Int Urogynecol J (2016) 27:1873–1877
DOI 10.1007/s00192-016-3052-2

ORIGINAL ARTICLE

Postoperative appointments: which ones count?

Margaret G. Mueller[1,2] · **Dana Elborno**[3] · **Bhumy A. Davé**[2] · **Alix Leader-Cramer**[2] · **Christina Lewicky-Gaupp**[2] · **Kimberly Kenton**[2]

Received: 6 January 2016 / Accepted: 11 May 2016 / Published online: 16 June 2016

Abstract
Introduction and hypothesis Although postoperative complications in women undergoing reconstructive pelvic surgery (RPS) have been characterized, little is known regarding the timeline of these occurrences. We aimed to determine the timeframe after RPS during which the majority of complications occur, to assist with planning intervals between postoperative visits.
Methods Women undergoing RPS were identified through billing information. Demographic, surgical, and complications data were extracted from electronic medical records.

The Pelvic Floor Complication scale is a surgical scale tailored to women undergoing RPS. It contains three subscales: intraoperative, immediately postoperative, and delayed complications. We applied this scale to each postoperative visit (at 2, 6, and 13 weeks).
Results 396 women underwent RPS and 125 patients had 179 complications, most of which (66 %) were identified by the 2-week visit. Complications at the 2-week visit consisted of urinary tract infection (UTI; 46 %), wound infection (10.0 %), and urinary retention (9.4 %). The majority of serious complications (venous thromboembolism [VTE], ileus, small bowel obstruction [SBO], readmission, and reoperation [1 incarcerated hernia and 1 sling release]) were diagnosed by 2 weeks. One patient was readmitted for ileus at between 2 and 6 weeks. At between 6 and 13 weeks, 1 patient was readmitted with SBO; 1 VTE was diagnosed; and 1 required reoperation for a prolapsed fallopian tube. In contrast, two thirds of the complications seen at the 13-week visit were due to granulation tissue, suture erosion or mesh erosion.
Conclusions The majority of non-mesh-related complications occur within the first 2 weeks after RPS, whereas mesh and suture complications are more likely to be identified at the 13-week visit.

Keywords Pelvic floor disorders · Postoperative complications · Reconstructive pelvic surgery · Urogynecology

This abstract was presented at the Society of Gynecologic Surgeons Annual Meetings, 22–25 March2015, Orlando, FL, and the International Urogynecologic Association Annual Meeting, 6–9 June 2015, Nice, France

✉ Margaret G. Mueller
mgmueller@nm.org

[1] Prentice Women's Hospital, 250 E Superior Street, Suite 05-2370, Chicago, IL 60611, USA

[2] Division of Female Pelvic Medicine and Reconstructive Surgery, Departments of Obstetrics and Gynecology and Urology, Northwestern University Feinberg School of Medicine, Chicago, IL, USA

[3] Loyola University Chicago Stritch School of Medicine, Maywood, IL, USA

Introduction

The occurrence of adverse events following surgical procedures is of utmost importance when counseling women who elect to undergo reconstructive pelvic surgery (RPS) to manage their quality of life symptoms. Most complications following common urogynecology surgery are well described in the literature. Unger et al. recently published two large descriptive series describing adverse events occurring in the immediate postoperative period in women undergoing vaginal uterosacral ligament suspension and minimally invasive sacrocolpopexy [1, 2], whereas Nygaard et al. reported long-term adverse events following common urogynecological procedures [3].

Although it is imperative for surgeons to recognize, identify, and anticipate specific complications, it is also important to know when these postoperative events are likely to occur. At present, little is known regarding the timeline of these events. This may account for the lack of consensus among surgeons as to when patients should be seen in the postoperative period. Scheduled postoperative appointments vary during the 6-month period following surgery. In fact, a survey of gynecology surgeons practicing in the United States revealed that postoperative follow-up varies widely, with a median of 2 visits (range 1–6) within the first year of surgery [4]. As efficiency in utilization becomes highlighted in the concept of streamlined medical care, we currently strive to maximize patient safety and minimize costs, while providing highest quality, safe health care. Postoperative appointments utilize health care dollars in the form of health care providers' time, clinic time and space, etc. Moreover, postoperative complications increase overall costs to the health system. According to a recent cost analysis of route of hysterectomy, the occurrence of a postoperative complication increased the overall cost by a considerable amount [5]. In addition, it is important to consider the "non-medical" costs to patients associated with postoperative care, including transportation, childcare, and lost wages, which can be significant, according to a recent analysis [6]. Knowledge regarding the timing of postoperative complications may help the surgical team to plan and allocate resources in the postoperative period to maximize patient care and minimize costs.

We aimed to identify the time frame during which the majority of postoperative complications occur and are identified after RPS to guide surgeons on the optimal timing for postoperative follow-up.

Materials and methods

Women undergoing RPS at Northwestern Medicine's Prentice Women's Hospital by a fellowship-trained urogynecologist from 1 July 2012 to 30 June 2014 were identified through billing information, after obtaining IRB approval (STU00101024). We excluded women undergoing RPS in combination with other surgeries (i.e., colorectal, general surgery, and general gynecology) secondary to differences in routine postoperative follow-up amongst specialties. Appropriate thromboembolic and antibiotic prophylaxis was administered according to guidelines by the American Congress of Obstetricians and Gynecologists [7, 8]. Demographic, surgical, and complications data were extracted from electronic medical records. In our clinical practice we routinely perform postoperative assessments at 2, 6, and 13 weeks following surgery for both major and minor surgical procedures.

The Pelvic Floor Complication (PFC) scale [9] is a surgical complication scale tailored to women undergoing surgery for pelvic floor disorders (PFD). It contains three subscales: intraoperative, immediately postoperative (before discharge), and delayed (after discharge) complications. We applied the PFC scale to the surgery (capturing intraoperative complications) and to postoperative visit (2, 6, and 13 weeks). Complications were broken down by systems and included hematological complications (deep vein thrombosis [DVT] and pulmonary embolism [PE]), bowel complications (ileus, small bowel obstruction [SBO], incarcerated hernia), infectious complications (fever, wound infection, pelvic abscess, sepsis), lower urinary tract complications (urinary tract infection [UTI] defined as cystitis requiring treatment, urinary retention), bleeding complications (bleeding requiring either observation or intervention), reoperation, erosion complications (granulation tissue, erosion of suture or mesh into the vaginal epithelium), neuropathy, fistula formation, systemic complication (myocardial infarction, congestive heart failure, pneumonia, mental status changes), and hospital readmission. All complications were regarded as symptomatic. All complications included in this analysis were collected in the outpatient setting at or around the time of the 2-, 6-, and 13-week scheduled postoperative appointment.

Results

Three hundred ninety-six women underwent reconstructive pelvic surgery for one or more diagnoses. Most were Caucasian, with a mean age of 54 ± 13 years, and carried a primary diagnosis of either pelvic organ prolapse (POP) or stress urinary incontinence (SUI; Table 1). The primary procedure performed was for the indication of POP in 213 and SUI in 126 women. The remaining 57 cases included fistula repair, mesh excisions, urethral diverticulectomies, perineal wound revisions, and vaginal reconstruction (Table 2).

Intraoperative complications were rare, occurring in only 1 % of patients. We identified 4 women with intraoperative complications: 3 cystotomies and 1 enterotomy requiring primary repair.

Table 1 Primary urogynecological diagnosis

Diagnosis	*n* (%)
Pelvic organ prolapse	213 (53.8)
Stress urinary incontinence	126 (31.8)
Vaginal wall cyst	19 (5.0)
Mesh exposure	13 (3.3)
Perineal wound breakdown	10 (2.5)
Vesicovaginal fistula	5 (1.3)
Rectovaginal fistula	4 (1.1)
Urinary retention	3 (0.8)
Other	3 (0.8)

Table 2 Procedures performed

Procedure	$N = 570$
Minimally invasive abdominal sacrocolpopexy	79
Uterosacral ligament suspension	89
Sacrospinous ligament suspension	6
Synthetic retropubic midurethral sling	228
Synthetic transobturator midurethral sling	9
Pubovaginal sling	2
Concomitant hysterectomy	143
Colpocleisis	11
Urethral diverticulectomy	3
Vaginal wall cyst excision	14
Perineal revision	10
Vesicovaginal fistula repair	6
Rectovaginal fistula repair	4
Transvaginal excision of mesh	12
Vaginal reconstruction	2
Isolated anterior/posterior colporrhaphy	28

Table 3 Postoperative complications

	2-week visit ($N = 388$)	6-week visit ($N = 342$)	13-week visit ($N = 241$)
Deep vein thrombosis	1	0	1
Ileus	3	1	0
Small bowel obstruction	4	0	1
Incarcerated hernia	1	0	0
Fever	4	0	0
Wound infection	13	4	0
Urinary tract infection	59	10	5
Urinary retention	12	2	1
Bleeding (observation)	4	0	0
Bleeding (requiring reoperation)	0	0	0
Reoperation	2	0	1
Granulation tissue	0	5	11
Suture erosion	0	3	8
Mesh erosion	1	2	3
Neuropathy	5	0	1
Fistula	1	0	0
Systemic complication	0	0	0
Readmission	9	1	1
Total	119	28	32

The majority of women ($n = 222$, 56 %, completed the recommended postoperative follow-up at 2, 6, and 13 weeks; however, follow-up rates were higher at the 2- and 6-week visits (98 % and 87 %) compared with the 13-week visit (61 %).

One hundred and twenty-five patients had a total of 179 complications (Table 3). Of these complications, 119 (66 %) were identified by the 2-week visit. Most of the complications by the 2-week visit were UTI (46 %), wound infection (10.0 %), and urinary retention (9.4 %). More importantly, most serious complications (DVT, ileus, SBO) were also diagnosed by 2 weeks. Nine women were readmitted owing to complications, and 2 women underwent reoperation before the 2-week visit (1 incarcerated hernia and 1 sling release for voiding dysfunction).

Twenty-eight complications were observed between the 2- and 6-week visits, and most were minor in nature, including UTI ($n = 10$), urinary retention ($n = 2$), superficial wound infection ($n = 4$), granulation tissue ($n = 5$), and mesh/suture complications ($n = 5$). One patient was readmitted for ileus.

Between 6 and 13 weeks, 3 new serious adverse events were identified: 1 readmission for SBO, 1 DVT, and 1 reoperation for a prolapsed fallopian tube. In contrast to the 2- and 6-week visits, two thirds of the complications identified at the 13-week visit were due to granulation tissue, suture erosion or mesh erosion.

Discussion

Most of the complications occurring after RPS in our cohort were identified within the first 6 weeks after surgery. Unlike most previous studies, which report the incidence of postoperative complications [1, 2, 10] we specifically report the precise time when each complication occurs. This precision in reporting allows us to identify the exact time period in which most complications were identified; thus, we can develop standardized protocols for postoperative visit timing and frequency to maximize patient care. As most serious complications occurred before or at the 2-week appointment, we suggest that this is an imperative appointment to include in any postoperative care schedule. Not surprisingly, foreign body complications (granulation tissue formation, suture and mesh erosion) took longer to occur and were more frequently identified at the 13-week visit, suggesting that longer intervals from surgery are important to screen for such complications. Given the small number of new complications that developed between 2 and 6 weeks after surgery, we believe that little additional benefit is gained from the 6-week postoperative visit.

Currently, postoperative care schedules vary widely among urogynecological practices. This is best exemplified by examining prospective surgical outcome trials in our field. Of the 5 prospective NIH-funded studies aiming to report postoperative outcomes (CARE, SISTer, OPUS, TOMUS, OPTIMAL), there was no consensus on postoperative scheduled follow-up, and only 2 (TOMUS and OPTIMAL) of the five studies included a postoperative appointment at 2 weeks [11–15]. Even though the assessment of postoperative complications was not the primary outcome in any of the aforementioned studies, each study commented on adverse events.

Although the procedures performed in our cohort represent a diverse group of reconstructive pelvic surgeries (including incontinence and prolapse procedures), the types of

complications experienced in our cohort are similar to those reported in the literature [1, 2, 10]. As expected, most complications were minor; however, there were several major complications. For example, 18 % of our patients were treated for a postoperative UTI, which is consistent with previous reports of UTI following RPS [16]. Similarly, our rate of VTE was small (0.5 %) and is consistent with a case series reported by Solomon et al. [17].

Assessment of adverse events and patient safety is at the crux of postoperative care; however, patient satisfaction is also an important driver in the postoperative period, especially in a field focused on the quality of life. Although intrinsically we as surgeons strive to satisfy our patients, recent government legislation demonstrated the importance of patient satisfaction. As part of the Affordable Care Act of 2011, Medicare has redistributed incentive funds based in part on patient satisfaction. This monetary weight placed on patient satisfaction has led many hospital systems to adapt their services to provide enhanced patient satisfaction. Patient satisfaction following RPS is generally high [18, 19], but factors in the postoperative care that might influence satisfaction have not been elucidated, such as excessive visits to the physician.

Achievement of patient-related goals correlates with satisfaction, and can be very individualized [20]. Oftentimes, the patient-selected goal has less to do with "symptom" control and more to do with lifestyle-type goals, specifically a quick return to activity [21]. As patient satisfaction continues to drive the "restructuring" of our health care system, it is imperative that we take these goals into account in postoperative care. Too many postoperative visits may "over-burden" a woman whose primary goal following surgery is to return to her normal routine. On the other hand, with the same goal in mind, insufficient postoperative visits may cause anxiety, thus impeding resumption of her normal activities, leading to an inability to attain her goal.

There are inherent limitations to our study owing to its retrospective nature. However, it is necessary to retrospectively identify a timeline of the occurrences of postoperative complications to better design postoperative follow-up. Also, we are limited by the accuracy of a chart review, and acknowledge that some postoperative complications may not be reflected.

Despite these limitations, our data demonstrate that most short-term postoperative complications, including severe complications, are identified at or before the 2-week postoperative visit, with the exception of permanent mesh and suture complications, which take longer to develop. We advocate that women undergoing reconstructive pelvic surgery should have routine postoperative follow-up 2 weeks after surgery to optimize patient safety and to facilitate the health care team in identifying and treating both serious and bothersome postoperative complications. Similarly, for patients in whom permanent sutures or mesh are used, a postoperative visit at least 3 months after surgery is warranted to identify foreign body complications.

Compliance with ethical standards

Conflicts of interest None.

References

1. Unger CA, Paraiso MF, Jelovsek JE, Barber MD, Ridgeway B (2014) Perioperative adverse events after minimally invasive abdominal sacrocolpopexy. Am J Obstet Gynecol 211(5):547.e1–547.e8
2. Unger CA, Walters MD, Ridgeway B, Jelovsek JE, Barber MD, Paraiso MF (2015) Incidence of adverse events after uterosacral colpopexy for uterovaginal and posthysterectomy vault prolapse. Am J Obstet Gynecol 212(5):603.e1–603.e7
3. Nygaard I, Brubaker L, Zyczynski HM, Cundiff G, Richter H, Gantz M et al (2013) Long-term outcomes following abdominal sacrocolpopexy for pelvic organ prolapse. JAMA: J Am Med Assoc 309(19):2016–2024
4. Mueller MG (2016) When do we see our postoperative patients? Am J Obstet Gynecol 214(4):S505–S506
5. Woelk JL, Borah BJ, Trabuco EC, Heien HC, Gebhart JB (2014) Cost differences among robotic, vaginal, and abdominal hysterectomy. Obstet Gynecol 123(2 Pt 1):255–262
6. Scott AR, Rush AJ 3rd, Naik AD, Berger DH, Suliburk JW (2015) Surgical follow-up costs disproportionately impact low-income patients. J Surg Res 199(1):32–38
7. Committee on Practice Bulletins—Gynecology ACoO, Gynecologists (2007) ACOG Practice Bulletin no. 84: prevention of deep vein thrombosis and pulmonary embolism. Obstet Gynecol 110(2 Pt 1):429–440
8. Bulletins—Gynecology ACoP (2009) ACOG Practice Bulletin no. 104: antibiotic prophylaxis for gynecologic procedures. Obstet Gynecol 113(5):1180–1189
9. Gutman RE, Nygaard IE, Ye W, Rahn DD, Barber MD, Zyczynski HM et al (2013) The Pelvic Floor Complication Scale: a new instrument for reconstructive pelvic surgery. Am J Obstet Gynecol 208(1):81.e1–81.e9
10. Brubaker L, Norton PA, Albo ME, Chai TC, Dandreo KJ, Lloyd KL et al (2011) Adverse events over two years after retropubic or transobturator midurethral sling surgery: findings from the Trial of Midurethral Slings (TOMUS) study. Am J Obstet Gynecol 205(5):498.e1–498.e6
11. Brubaker L, Cundiff GW, Fine P, Nygaard I, Richter HE, Visco AG et al (2006) Abdominal sacrocolpopexy with Burch colposuspension to reduce urinary stress incontinence. N Engl J Med 354(15):1557–1566
12. Albo ME, Richter HE, Brubaker L, Norton P, Kraus SR, Zimmern PE et al (2007) Burch colposuspension versus fascial sling to reduce urinary stress incontinence. N Engl J Med 356(21):2143–2155
13. Richter HE, Albo ME, Zyczynski HM, Kenton K, Norton PA, Sirls LT et al (2010) Retropubic versus transobturator midurethral slings for stress incontinence. N Engl J Med 362(22):2066–2076
14. Wei JT, Nygaard I, Richter HE, Nager CW, Barber MD, Kenton K et al (2012) A midurethral sling to reduce incontinence after vaginal prolapse repair. N Engl J Med 366(25):2358–2367
15. Barber MD, Brubaker L, Burgio KL, Richter HE, Nygaard I, Weidner AC et al (2014) Comparison of 2 transvaginal surgical

approaches and perioperative behavioral therapy for apical vaginal prolapse: the OPTIMAL randomized trial. JAMA 311(10):1023–1034

16. Sutkin G, Alperin M, Meyn L, Wiesenfeld HC, Ellison R, Zyczynski HM (2010) Symptomatic urinary tract infections after surgery for prolapse and/or incontinence. Int Urogynecol J 21(8): 955–961
17. Solomon ER, Frick AC, Paraiso MF, Barber MD (2010) Risk of deep venous thrombosis and pulmonary embolism in urogynecologic surgical patients. Am J Obstet Gynecol 203(5): 510.e1–510.e4
18. Burgio KL, Brubaker L, Richter HE, Wai CY, Litman HJ, France DB et al (2010) Patient satisfaction with stress incontinence surgery. Neurourol Urodyn 29(8):1403–1409
19. Wolters JP, King AB, Rapp DE (2014) Satisfaction in patients undergoing concurrent pelvic floor surgery for stress urinary incontinence and pelvic organ prolapse. Female Pelvic Med Reconstr Surg 20(1):23–26
20. Mahajan ST, Elkadry EA, Kenton KS, Shott S, Brubaker L (2006) Patient-centered surgical outcomes: the impact of goal achievement and urge incontinence on patient satisfaction one year after surgery. Am J Obstet Gynecol 194(3):722–728
21. Lowenstein L, FitzGerald MP, Kenton K, Dooley Y, Templehof M, Mueller ER et al (2008) Patient-selected goals: the fourth dimension in assessment of pelvic floor disorders. Int Urogynecol J Pelvic Floor Dysfunct 19(1):81–84