10-100%

- More complications
  - Infection 5-7%, erosion 3-13%, removal 2-35%, bladder perforation 5-29%, retention 35%, pain 4-38%
Artificial Urinary Sphincter

- Popularized since 1978

- Most popular model AMS 800
  - Pump
  - Cuff of size 3.5 – 14cm
  - Reservoir in different pre-set pressures
  - Deactivation button

AUS outcomes

- Much longer mean follow-up 3 to 7.7 years
- Continent (0-1 pads) – 59-91%
- Complications
  - Urethral atrophy 4-10%, erosion 4-10%, infection 1-14%, mechanical failure 0-29%
- Most revisions are within first 36-48 months
- Long-term mechanical failure rate: 36% at 10 years

Sling or AUS

- No universally accepted standard of stratification
  - Degree of incontinence
  - Inability to function AUS
  - Prior sling or AUS
  - Patient or Surgeon preference/ expertise
  - Literature
  - Complications

AMS 800 Artificial Urinary Sphincter is the gold standard of treatment of male SUI

... since late 1990s, male sling was introduced as a surgical alternative for patients with low volume incontinence (1-3 pads/ day)

New AUS

- ZSi 375 device (Zephyr Surgical Implants, Geneva, Switzerland)
  - One-size-fit-all adjustable cuff
  - Pump and pressure-regulating tank together (pressure adjustable after insertion)
  - NO abdominal reservoir

ZSI 375 AUS

- Median follow-up 15.4 months
  - Social continence (0-1 pads/ day) 78% at 3 months, 73% at 6 months
  - Removal in 4 out of 36 patients (erosion/ infection)
...Uncommon to have complete resolution of incontinence

... patient counselling on reasonable expectations and potential complications