


Review

Therapeutic Options for Advanced Pelvic Organ Prolapse

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Abstract: Background: Advanced pelvic organ prolapse (POP) can have a significant impact on women's health and quality of life (QoL). Several treatments, both conservative and surgical, can be offered to patients. These include vaginal pessaries, abdominal reconstructive surgeries, vaginal reconstruction, as well as obliterative procedures. **Methods:** This is a narrative review of the management of advanced POP using the PubMed, Google Scholar, and Cochrane databases. **Results:** Gellhorn pessaries are the most used space-occupying pessaries, with good long-term success rates. The only space-occupying pessaries that allow for self-management by the patient and that could be associated with prolapse reduction are cube pessaries. Laparoscopic sacrocolpopexy (L-SCP) is the gold standard for POP surgery. Other abdominal reconstructive procedures include sacrocervicopexy (SCerP) and laparoscopic lateral suspension (LLS). The two most common vaginal reconstructive techniques are sacrospinous ligament fixation (SSLF) and uterosacral ligament suspension (USLS). Both procedures have comparable success rates. Obliterative procedures include the total, Lefort, and Labhart colpocleisis. These procedures are ideal for women who do not wish to have intercourse or who cannot tolerate extensive surgical procedures. **Conclusions:** Several therapeutic options exist for advanced POP, and most of them are associated with good long-term success rates. Treatment should be chosen based on patient comorbidities and in the context of shared decision-making.



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1. Introduction

Pelvic organ prolapse (POP) ranges from mild bulging of one or many pelvic organs to complete eversion of the vagina and uterus. The latter corresponds to procidentia, or advanced POP, and is considered a stage IV prolapse according to the Pelvic Organ Prolapse Questionnaire (POP-Q) [1].

In addition to symptoms of pelvic organ protrusion, advanced POP can have significant impacts on women's quality of life. Many patients report lower urinary tract symptoms (LUTSs), defecatory issues, as well as anxiety, fear of not being sexually desirable, fear of rejection, and shame [2]. POP, especially when severe, can also lead to complications, such as bladder outlet obstruction, detrusor underactivity, hydronephrosis, and even renal failure. The risk of hydronephrosis increases with the severity of the prolapse, but complete resolution of hydronephrosis is possible after surgical treatment of advanced prolapse [3,4].

POP affects approximately 40% of women worldwide, and its prevalence is expected to increase with the aging of the population [5]. Although they share similarities, procidentia and low-grade POP cannot be approached identically, and some treatment options for the latter may not be suitable for advanced POP.

This is a narrative review of the main therapeutic options for procidentia. We will first discuss conservative measures, such as pelvic floor muscle training (PFMT) and vaginal pessaries. We will then review the most common surgeries, including sacrocolpopexy (SCP) and sacrocervicopexy (SCerP), sacrospinous ligament suspension (SSLS), uterosacral ligament suspension (USLS), and colpocleisis.

This narrative review aims to provide a comprehensive overview of the therapeutic options available for individualized patient care. By addressing gaps in the literature and summarizing recent advancements, this article offers valuable insights for urologists, gynecologists, and other healthcare professionals involved in the care of patients with advanced POP, aiding in evidence-based decision-making and improving patient outcomes.

2. Methods

A systematic search of the MEDLINE/PubMed and Google Scholar databases was conducted to identify relevant studies published between 2000 and 2024 on the management of advanced POP. The following search terms were used: “advanced pelvic organ prolapse”, “Gellhorn pessary”, “sacrocolpopexy”, “sacrohysteropexy”, “uterosacral ligament suspension”, “sacrospinous fixation”, and “colpocleisis”. Studies were included if they reported on outcomes such as long-term anatomical success, patient satisfaction, and complication rates for both conservative and surgical interventions. Randomized controlled trials (RCTs), prospective and retrospective cohort studies, and high-quality observational studies were prioritized. Articles focusing solely on mild or moderate POP without addressing advanced cases were excluded.

2.1. Conservative Management

2.1.1. Pelvic Floor Muscle Training (PFMT)

There is little to no evidence showing that PFMT is effective in women with advanced POP, and it is therefore usually recommended for patients with mild-to-moderate prolapse [6].

2.1.2. Vaginal Pessaries

Vaginal pessaries are usually offered as a first-line management of POP and as the only option for women who are poor surgical candidates [7].

Pessaries are divided into supportive types, such as ring pessaries, and space-occupying types, including the Gellhorn, Donut, and cube pessaries. Ring pessaries are preferably used for stage I and II POP, whereas Gellhorn pessaries are reserved for stage III and IV POP.

Gellhorn pessaries are the most used space-occupying pessaries. They rarely become dislodged, as compared to ring pessaries. They create suction to the proximal vaginal wall, thus making support of the pelvic organs, even in advanced POP, more effective [8]. They have also been shown to decrease bulging and pelvic pressure sensations and could potentially improve voiding symptoms [9].

The most common complications associated with Gellhorn pessaries are discomfort, defecation difficulties, de novo stress urinary incontinence (SUI) or voiding difficulties, vaginal discharge, and abnormal vaginal bleeding [10]. Serious complications, such as cancer or fistulae, are rare. It is generally recommended to clean the pessary and perform a pelvic exam every 2 to 4 months, although reduction in the risk of fistulae with this practice has not been demonstrated in the literature [11].

Gellhorn pessaries appear to be an effective and long-term treatment for POP and can be a viable alternative to surgery [8]. Their long-term success rates vary between 47% and 75%, depending on the studies (Table 1) [12–14]. The main reasons for discontinuation are incompatibility with intercourse and difficult insertion and removal [10,15]. Prior hysterectomy, prolapse surgery, predominant anterior wall prolapse, and higher BMI appear to be associated with poorer outcomes. The reason for which a higher BMI might be associated with lower success rates is that higher abdominal pressures can lead to difficulties in retaining the pessary in the vagina [10].

Table 1. Long-term success rates * of Gellhorn pessaries for high-grade prolapse.

Study	Success Rate	Follow-Up
Chien et al. [12]	47.2%	5 years
Mao et al [14]	75.3%	5 years
Mao et al. [14]	58.3%	23.5 months

* Definition of success: continued use of pessary.

Donut pessaries are designed to fill the vaginal space. Given their shape and size, they can be useful for reducing prolapses in women with a large vaginal introitus. Compression of this type of pessary can be difficult, thus making it sometimes challenging to insert and remove [16]. Sexual intercourse is not possible, and adverse effects are similar to Gellhorn pessaries [17].

The cube pessary is another type of space-occupying pessary that can be self-managed by the patient. This pessary maintains its position by creating a vacuum effect on its six concave surfaces within the vagina and can be used for advanced POP. It is the only type of space-occupying pessary where sexual intercourse is possible. Indeed, the patient can remove and reinsert the pessary herself, and most women report self-management as being relatively easy [16,18]. A randomized controlled trial comparing Gellhorn to cube pessary use showed that the rate of pessary continuation was higher in the cube group and that self-management was associated with greater self-efficacy in the management of prolapse symptoms. In addition, because of the nightly removal of the cube pessary, the rate of vaginal complications such as erosion, bleeding, or fistula is quite low. Removal of the pessary allows for regeneration of the vaginal mucosa. Studies have also suggested that there is a potential for improvement in POP severity with time. Indeed, there appears to be downsizing of the pessary with time, and this could potentially correlate with a reduction in excess vaginal space, which is a marker of prolapse stage [19]. Success rates have been reported to be as high as 91.5% at 18 months and 82.2% at five years [18,20].

2.2. Surgery

It is estimated that the lifetime surgical risk for POP is 13%. Up to 17% of patients will undergo reoperation, and advanced POP is associated with higher prolapse recurrence [21].

Evaluating Outcomes

Measuring the success of surgery for advanced POP has proven to be challenging. Several studies do not differentiate between low- and high-grade POP when evaluating outcomes. In addition, there is no consensus regarding the definition of success for prolapse surgeries. Therefore, there is great variability in the reported treatment success rates in the current literature, and comparison between studies can be difficult [21]. Success ranges from anatomic results to subjective patient-reported outcomes, complications, and recurrence of POP. Patients may also view success very differently from clinicians and researchers, and it has been demonstrated that anatomical findings often do not correlate with patient

perception of improvement. In fact, the International Urogynecological Association (IUGA) states that patient-reported outcome measures (PROMs) are essential in defining success for POP surgeries [22].

In addition, the management of SUI at the time of POP repair is controversial. Surgical correction of POP itself can lead to resolution of SUI, and it remains difficult to predict who will benefit from a concomitant anti-incontinence procedure [23,24]. Although cure rates with concomitant anti-incontinence procedures are excellent, this puts the patients at risk of overtreatment and potentially additional, unnecessary risks [25]. Some authors have advocated for a staged procedure, which allows for re-evaluation of women after POP repair [26]. Ultimately, the decision will depend on patient goals and preferences, their level of burden, and the weighing of risks and benefits. Some surgeons also believe that patients who are relieved from a severe prolapse will be more tolerant of minor incontinence [27].

There is significant controversy concerning the use of mesh for prolapse repair. In 2011, the U.S. Food and Drug Administration raised concerns regarding the occurrence of pelvic pain and increased adverse events related to vaginal mesh use for prolapse [28]. Currently, most regulations worldwide pertain to transvaginal mesh for POP and urinary incontinence but not for abdominal procedures such as SCP and SCerP. However, this has also led to growing interest from patients and surgeons to use alternative, mesh-less treatments [29,30].

In general, surgeries for advanced POP can be divided into reconstructive and obliterative procedures. Abdominal reconstructive procedures include sacrocolpopexy (SCP), sacrocervicopexy (SCerP), and laparoscopic lateral suspension (LLS), whereas the main vaginal reconstructive procedures are sacrospinous ligament fixation (SSLF) and uterosacral ligament suspension (USLS). The most common obliterative surgeries are the total, the Labhardt, and the partial (or LeFort) colpocleisis.

3. Abdominal Reconstruction

SCP and SCerP correspond, respectively, to the suspension of the vaginal apex and uterine cervix to the anterior longitudinal ligament of the sacrum using a graft. Laparoscopic sacrocolpopexy is currently the gold standard for POP surgery, but the open, robotic, and vaginal routes can also be used [31]. Potential advantages of the robotic approach include better ergonomics, better surgeons' view, and overall ease. Robot-assisted SCP (R-SCP) and laparoscopic SCP (L-SCP) provide similar cure and complication rates, although the costs of R-SCP are higher than those of L-SCP. In their prospective, randomized, single-centre study, Iliano et al. found a 100% cure rate of the apical compartment for both procedures at 2-year follow-up [32,33]. Although fewer studies have assessed SCerP, success and complication rates appear comparable to SCP [34].

Abdominal reconstructive surgery may confer some advantage over the vaginal approach with respect to postoperative sexual function. Indeed, SCP and SCerP have been shown to preserve more vaginal length, and there appears to be less dyspareunia than with transvaginal procedures [35]. Some authors have suggested that SCP or SCerP might be especially beneficial to patients who are sexually active or those who have a shorter vaginal length [36]. However, there is evidence that shows that vaginal length itself does not have an impact on sexual activity or function [35].

There is a theory that the uterus plays a passive role in the development of prolapse and relapse after surgery, and that performing a concomitant hysterectomy at the time of SCP and SCerP could potentially improve surgical pelvic correction. In general, subtotal hysterectomy is preferred over total hysterectomy because it confers a lower risk of mesh exposure [37–40]. However, there is increasing interest towards uterine preservation by both patients and their surgeons. Potential motivating factors for patients include a desire

to maintain fertility, beliefs that the uterus is important for sexual function and a sense of self, and concerns about the risks of hysterectomy [40]. On the other hand, potential disadvantages to uterine preservation include the need to continue monitoring of the uterus and a more challenging surgery, should a subsequent hysterectomy be required [41].

A multicenter retrospective study of 88 women who either underwent L-SCP with supracervical hysterectomy or robotic sacrohysteropexy (R-SHP) was conducted by Arcieri et al. Objective cure rates were high and similar in both groups, and there was no difference in urinary and sexual function outcomes. However, subjective improvement was statistically higher in the L-SCP with hysterectomy group (Table 2) [40].

Similarly, an observational study conducted by Campagna et al. showed that both L-SCP with supracervical hysterectomy and laparoscopic sacrohysteropexy (L-SHP) have similarly high objective and subjective cure rates. They also showed that both procedures significantly improved functional outcomes, such as SUI (Table 2) [42].

Table 2. Objective and subjective success rates of SCP + supracervical hysterectomy vs. SHP for high-grade prolapse.

	Treatment	Objective Success ^a	Subjective Success ^{b,c,d}
Arcieri et al. [40]	L-SCP + supracervical hysterectomy	98.5%	97.8%
	R-SHP	96.4%	81.8%
	<i>p</i> -Value		0.034
Gracia et al. [43]	L-SCerP + subtotal hysterectomy	Apical: 90% Anterior: 66.7%	100%
	L-SHP	Apical: 46.7% Anterior: 27.6%	100%
	<i>p</i> -Value	Apical: 0.002 Anterior: 0.02	0.01
Campagna et al. [39]	L-SCP + supracervical hysterectomy	87.9%	93.1%
	L-SHP	84.6%	89.7%
	<i>p</i> -Value		0.494

^a POP-Q < 2 at follow-up (all studies). ^b Arcieri et al.: Patient Global Impression of Improvement (PGI-I) score < 3. ^c Gracia et al.: PGI-I score ≤ 3. ^d Campagna et al.: absence of bulge symptoms.

On the other hand, in their prospective observational study, Gracia et al. showed a higher subjective and objective success rate with laparoscopic SCerP (L-SCerP) with subtotal hysterectomy compared to L-SHP [43]. However, the study has been criticized because of its small sample size, where there were only 15 cases of L-SCP compared with 30 cases of L-SCerP with subtotal hysterectomy (Table 2) [40].

The most common complications associated with SCP and SCerP include de novo urinary symptoms, bowel symptoms, dyspareunia, bladder injury, hematoma, infection, and mesh erosion (although rare) [44].

There is growing interest in LLS with mesh, which is indicated for apical and anterior prolapses only. In this procedure, the arms of the mesh are suspended laterally to the vesicovaginal fascia in a tension-free manner, and the central part of the mesh is attached to the vagina. This technique avoids dissection of the sacral promontory and therefore lowers perioperative risks of neurovascular injury [45]. It is usually performed laparoscopically, but mini-laparoscopy and robotic approaches have also been described. This procedure lends itself very nicely to uterine preservation, which is increasing in popularity because of its potential benefits in terms of surgical, functional, and psychological outcomes [46,47]. A recently published review article showed average short- and long-term success rates of 90% and 80%, respectively [45]. The overall risk of mesh erosion appears quite low,

especially when using type I microporous polypropylene mesh. Mereu et al. published a series of 120 patients with advanced POP who underwent LLS with type I microporous polypropylene mesh fixed with permanent sutures, and the incidence of mesh erosion was 0.8% [46]. On the other hand, in a cohort study of 88 women with POP ≥ 2 by Chatziioannidou et al., none of the patients had erosion when this mesh was fixed with absorbable sutures. The authors argued that the use of absorbable sutures may lower the risk of erosion and that the fibrosis created by the scarring process is sufficient to provide support [47]. Unlike SCP, which diverts the physiologic axis of the vagina, LLS results in a very natural suspension of the apical compartment. It is hypothesized that preservation of the vaginal anatomy could improve pain and sexual outcomes [46].

The main intraoperative complications with these procedures include cystostomy, enterotomy or proctotomy, and ureteral injury. Postoperative complications include urinary tract infections, wound problems, mesh erosion, and hemorrhage or transfusion [48].

4. Vaginal Reconstruction

Two of the most studied vaginal reconstructive repair techniques are the SSLF and the ULS. They can be performed concomitantly with a hysterectomy or with a uterine-sparing approach. SSLF is an extraperitoneal procedure where the vaginal apex is suspended to the sacrospinous ligaments with the use of suture or graft. USLS, on the other hand, is an intraperitoneal procedure where the vaginal apex is sutured to the uterosacral ligaments. These procedures are usually performed as a transvaginal procedure through a vaginal approach. However, laparoscopic modifications or abdominal entry are also possible [31,36].

The Operations and Pelvic Muscle Training in the Management of Apical Support Loss (OPTIMAL) trial was a multicenter, randomized controlled trial that provided the first direct comparative data between ULS and SSLF [49]. In a secondary analysis of a subset of women with advanced POP from the OPTIMAL cohort, Meyer et al. found no difference in surgical success at two years (58.2% vs. 58.5% for ULS and SSLF, respectively). Improvement in prolapse symptom severity scores and complication rates was also similar in both groups. Compared to stage II POP, patients with advanced POP had lower success (58.3% vs. 73.2%) and higher retreatment rates (8.2% vs. 0%), but there was no difference in adverse events. The authors of the study also hypothesized the true success rates might be higher than what was demonstrated in their study, as they only used strict anatomic criteria to measure success. In addition, there did not appear to be a difference between ULS and SSLF success by severity of prolapse [21].

Some studies suggest that SSLF may alter the vaginal axis, potentially increasing pressure on the anterior compartment, which could lead to higher rates of anatomical recurrence. In contrast, ULS is considered more anatomically aligned. However, a recent meta-analysis comparing SSLF and ULS found that recurrence rates between the two procedures were similar. Additionally, the study showed no significant differences in anatomical success rates, regardless of POP stage. While the overall incidence of complications was comparable between SSLF and ULS, the ULS group had a higher rate of granulation tissue formation and ureteral injury.

SSLF is becoming increasingly popular due to its shorter operative time and procedural simplicity. However, there are few high-quality randomized controlled trials (RCTs) in this area, highlighting the need for further research, especially concerning complication rates [50]. Although RCTs, such as the OPTIMAL study, are ideal for comparing the surgical efficacy of different approaches, they often lack data on rare adverse events and perioperative complications. Database studies have identified the most common short-term complications associated with vaginal approaches as urinary tract infections

(UTIs), blood transfusions, surgical site infection, reoperation, dyspareunia, recurrence, and gluteal pain [51,52].

5. Obliterative Procedures

Colpocleisis is an obliterative procedure that involves the removal of the vaginal epithelium. The most common types are the partial, or LeFort colpocleisis; the total colpocleisis; and the Labhart colpocleisis. The LeFort, unlike the total colpocleisis, leaves some portion of the vaginal epithelium in place. This provides drainage tracts for cervical or other upper genital discharge [53]. It is the only obliterative procedure that can be offered if there is a desire to preserve the uterus. However, it can also be performed in cases of post-hysterectomy prolapse [54].

Obliterative procedures are ideal for women who no longer wish to have vaginal penetrative intercourse or who have multiple comorbidities and cannot tolerate more extensive surgical procedures [54,55]. Indeed, colpocleisis can be performed under local anesthesia or with a pudendal block. It also confers a lower risk of injury to nearby organs, is faster than reconstructive surgeries, and is associated with a shorter recovery time [1]. This procedure may be increasingly utilized because of the aging population [56].

The LeFort and total colpocleisis have comparable and high long-term anatomic success and patient satisfaction rates and are associated with few complications [57]. General decision regret is low and is mostly associated with persistent or de novo urinary symptoms and loss of coital ability [57,58]. Rates of loss of sexual function remain relatively low (0% to 12.9%). In fact, it has even been shown that some women might maintain or even regain sexual function. This is because colpocleisis might resolve pelvic floor dysfunction and improve body image and subjective attractiveness, which may increase sexual desire and activity. This should be taken into consideration when counselling patients for surgery [58].

In the Labhardt colpoperineocleisis, there is fusion of the lateral walls and the vaginal introitus. Although this procedure has been less studied than the Lefort colpocleisis, potential advantages include a reduced risk of de novo SUI because it only involves the posterior vagina and, therefore, does not affect the bladder neck and urethral anatomy. In addition, the Labhart procedure could provide increased support and prevent the development of an enterocele by joining the levator muscles in the midline. Finally, this technique uses the ischiocavernosus and bulbocavernosus muscles instead of the vaginal mucosa alone, thus providing additional overall support [59–61].

In a retrospective study, Sadeh et al. evaluated 188 patients with stage III or IV prolapse who underwent vaginal hysterectomy and 32 patients who had colpocleisis. Despite the fact that the patients in the colpocleisis group presented with higher comorbidity rates and higher degrees of POP, they had lower peri- and postoperative complication rates, including blood loss and urinary retention, and lower hospital stays. While objective prolapse recurrence rates were low in both groups, they were significantly lower in the colpocleisis group than in the vaginal hysterectomy group (7% vs. 0% and 21% vs. 0% for the anterior and posterior compartments, respectively) [56].

Complication rates are very low for all types of obliterative procedures. The main short-term adverse events that have been reported include UTI, rectal or bowel injury (although absent in most studies or found in single cases), and intraoperative injury to the urinary tract [57].

Similarly to SCP and SCerP, there is ongoing debate concerning the performance of concomitant hysterectomy at the time of colpocleisis. Currently, it is recommended to perform concomitant hysterectomy at the time of colpocleisis only if the patient has abnormal postmenopausal bleeding or in patients with risk factors for endometrial or cervical cancer [25,62]. Indeed, the risk of finding malignancy in hysterectomy specimens

at the time of POP repair remains very rare, but this risk increases with a history of postmenopausal bleeding. In addition, performing concomitant hysterectomy with colpocleisis is associated with an increased risk of complications, the most common being the need for blood transfusion [55,63,64].

6. Discussion

The studies reviewed provide valuable insights into the outcomes of different therapeutic options for advanced POP, but they also present certain limitations. For instance, most studies are limited by their relatively short follow-up periods, which may not capture the full spectrum of long-term complications such as mesh erosion. Similarly, many studies do not distinguish between outcomes for sexually active and inactive patients, which could impact the generalizability of their findings. The lack of standardized definitions for treatment success—whether based on anatomical criteria or PROMs—complicates comparisons between studies. Addressing these gaps requires future research with longer follow-up durations, standardized success criteria, and exploration of emerging techniques such as LLS. Expanding the evidence base in these areas will ultimately enable more tailored and effective treatment options for patients with advanced POP.

The evidence suggests that both conservative and surgical approaches can effectively manage advanced POP, with indications varying based on patient characteristics. Gellhorn pessaries offer a non-surgical option for patients who may not be ideal candidates for surgery due to comorbidities, while surgical options like SCP provide durable support but carry risks such as mesh-related complications. Clinicians should engage in shared decision-making with patients, discussing the trade-offs between uterine-preserving surgeries and those that involve concomitant hysterectomy, as well as the risks associated with mesh versus native tissue repairs. Additionally, this review highlights the role of PROMs in guiding treatment decisions, as they reflect patient satisfaction and perceived improvements in quality of life (QoL), which may differ from purely anatomical outcomes.

7. Conclusions

Advanced POP has a significant impact on women's QoL and can lead to complications such as hydronephrosis and renal failure. Although they share similarities, the management of advanced POP is distinct from lower-grade prolapse because of specific anatomic considerations.

While PFMT is unlikely to render significant improvement, Gellhorn pessaries are a good first-line treatment and a viable long-term option for patients who do not wish to undergo surgery or who are poor surgical candidates. In the context of recent reports showing high success and satisfaction rates with surgery, there has been decreased enthusiasm for pessary treatment as opposed to surgery by both patients and doctors [12]. Nonetheless, given their high success and low morbidity rates, space-occupying pessaries should be given consideration in the treatment algorithm for advanced POP, and surgeons should discuss the pros and cons of this management option. Education about the basic anatomy of POP and the mechanism of pessaries, as well as patients sharing their experiences together, can improve the confidence of patients using a pessary [8].

When conservative measures fail or if patients refuse to try pessaries, both reconstructive and obliterative surgeries can be offered. Currently, laparoscopic SCP is the surgical gold standard for advanced POP.

Although multiple surgical options exist, it can be difficult to determine which option is most suitable for each patient. There are still few studies that evaluate surgical procedures for advanced POP specifically, and the lack of a universal definition of success makes it challenging to evaluate objectively and to compare procedures with each other. There

is an abundant body of literature that has shown that patient perception and PROMs are extremely important in assessing success and should be prioritized when evaluating postoperative results.

The decision on the type of surgery should be an individualized approach, where the risks and benefits should be weighed for each option. In addition to consideration for patient comorbidities and anesthesia risks, patient expectations should be discussed, and several factors should be reviewed, including a desire for uterine preservation and future vaginal penetrative intercourse. The risks and benefits of inserting mesh and performing a concomitant stress urinary incontinence surgery should also be presented. Ultimately, the choice of surgery is a complex, shared-decision process between the patient and her surgeon with particular attention on patient expectations and goals.

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