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STRESS INCONTINENCE AND PROLAPSE (S REYNOLDS, SECTION EDITOR)

Concurrent Repair of Stress Incontinence and Pelvic Organ Prolapse: Impact on Surgical Outcomes and Additional Considerations

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Abstract

Purpose of Review Pelvic organ prolapse and stress urinary incontinence are highly prevalent conditions and may occur simultaneously. As such, surgical repairs for both conditions may be performed concurrently. The aim of this review is to discuss the literature reporting on efficacy and safety outcomes of concurrent surgery, as well as additional considerations for performing combined repairs.

Recent Findings There is limited data focused on the potential impact of concurrent surgery on incontinence or prolapse outcomes. Generally, the majority of data suggest that performing concomitant repairs has little impact on outcomes. Further, the type of prolapse or incontinence repair does not appear to affect incontinence outcomes. In general, patient satisfaction is high following concurrent surgery, though concurrent surgery may increase rates of adverse events. Some data suggest that a staged repair may be appropriate in select patients. Concomitant surgery may affect costs and follow-up and are additional considerations.

Summary Available data suggest that performing concomitant repairs likely has little impact on outcomes. Given the prevalence of concurrent prolapse and incontinence, surgeons should be familiar with the effect of concomitant surgery on operative risks and benefits, costs and burdens of procedures, and patient expectations to allow for optimal patient counseling.

Keywords Pelvic organ prolapse · Stress urinary incontinence, pelvic floor disorders, suburethral sling · Concurrent repair

Abbreviations

PFD	Pelvic floor disorders
UI	Urinary incontinence
POP	Pelvic organ prolapse
SUI	Stress urinary incontinence
TVTO	Tension-free vaginal tape inside-out
AE	Adverse events
SAE	Serious adverse events

Introduction

Pelvic floor disorders (PFD), including urinary incontinence (UI) and pelvic organ prolapse (POP), are highly prevalent, impacting approximately 25% of all women and 50% of women over 80 years of age [1, 2]. Population studies demonstrate that concurrent stress urinary incontinence (SUI) and POP are present in 7% of patients with PFD [3]. As a result, approximately 11% of women will undergo at least one operation for UI or POP by age 80, and concurrent SUI and POP repairs are common [4]. In addition, concomitant anti-incontinence surgery is frequently performed in asymptomatic patients undergoing POP repair given the high prevalence of de novo SUI associated with POP repair [5, 6].

Given the frequency of concurrent surgery for both POP and SUI, it is important to understand the potential impact of combined repairs. This article aims to review the reported literature focused on the potential impact of concurrent surgery on outcomes. In addition, we describe factors influencing the choice to perform surgery concurrently and how this may influence the choice of surgical approach.

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Indications for Concurrent Surgery

Certainly, the most important factor influencing the choice to perform concurrent surgical treatment of both POP and SUI is patient symptoms and related bother. Accordingly, in patients with highly symptomatic POP and SUI, both conditions are likely to be managed in the same surgical setting.

The decision to perform concurrent anti-incontinence repair at the time of POP repair becomes more complex in patients with occult or absent SUI preoperatively. The reported literature assessing anti-incontinence repair in these settings is vast and a complete review is beyond the scope of this article. However, several findings are important to detail. Cochrane analysis reported by Beassler et al. identified a reduction in subjective SUI postoperatively in women with occult SUI undergoing POP repair with versus without concurrent MUS [7••]. In women with absent clinical or urodynamic SUI preoperatively, the notable OPUS trial found that de novo SUI was identified in 21% versus 38% of patients undergoing MUS versus sham, respectively [5].

While these studies suggest that concurrent MUS decreases rates of postoperative SUI in the setting of both occult or absent preoperative SUI, this benefit must be balanced with an understanding of related risks. Accordingly, Nitti and colleagues demonstrated that, in patients without clinical or occult SUI, the risk of surgery to correct obstruction by prophylactic sling is substantially equivalent to the risk of undergoing delayed surgery for de novo SUI [8]. As a result, the authors suggest that prophylactic sling may not be indicated given that risk was essentially equal to benefit.

Given this controversy surrounding choice to perform concurrent surgery in the absence of clinical SUI, it becomes critical to understand the impact that combined repairs may have on outcomes. Further, even in the setting of symptomatic POP and SUI, it remains important for surgeons to be aware of relevant considerations specific to concurrent surgery. This is even more important following the FDA notification on serious complications associated with transvaginal mesh. Indeed, subsequent to the FDA notification, the investigation has demonstrated a decrease in the incidence of concomitant MUS placement during POP repair [9]. This data suggests that surgeons may be becoming more restrictive in the use of prophylactic MUS in an effort to balance the risks and benefits. The following sections detail the potential impact of combined SUI and POP surgeries on success rates and complications.

Effect of Concurrent Surgery on Outcomes

There is a paucity of dedicated research to evaluate whether concurrent surgery influences outcomes of either POP or SUI surgery. In addition, available research is complicated by several significant limitations. Foremost, the inclusion of many different types of POP and anti-incontinence repairs makes direct comparison difficult and limits systematic analysis. Second, the heterogeneous nature of outcomes complicates the analysis, as focus can include both incontinence measures, prolapse outcomes, and adverse events. Despite these limitations, published literature offers insight regarding the potential influence of concurrent surgery on clinical outcomes.

Efficacy, Incontinence Outcomes

Specific to incontinence outcomes, available investigation demonstrates little difference in comparison of patients undergoing sling procedure with versus without concurrent POP repair. Coskun et al. reported no change in SUI cure in patients undergoing MUS with or without concurrent vaginal POP repair [10]. Similarly, Naidu and colleagues demonstrated no change in subjective cure rates in patients under MUS with or without POP repair [11].

Further, although limited by study heterogeneity, reported literature suggests that, when performed concurrently, type of POP or anti-incontinence repair likely does not affect continence outcomes. Tubre et al. reported no statistical difference in 12-month SUI cure in women undergoing sacrocolpopexy combined with varied continence procedures (pubovaginal sling (PVS), transobturator mid-urethral sling (MUS), retropubic MUS) [12]. Similar findings are seen across addition studies comparing MUS, PVS, and retropubic continence repairs [7••, 10, 12, 13]. It should be noted that some of these studies suggested that Burch may be associated with lower cure rates when compared to MUS, although findings failed to achieve statistical significance given limited patient numbers [7••, 13].

Similarly, we previously reported no difference in continence outcomes following TVTO sling combined with varied POP procedures [14]. We hypothesized that the varying fixation points characteristic of different POP repairs (e.g., sacrospinous ligament vs. sacrum) could potentially produce differences in vaginal angulation and bladder neck support or urethral hypermobility. And, that this could influence continence outcomes despite a common anti-incontinence surgery (TVTO). Our data, however, demonstrated no significant difference in continence outcomes across POP repairs [14].

Efficacy, Prolapse Outcomes

Specific to POP outcomes, there is a limited and conflicting investigation to assess whether the addition of anti-incontinence procedure significantly affects POP outcomes. A study by Goldberg et al. has suggested a protective effect of the suburethral sling on cystocele recurrence [15]. However, Costantini and colleagues reported that the addition of retropubic urethropexy did not affect POP recurrence

following abdominal sacrocolpopexy [16]. Further directed investigation is necessary to assess the effect of anti-incontinence surgery on POP outcomes.

Efficacy, Satisfaction

In addition to the impact on objective outcomes described above, the potential effect on patient satisfaction is equally important and complex. This is in large part given that success following surgery for both pathologies is assessed through a wide variety of subjective and objective measures that are often poorly defined or fail to correlate with each other. For example, it has been widely demonstrated that objective symptom improvement often fails to correlate with subjective benefit after incontinence surgery [17, 18]. Our own reported experience demonstrated that while many patient-reported outcomes correlated with patient satisfaction, others (e.g., patient-reported pad use) did not [19].

Further, the definition of patient satisfaction can be variable and significantly affect corresponding satisfaction rates. Using a Likert scale of 5–10 to define varying degrees of patient satisfaction, Kobashi and colleagues demonstrated satisfaction rates following mid-urethral and pubovaginal slings to range between 34 and 74% depending on threshold used to define satisfaction [20]. Indeed, these data demonstrate that the factors influencing patient satisfaction are highly complex.

These issues are notable as patient satisfaction becomes even more complicated in the setting of concurrent surgery. Accordingly, overall satisfaction may be more significantly impacted by one portion of the concurrent surgery. For example, despite successful restoration of vaginal anatomy following POP repair, a patient may report overall dissatisfaction if the incontinence repair is unsuccessful.

In general, patient satisfaction is high following concurrent surgery [21, 22]. Accordingly, Giberti and colleagues assessed 108 patients undergoing transobturator sling, with 45 undergoing concurrent transvaginal prolapse repair. An overall satisfaction rate of 88% was demonstrated, with no difference based on concurrent intervention [21]. Wolters et al. specifically evaluated satisfaction in patients undergoing POP repair and concomitant mid-urethral sling placement, with a focus on comparing satisfaction rates in cohorts achieving cure in only one versus both surgical procedures [23]. Satisfaction rates were 95% in patients achieving cure of both POP and SUI, compared to 60% and 78% in patients with isolated failure of SUI or POP repairs, respectively [23]. These findings highlight that concurrent surgery may make achieving overall patient satisfaction more challenging.

Complications

Considerations to concurrent surgery should not only include focus on its potential effect on clinical outcomes but also complications. Similar to effect on efficacy, there is limited comparative study to understand whether concurrent surgery significantly impacts complication rates.

Generally, the addition of anti-incontinence surgery in women undergoing POP repair appears to be associated with a higher rate of adverse events (AE). Alshankiti et al. reported adverse events in a cohort of 226 women undergoing POP repair, with 29% undergoing concurrent anti-incontinence surgery [24]. In this study, concurrent incontinence repair was found to be a positive predictor for postoperative complication. In an analysis of the American College of Surgeons National Surgical Quality Improvement Program (NSQIP) database, Erekson and colleagues assessed complications in 33,416 women undergoing POP repair, with concomitant slings performed in 33%. Similarly, the authors noted complications were higher in patients who underwent concomitant sling procedures (3.5% v. 2.9%, $p = 0.001$) [25••]. Finally, a meta-analysis by van der Ploeg et al. demonstrated a higher rate of AEs and serious adverse events (SAE) in comparison of vaginal prolapse repair with versus without MUS placement (AE 28% v. 15%; SAE 14% v. 8%, respectively) [26••]. While these data suggest there may be a higher rate of AEs in patients undergoing concurrent repair, other data suggests no difference. Brubaker and colleagues reported that, in patients who underwent sacrocolpopexy with or without Burch colposuspension, 2-year prolonged voiding dysfunctions, AEs and SAEs, were not statistically different [27]. Combined, these data generally suggest there may be a higher rate of AEs in patients undergoing concurrent repair. Nonetheless, it is unclear whether this rate is simply related to the addition of a second procedure or whether the increase is synergistic.

Staged Approach

Given these factors, consideration of a staged approach in the setting of POP repair bears mention. Some investigation suggests that, in a significant number of patients, isolated POP repair corrects SUI and avoids the need for additional anti-incontinence procedure [28, 29]. Accordingly, Borstad and colleagues found that 27% of women with preoperative symptomatic SUI and POP experienced cure of their SUI following POP repair alone [28]. Similarly, van der Ploeg et al. found that 39% of women with preoperative symptomatic SUI who underwent POP repair alone were cured of SUI postoperatively [29]. Finally, Christmann-Schmid et al. demonstrated that, of 62 patients undergoing sacrocolpopexy with symptomatic or occult SUI, only 31% had persistent postoperative SUI, and only 37% of women with postoperative SUI elected to undergo surgical intervention for SUI in a stage fashion [30].

Combined, these data suggest that a significant proportion of patients with preoperative SUI will achieve cure following

POP repair alone. The physiologic basis for this effect is unknown. Further, these data suggest that a significant number of patients experiencing persistent SUI following POP will decline subsequent anti-incontinence repair. Whether these patients decline staged repair because of a low degree of bother versus a reluctance to undergo another surgery and related recovery is unknown. Nonetheless, these data suggest that a staged approach may be appropriate in a subset of patients.

Choice of Surgical Approaches

Given the wide variety of surgical approaches to both the treatment of SUI and POP, the addition of a second procedure can also affect choice of surgical approach. For example, the retropubic suspension was a natural complement to abdominal approaches for POP repair. More recently, the popularity of the mid-urethral or autologous sling is a natural complement to vaginal prolapse repair. Although abdominal POP repair is often combined with vaginal SUI repair, this requires a second dissection that adds complexity and potential morbidity to the surgical case. This is common presently given the increased rate of robotic sacrocolpopexy and provides surgeons with a more complex decision regarding approach to incontinence repair. In such cases, although abdominal approaches to incontinence repair are possible (retropubic urethropexy), certain surgeons may be unfamiliar with these techniques given contemporary residency training patterns. Accordingly, choices regarding concurrent surgery approaches may influence one another and are often based on a complex combination of factors including surgical outcomes, complication rates, surgeon experience, and surgical location.

Additional Considerations

Financial Considerations

Another important consideration of concurrent surgery is the potential financial impact. Limited study exists to directly understand the financial impact of concurrent SUI and POP surgeries. Nonetheless, available literature identifies several important considerations.

From a patient standpoint, there is a significant cost associated with SUI. Investigation estimates annual out-of-pocket costs of managing UI to be approximately $750, including incontinence supplies and laundry expenses [31]. Accordingly, the treatment or prevention of SUI can reduce the financial burden on the patient. Indeed, Subak and colleagues demonstrated a 72% weekly reduction to patient expenditures for UI management following anti-incontinence surgery [32].

Conversely, it is important to consider the potential financial impact on the health care system. Anti-incontinence procedures are one of the most common procedures performed annually, with population study reporting 182,110 anti-incontinence procedures performed between 2000 and 2009 in the USA. In this study, slings accounted for 146,748 (89%) of continence procedures, with an associated cost per procedure ranging from 6 to 10 thousand dollars [33, 34]. In addition to surgical costs, indirect costs associated with preoperative assessment and work-up are significant. Given previously detailed studies demonstrating that only a minority of patients without preoperative SUI will develop de novo SUI with POP repair, these data suggest that prophylactic sling placement in all patients represents a significant cost.

Follow-Up

Yet another consideration is the effect that concurrent surgery may have on follow-up protocol. In general, follow-up of native tissue POP repairs is limited. After the initial postoperative evaluations, patients can generally follow-up as needed because delayed complications are rare. In contrast, delayed complications are not uncommon in the setting of synthetic mesh placement. In the long-term investigation, Ward et al. reported that 50% of observed mesh complications (such as exposure) was seen beyond 2-year follow-up [35]. Our own reported experience with the management of MUS urethral perforation revealed that this complication is characterized by a delayed diagnosis (mean 41 months) [36]. This finding is supported by additional series with a mean time to urethral perforation diagnosis of 18–22 months and a range up to 60 months [37].

Although the optimal protocol for follow-up duration after MUS is not well defined, these data suggest long-term follow-up may be beneficial. Indeed, we routinely maintain long-term follow-up of these patients to rule out mesh complications. As a result, the choice to perform concurrent MUS can extend follow-up, related cost, and patient impact, and is a notable consideration.

Conclusions

Urinary incontinence and pelvic organ prolapse are highly prevalent and concurrent SUI and POP repairs are common. Limited dedicated research is available that focuses on the effect of concurrent surgery on incontinence and prolapse outcomes. However, available data suggests that concurrent surgery does not significantly affect repair success rates. Generally, the addition of anti-incontinence surgery in women undergoing POP repair appears to be associated with a higher rate of AEs. Nonetheless, it is unclear whether this rate is simply related to the addition of a second procedure or

whether the increase is synergistic. Accordingly, careful consideration of the risks and benefits to surgical repair is important, especially in the setting of prophylactic MUS placement.

Several additional considerations are important to concurrent POP and SUI repair. Foremost, there is some data to suggest that a staged approach may be appropriate in a subset of patients. Further, the addition of concurrent MUS may affect follow-up protocol and cost. Finally, concurrent surgery may influence the choice of repairs given the anatomic location of differing repair types. Given this potential impact that combined repairs may have on outcomes, cost, and follow-up, it is important for surgeons to be aware of relevant considerations specific to concurrent surgery.

Compliance with Ethical Standards

Conflict of Interest David Rapp declares the following disclosure: Dr. Rapp is a consultant for Johnson and Johnson.

Dr. Krzastek declares the following disclosure: Sarah Krzastek's spouse is employed by Boston Scientific.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

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