Pelvic Organ Prolapse Evaluation and Treatment

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1. Introduction

This article will review the current treatment of pelvic organ prolapse.

2. Keywords

pelvic organ prolapse, apical prolapse, enterocele, rectocele, cystocele, vaginal mesh

3. Definition

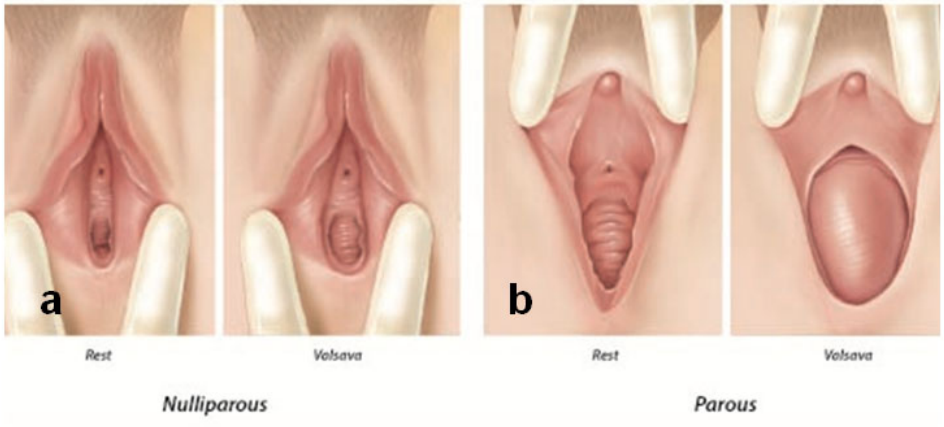
The International Urogynecological Association/International Continence Society (IUGA/ICS) joint report on the terminology of female pelvic floor dysfunction defines pelvic organ prolapse (POP) as "**the descent of one or more of the anterior vaginal wall, posterior vaginal wall, or the apex of the vagina (vaginal vault or cuff scar after hysterectomy)**". POP is a condition that occurs when the normal support of the pelvic floor has weakened.[1] The recommended terminology is anterior and posterior vaginal wall prolapse, rather than "cystocele" and "rectocele," since we cannot completely discern (on physical exam) the anatomy behind the "bulge".

4. Risk Factors and Pathophysiology

Table 1. Risk Factors Associated with POP
Vaginal Parity
Advancing Maternal Age
Infant size
Race (Caucasian or Hispanic)
Operative Delivery (Forceps, Vacuum)
Estrogen Status (use of HRT might be protective)
Pelvic Surgery
Increased Abdominal Straining (obesity, smoking, lung disease)

The risk factors commonly associated with the development of POP (**Table 1**) are **vaginal parity, advancing age, large infant size, race (Caucasian and Hispanic), operative delivery (forceps or vacuum), estrogen status and factors associated with increased abdominal straining such as obesity, chronic lung disease and cigarette smoking**.[2,3] The effect of parity is cumulative with the greatest effect occurring with the first several births.[2]

5. Epidemiology



Visual examination of the pelvic floor at rest and with Valsalva in (a) nulliparous woman with no prolapse and (b) parous woman with apical and anterior vaginal wall descent.

Figure 1: Visual Examination of the Pelvic Floor

One of the difficulties of epidemiologic studies of prolapse is that symptoms are not always correlated to the physical exam. As a result, studies that evaluate the incidence and prevalence of POP require a physical exam and a standardized system of evaluating POP. The pelvic organ prolapse quantification system (POPQ) was developed in 1996 and is the IUGA/ICS standard for reporting POP (**Table 2**).[4] Studies using the POPQ show that there is a natural loss of support as parous women age. **Less than 7% of women have ideal support and at least 50% of women will have widening of the genital hiatus and visible movement of the anterior or posterior vaginal wall when the patient is straining on physical exam** (**Figure 1**).

Table 2. POPQ Staging of Pelvic Organ Prolapse

Stage	Description
Stage 0	No prolapse
Stage I	Most distal portion of prolapse is 1cm above the level of the hymen
Stage II	Most distal portion of prolapse is 1 cm distal or proximal to the hymenal plane
Stage III	Most distal portion is more than 1 cm below the hymen but protrudes no further than 2cm less the total vaginal length (TVL)
Stage IV	Complete vaginal eversion

6. Diagnosis and Evaluation

Women may attribute an array of symptoms to POP. In general, most studies demonstrate weak to moderate correlations between the degree of prolapse and the symptoms of **pelvic pressure, back pain, pelvic pain and the sensation of a bulge**.[5,6] Likewise, numerous studies report either weak or absent association between posterior vaginal support and specific anorectal symptoms.[5] The symptoms of a **feeling of incomplete emptying, straining to defecate, splinting, and fecal urgency or incontinence** often predate the finding of POP and may be secondary to pelvic floor neuropathy.[7] **The symptom that is consistently associated with objective evidence of prolapse is the presence of a bulge outside the hymen.**[8] Women with POP that extends beyond the hymen may also report **voiding dysfunction** symptoms. The mechanism is elevated urethral pressure from mechanical kinking of the urethra when the prolapse is maximally everted.[9] Physical examination of women with symptoms of POP is best done with the patient standing to optimize assessment of the prolapse. In women with prolapse undergoing **urodynamic**[10,11] evaluation, additional information on bladder function is obtained by performing the study with and without prolapse reduction.

7. Treatment

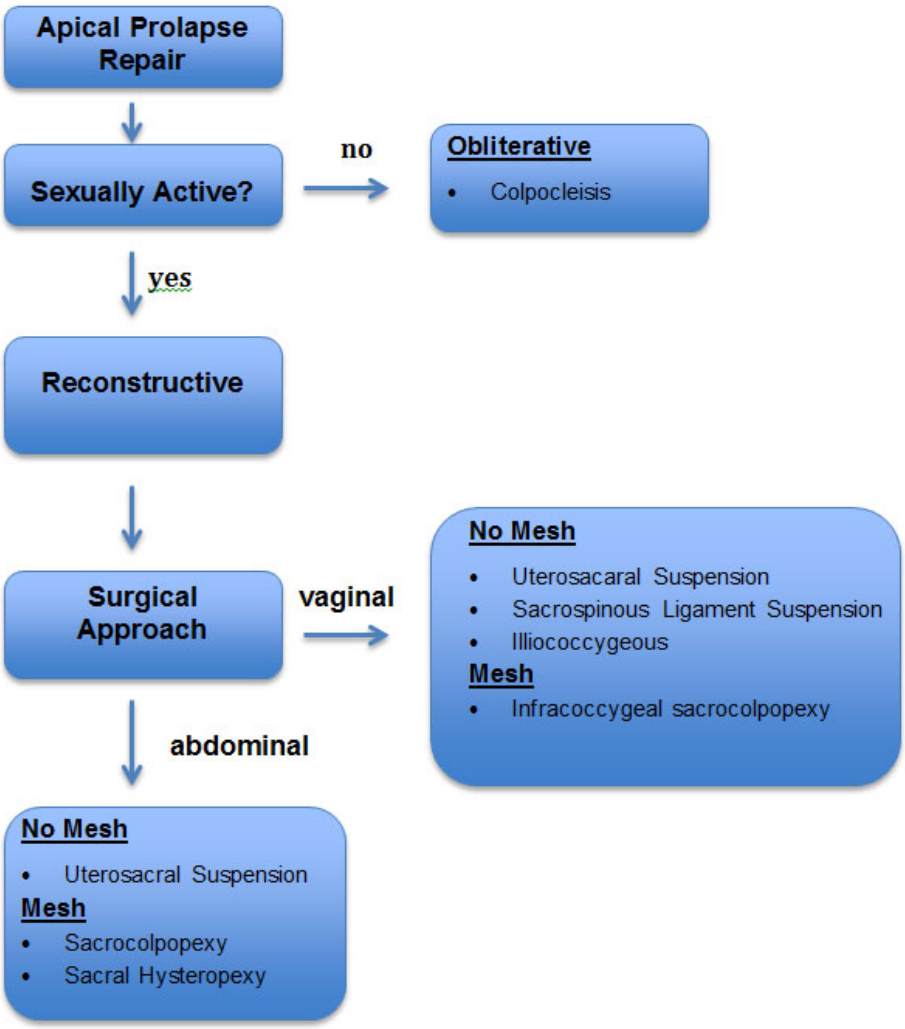


Figure 2: Algorithm for Surgical Repair of Apical Prolapse

LeFort Colpocleisis: a.) Preoperative b.) The vaginal apex is pulled down by 2 Allis clamps after dilation and cutterage ensures that the endometrial cavity has scant tissue. c. and d.) A rectangular piece of the vaginal epithelium from the anterior and posterior vaginal walls is removed. e.) The rectangular wound edges are sutured in an imbricated fashion to make tunnels that allow for uterine drainage. f.) Final view before the perineorrhapy.

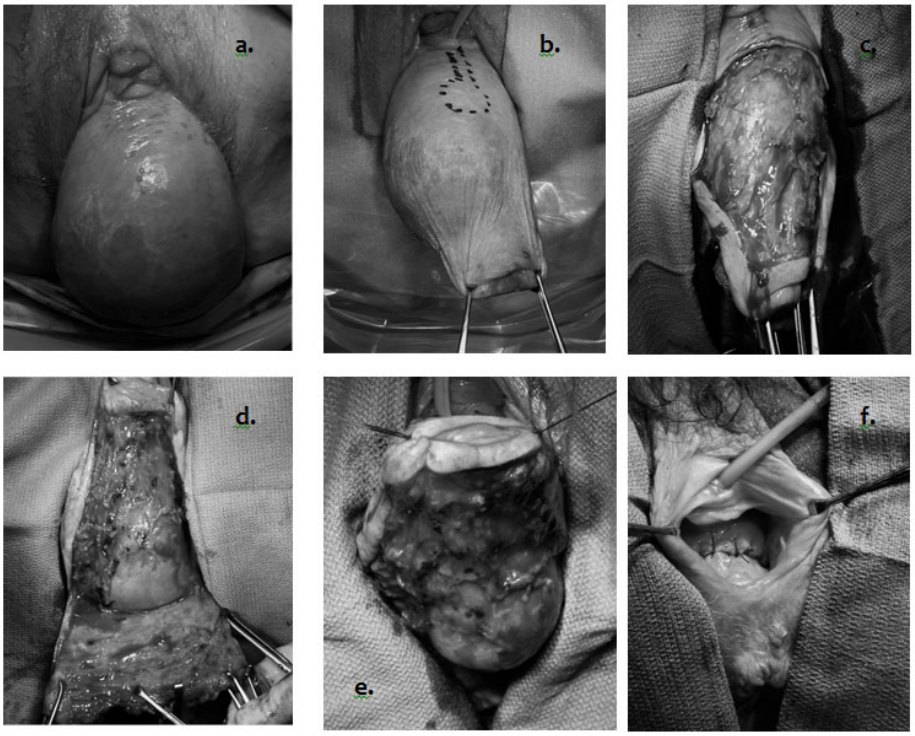


Figure 3: LeFort Colpocleisis

7.1 Conservative

Prolapse is generally life altering, not life threatening. That said, when women adjust their lifestyle to accommodate POP (such as decreased exercise), the condition is no longer simply a quality-of-life issue but can manifest health consequences. **The therapies to treat POP should not cause more harm than benefit**[12] Women who present with physical exam findings of prolapse should be asked about their level of bother related to the prolapse. **Women who are not bothered by the symptoms or physical presence of a bulge can be followed with periodic exams**. Exceptions are women who develop signs or symptoms that they may not attribute to the POP such as urinary retention resulting in overflow incontinence or recurrent symptomatic UTIs. Women rarely have severe consequences due to voiding obstruction caused by prolapse because at night, a supine position often reduces the POP and the lower urinary tract obstruction is relieved.

While the condition of pelvic organ prolapse is not improved with the use of vaginal estrogen, symptoms such a vaginal introital burning or **dyspareunia**, that are attributed to POP in post-menopausal women, can be alleviated. A 2010 Cochrane review demonstrated that the use of transvaginal estrogen in conjunction with physical therapy may reduce the incidence of post-operative cystitis within the first four weeks after surgery.[13] A typical regime consists of 200-400 micrograms of estradiol placed into the vagina before bed nightly for two weeks followed by a

maintenance dose of 100 micrograms at night twice a week.

7.1.1 Physical Therapy

When physical symptoms such as pelvic heaviness, pressure or the sensation of "something falling out of the vagina" are greater than the objective evidence of POP then women will often benefit from physical therapy. Women who undergo the proper therapy will often have no change in their POPQ evaluation following successful therapy but do demonstrate improvement in the symptoms of pelvic pressure and associated urinary incontinence.[14] Therapy consists of myofascial release and often includes strengthening of the core including the hips, back and abdomen.

7.1.2 Pessaries

Pessaries are silicone intravaginal devices designed to support POP. They are used in the daily practice of 98% of urogynecologists.[15] Pessary treatment is preferred over surgery in the frail elderly, and pessary use decreases with advanced stages of POP although this may be due to the inability to fit the patient with a pessary. Most women who are sexually active tend to prefer surgery to conservative treatments however, women who use pessaries report reduced POP-related bother symptoms and an improvement in their perception of their body image.[16] **Since pessaries can also be used for stress incontinence symptoms, they can be employed as a single treatment for both stress incontinence and POP and are useful also in short-term situations until a woman can undergo surgery**. Pessary trials can assist with guiding surgical therapy by revealing occult incontinence allowing counseling regarding concomitant treatment of stress incontinence. Women can learn to remove, clean and place pessaries unless they have physical limitations. Pessaries should be taken out and left out overnight 2-3 times a week. Women who cannot remove their pessaries themselves, can leave a pessary in continuously but require office exams every 3-6 months to assess the vaginal walls for erosion. Many practitioners will start intravaginal estrogen in the form of cream or intravaginal estradiol rings to prevent or treat erosion in patients who have no contraindication to estrogen treatment[17]

7.2 Surgical

Estimates suggest that the number of women who will undergo surgery for POP will increase by 47% over the next four decades from 166,000 procedures in 2010 to 245,970 in 2050. [18] A recent study of > 2,500 women who underwent POP repair and were followed for 2 years found that 84% were satisfied with the outcome and 90% reported an improvement compared to their pre-operative state. [19] The strongest predictive factors for success were advanced stage of POP, and the presence of a vaginal bulge. Surgical management of POP is challenging because multiple support defects frequently coexist. Several authors have demonstrated a direct relationship between significant anterior/posterior vaginal wall prolapse and vaginal apical support, and many experts would argue that adequate suspension of the apex is the cornerstone of a successful POP repair.[20,21] For that reason, we will review current procedures that are routinely used to repair apical defects of the

vagina.

Once the decision for surgical correction is made, the first decision point is whether to perform an obliterative or reconstructive procedure (**Figure 2**). **Obliterative procedures are reserved for women who no longer desire to have sexual intercourse due to their advanced age, medical comorbidities or lack of a partner who has functional erections**. On the other hand, reconstructive procedures maintain vaginal length sufficient for intercourse.

If a reconstructive procedure is chosen, the benefits, and complications of abdominal versus vaginal surgery will help direct the route of access. Next, the use of synthetic meshes may be considered followed by a discussion of risks and benefits along with the recent FDA warning about the use of synthetic mesh in reconstructive surgery. [22] Currently, as discussed below, no transvaginal mesh for POP is allowed in the US, however mesh is routinely used for abdominal procedures such as sacrocolpopexy and for stress incontinence treatments.

7.2.1 Obliterative

Colpocleisis is a highly effective transvaginal procedure with low morbidity for women with advanced apical POP who do not want to preserve the option of vaginal intercourse. The procedure can be performed in women with or without a uterus by simply modifying the technique. A total colpocleisis includes removal of the vaginal epithelium, whereas a partial colpocleisis refers to leaving some portion of the lateral vaginal epithelium to provide drainage tracts in a woman with a uterus. Critical steps of the LeFort partial colpocleisis procedure are demonstrated in **Figure 3**. Depending on patient factors, such as age, comorbidities, and prior **gynecologic history**, some surgeons advise Pap smear testing and endometrial evaluation (e.g. transvaginal sonogram, endometrial biopsy) prior to performing a colpocleisis as the vaginal tract will be obliterated after the procedure thereby precluding future testing.

In the appropriate population, the advantages of obliterative procedures compared with other types of POP surgery are shorter operative duration, decreased perioperative morbidity, and an extremely low risk of prolapse recurrence. [23,24] Reoperation rates at 1 year are 1%, and 95% of patients report being satisfied with the outcome of surgery.

7.2.2 Vaginal Reconstructive

A. Sacrospinous Ligament Suspension

The SSLS is the best-studied vaginal procedure for apical prolapse with three randomized controlled trials comparing the procedure to abdominal sacrocolpopexy ASC.[25,26,27] The procedure involves transvaginal suspension of the vaginal apex to the sacrospinous ligament with permanent or delayed absorbable sutures. The suspension is often performed with a concomitant hysterectomy, and the sutures are usually placed unilaterally although it has been described bilaterally. Prior to initiating the procedure, the surgeon must ensure that there is enough vaginal length to reach to the sacrospinous ligament without a suture bridge. Modifications of the procedure

have been described to reduce the incidence of anterior vaginal wall recurrence. [28] Anatomic cure rates after SLSS range from 63-97%.[25,26,27] One distinct advantage of the SSLS is that the dissection and suture placement are in the extraperitoneal space. The complications most often associated with SSLS are **post-operative dyspareunia, gluteal pain and anterior vaginal wall prolapse recurrence**.

B. Vaginal Uterosacral Ligament Suspension

The vaginal uterosacral ligament suspension (USLS) in a transvaginal, intraperitoneal procedure where the vaginal apex is attached to the bilateral uterosacral ligaments. Shull et al. described his modification of the procedure using three permanent sutures placed through each uterosacral ligament 1.5 cm medial and 1.5 cm posterior to the ischial spine. [29] In this study, patients often received a concomitant anterior/posterior repair. After 4 years of follow-up, 5% of patients had grade 2 or higher persistent or recurrent support defects. **Complications of the procedure are ureteral obstruction (11%), nerve injury and suture erosion. Intraoperative cystoscopy is essential once the suspension sutures are tied in place to insure ureteral patency**. A single randomized trial in 2014 compared SSLS to USLS and found that at 2 years the 2 surgeries had similar anatomic, functional and adverse event outcomes.[30]

C. Transvaginal Mesh Procedures

The use of synthetic mesh in the anterior compartment is associated with a decreased risk of recurrent prolapse on physical examination; however, this did not result in an improvement in functional or quality of life measures.[31,32] In a committee opinion drafted by the American College of Obstetrician and Gynecologists in 2017 on the topic of vaginal placement of synthetic mesh for pelvic organ prolapse, the authors concluded that “compared with native tissue anterior repair, polypropylene mesh augmentation of anterior wall prolapse repair improves anatomic and some subjective outcomes but is associated with increased morbidity” and “the use of synthetic mesh or biologic grafts in the transvaginal repair of posterior vaginal wall prolapse does not improve outcomes. [33]

Transvaginal mesh or biologic grafts are associated with unique complications not seen in POP repair with native tissue repairs.[34] The FDA updated the concern about transvaginal placement of mesh for pelvic organ prolapse in 2011 and stated that *“serious complications associated with surgical mesh for transvaginal repair of pelvic organ prolapse are not rare and it is not clear that transvaginal prolapse repair with mesh is more effective than traditional non-mesh repair”*.[22] In 2014, the FDA reclassified surgical mesh for transvaginal prolapse repair from class II to class III.[35] In 2016, the FDA finalized the order that was released in 2014 and also required premarket approval (PMA) applications, which is the agency’s most stringent device review pathway. Mesh manufacturers did this by the required date in 2018 and could keep their products on the market while the FDA reviewed their applications. By this time only 2 manufacturers remained in the marketplace. After review of the applications, the FDA halted the selling and distribution of transvaginal prolapse mesh products in April 2019, while still requiring the manufacturers to continue to study the participants

who had already enrolled in their studies. The requirement set up by the FDA was a superior outcome for surgical mesh for transvaginal repair of prolapse and a comparable safety profile to native tissue repairs. [36]

In April 2013, the NIH sponsored the Pelvic Floor Disorders Network enrolling post-menopausal women with apical prolapse into the Study of Uterine Prolapse Procedures Randomized Trial (SUPeR trial).[37] This was a 2-arm randomized study of transvaginal hysterectomy with uterosacral ligament suspension (USLS, n=90) and transvaginal hysteropexy with the Uphold LITE transvaginal mesh support system (Boston-Scientific, n=93). The primary aim of this superiority study was to detect a 10% difference in the treatment failure between the two arms (using anatomic, clinical and patient-reported outcome measures). The authors found no significant difference in the composite primary outcome with 36-month adjusted failure incidence rates of 26% for mesh hysteropexy versus 38% for native tissue apical suture suspension. Mean operative time was lower in the hysteropexy group by 41 minutes, there were more mesh exposures (8% vs 0%), no ureteral kinking managed intraoperatively (versus 7% in USLS) and less suture exposure after 12 weeks (1% versus 11%). The authors concluded “vaginal mesh hysteropexy compared with vaginal hysterectomy with uterosacral ligament suspension did not result in a significantly lower rate of the composite primary outcome after 3 years. However, imprecision in study results precludes a definite conclusion, and further research is needed.”

7.2.3 Abdominal Reconstructive

Abdominal surgery for POP, specifically the abdominal sacrocolpopexy (ASC), offers distinct advantages compared to vaginal apical POP repairs. The procedure has been well studied since Lane [38] first advocated the use of a graft between the vagina and the sacrum over 50 years ago. Since then, numerous modifications have led to the procedure as we know it today, where synthetic mesh is placed on the anterior and posterior aspects of the vagina and the free ends are suspended to anterior longitudinal ligament usually at S1-S2 (open approaches) or the sacral promontory (minimally invasive approach).[39,31] **The 2016 Cochrane review of surgery for women with apical POP included 20 RCT’s (3414 women) and concludes that sacrocolpopexy is associated with a lower risk of awareness of prolapse, recurrent prolapse on examination, repeat surgery for prolapse, post-operative SUI and dyspareunia than a variety of vaginal interventions.**[40]

Intraoperative complications during ASC are uncommon but can be life threatening. In a comprehensive review that spanned 38 years of literature published on open ASC, Nygaard[41] reports the median rates for the following intraoperative complications during ASC: **cystotomy (3%), enterotomy or proctotomy (2%), ureteral injury (1%)**. Median complication rates for the following post-operative events were: **urinary tract infection (11%), wound problems (5%), hemorrhage or transfusion (4%), ileus (4%), deep vein thrombosis or pulmonary embolism (3%), operation for small bowel obstruction (1%) and incisional hernia repair (5%)**. The overall **mesh erosion rate was 3%** (70 erosions out of 2,178 cases). Median mesh erosion rates varied by the materials used as follows; **autologous or cadaveric fascia (0%), polypropylene (0.5%), Mersilene (3%), Gortex**

(3%), Teflon (5.5%) and Marlex (5%).

Minimally invasive laparoscopic approaches of ASC may or may not use **robotic assistance**. **Two randomized trials have demonstrated similar operative times and 1-year anatomic outcomes using pure laparoscopic (LASC) and robotic-assistance (RASC)**.[42,43] Both studies also demonstrated that women experience less-post-operative pain with the laparoscopic approach.

7.2.4 Uterine Preservation at the time of Apical Prolapse Repair

In two studies enrolling over 300 women, **36-60% of participants surveyed indicated that, if given a choice, they would prefer uterine preservation at the time of prolapse repair** if it did not affect the surgical outcome.[44,45] When the scenario changed to "hysterectomy offering a superior outcome", 21% of respondents indicated that would still prefer uterine preservation. **Contraindications to uterine preservation include a history of cervical pathology, abnormal uterine bleeding, risk factors for uterine malignancy and if pre-menopausal, future pregnancy**. That said, few studies exist that compare the same surgical approach for prolapse with a hysterectomy versus uterine preservation.

A multicenter trial with 183 participants compared transvaginal mesh hysteropexy using Uphold LTE to vaginal hysterectomy with USLS.[37] Twelve-month failure rates (retreatment for prolapse, anatomic prolapse beyond the hymen, or bothersome symptoms of a vaginal bulge) were similar at 26% versus 38%, respectively. Five-year follow up data was available for 89% of participants and favored mesh hysteropexy[46] with failure rates of 37% versus 54%. These results are less clinically relevant since the FDA halted the selling and distribution of all transvaginal mesh hysteropexy kits in 2019.

A randomized trial compared two routes for hysteropexy: laparoscopic abdominal sacrohysteropexy (LAS) versus sacrospinous hysteropexy (SSH). 126 participants with POPQ ≥ 2 were enrolled and failure was defined as recurrence of POPQ ≥ 2 at 12 months.[47] LAS was non-inferior for surgical failure (1.6% vs 3.3%), resulted in more bothersome symptoms of overactive bladder and fecal incontinence, and less bother from dyspareunia. A systematic review of the literature reviewing randomized and non-randomized studies of uterine preserving surgeries for prolapse concluded that " **hysteropexies have a wide range of POP recurrence and adverse events; little data exist directly comparing different hysteropexy types…surgeons should counsel on outcomes and risks to the specific hysteropexy planned**".[48]

7.2.5 Concomitant Treatment of Stress Urinary Incontinence

Women undergoing prolapse surgery may experience stress urinary incontinence after prolapse reduction (i.e. "unmasking" stress urinary incontinence due to unkinking the urethra). Large randomized trials have demonstrated improved stress urinary incontinence outcomes after prolapse surgery when a concomitant stress urinary incontinence procedure is performed.[49,50] **However, performing concomitant stress urinary incontinence surgery presents additional surgical risk and is not necessary in all patients. Thus, many surgeons proceed on a case by case basis when it comes to performing a concomitant stress urinary**

incontinence procedure at the time of prolapse repair.[51]

8. Costs

Direct annual costs of POP surgery were US $1012 million (1997 dollars).[52] Hospitalization accounted for 71% of the costs and the remainder was physician services.

Videos

Transvaginal Colpocleisis in the Treatment of Vaginal Vault Prolapse in the Elderly Female: Surgical

Transvaginal Sacrospinous Hysteropexy

Robotic Uterosacral Ligament suspension: Proximity of the ureters and the uterosacral ligaments

Robotic Sacral Colpopexy with Concomitant Supracervical Hysterectomy

Robotic-assisted laparoscopic removal of extruded sacrocolpopexy mesh

Transabdominal Sacrocolpopexy with Rectus Fascia Graft

Sacrocolpopexy with Autologous Fascia

Surgical technique: Robotic assisted laparoscopic abdominal sacrocolpopexy

Minimally Invasive Sacrocolpopexy, Step-by-Step

Presentations

PELVIC ORGAN PROLAPSE EVALUATION AND TREATMENT Presentation 1

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