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Outcomes of Vaginal Prolapse Surgery Among Female Medicare Beneficiaries: The Role of Apical Support

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Abstract

OBJECTIVE—Recurrent pelvic organ prolapse (POP) has been attributed to many factors, one of which is lack of vaginal apical support. To assess the role of vaginal apical support and POP, we analyzed a national dataset to compare long-term reoperation rates after prolapse surgery performed with and without apical support.

METHODS—Public Use File data on a 5% random national sample of female Medicare beneficiaries was obtained from the Centers for Medicare and Medicaid Services. Women with POP who underwent surgery during 1999 were identified by relevant International Classification of Diseases, 9th revision, Clinical Modification and Current Procedural Terminology, 4th edition codes. Individual patients were followed through 2009. Prolapse repair was categorized as anterior, posterior, or anterior–posterior with or without a concomitant apical suspension procedure. The primary outcome was the rate of retreatment for POP.

RESULTS—In 1999, 21,245 women had a diagnosis of POP. Of these, 3,244 (15.3%) underwent prolapse surgery that year. There were 2,756 women who underwent an anterior colporrhapy, posterior colporrhaphy, or both with or without apical suspension. After 10 years, cumulative reoperation rates were highest among women who had an isolated anterior repair (20.2%) and significantly exceeded reoperation rates among women who had a concomitant apical support procedure (11.6%, $p < 0.01$).

CONCLUSION—Ten years after surgery for POP, the reoperation rate was significantly reduced when a concomitant apical suspension procedure was performed.

INTRODUCTION

The prevalence of pelvic organ prolapse (POP) approaches 40% and will continue to rise as the population ages (1, 2). Unfortunately, recurrence rates after prolapse surgery have been

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Disclosure of Potential Conflicts of Interest

Karyn S. Eilber is a speaker for Astellas, an investigator and consultant for American Medical Systems, and an investigator for Boston Scientific.

J. Quentin Clemens is a consultant for Medtronic, Afferent Pharmaceuticals, and Amphora Medical.

All other authors have no potential conflicts of interest to report.

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reported as high as 29% (3). The significant failure rate of POP surgery led surgeons to augment native tissue repairs with biologic grafts or synthetic mesh; however, use of biologic grafts has not been definitively shown to improve outcomes, and the use of synthetic mesh has been reduced due to increasing awareness of mesh related complications as well as the FDA Public Health Notification regarding use of synthetic mesh for transvaginal repair of POP (4, 5). Thus, it is crucial to identify surgical variables that may have an impact on outcomes of POP repair.

A pivotal role of Level I (apical) vaginal support has been demonstrated (6) and loss is a major factor in the development of symptomatic apical and anterior wall prolapse (7). Simulated restoration of apical support has been shown to correct both anterior and posterior vaginal prolapse, and the invariable relationship between high stage anterior wall prolapse and loss of apical support has also been demonstrated (8, 9, 10). Traditionally, the most frequently performed procedures for POP have been anterior or posterior colporrhaphy with fewer patients undergoing vaginal apical suspension (11).

To investigate the role of vaginal apical suspension in long-term outcomes of prolapse repair, we used a national data set to compare reoperation rates after prolapse surgery performed with and without an apical support procedure.

MATERIALS AND METHODS

The Institutional Review Board of University of California, Los Angeles, determined this study to be exempt. Medicare Public Use File data, comprised of national de-identified administrative and claims data on a random 5% sample of the United States Medicare population, were obtained from the Centers for Medicare and Medicaid Services (CMS). An analytical cohort was identified using the Public Use File data that included a 5% random national sample of female Medicare beneficiaries aged 65 years and older. Within this sample only women who underwent prolapse surgery during the year 1999, as identified by relevant ICD-9-CM and CPT-4 codes, were included in the study (Appendix 1). Prolapse repair was categorized into anterior colporrhaphy alone, posterior colporrhaphy alone, combined anterior and posterior colporrhaphy, or colpocleisis. Except for colpocleisis, these were further categorized into whether or not a concomitant apical suspension procedure was performed. Apical suspension procedures included both vaginal and abdominal colpopexy (vault suspension), enterocele repair, and concomitant hysterectomy.

The same set of ICD-9-CM and CPT-4 codes were subsequently used to identify which of these patients had recurrence of prolapse over the next 10 years (through the end of 2009). Diagnosis codes alone cannot reliably identify recurrent prolapse as preoperative diagnoses may remain on a patient's problem list even after surgery; therefore, we exclusively identified recurrent POP by treatment after the index surgery. A reoperation for prolapse served as the study's primary outcome. We also included insertion of a pessary as evidence of a symptomatic prolapse recurrence. Cumulative recurrence rates over the 10 years of follow-up were reported. Fisher's exact test was used to detect statistically significant differences between patients receiving different types of surgical procedures.

RESULTS

In 1999, 21,245 women within the 5% national random sample were diagnosed with pelvic organ prolapse (POP). Of these, 3,244 (15.3%) had surgery for POP: anterior colporrhaphy, posterior colporrhaphy, repair of enterocele, colpopexy, uterine suspension, colpocleisis, and/or hysterectomy. Patient demographics are summarized in Table 1. Mean age was 72.2 (range: 65–96). The most common race was Caucasian (91.9%) followed by Black (3.5%)

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and Hispanic (1.8%). The surgical procedures were performed transvaginally in 2,756 (84.9%) of cases. We categorized all isolated anterior colporrhaphy and posterior colporrhaphy procedures as a vaginal case unless there was an associated CPT code for an abdominal procedure. The demographic characteristics of the subgroup who had surgery performed transvaginally were similar to the entire cohort. The mean duration of follow-up was 9.0 years (range 8.9 to 9.2). During the 10-year study period, 26.9% (range 24.5%–31.8%) of patients died. These figures were similar across all subcohorts.

Of the 2,756 vaginal cases, 382 (13.9%) patients had anterior colporrhaphy alone, 256 (9.3%) had anterior colporrhaphy with a vaginal apical suspension procedure, 246 (8.9%) had posterior colporrhaphy alone, 241 (8.8%) had posterior colporrhaphy with an apical suspension, 469 (17.0%) patients had combined anterior and posterior colporrhaphy, and the remaining 1,160 (42.1%) patients had combined anterior and posterior colporrhaphy with an apical suspension procedure.

The rates of retreatment for recurrent POP over the 10 year follow-up are summarized in Table 2. The highest cumulative reoperation rate was observed in women who initially underwent an isolated anterior colporrhaphy (20.2%). The reoperation rate after an isolated anterior colporrhaphy was significantly greater than women whose index surgery was an anterior colporrhaphy combined with a procedure for apical support (20.2% vs. 11.6%, respectively, $p < 0.01$). A similar finding was observed for patients who initially underwent a combined anterior and posterior colporrhaphy with or without a concomitant apical suspension procedure. The reoperation rate was 14.7% if a combined anterior and posterior colporrhaphy was performed without an apical procedure versus 10.2% if an apical suspension was initially performed ($p = 0.01$). The overall reoperation rate for recurrent prolapse between women who initially underwent posterior colporrhaphy alone (14.6%) versus posterior colporrhaphy combined with an apical suspension (12.9%) was not statistically significant ($p = 0.60$). However, the rate of repeat posterior colporrhaphy was significantly higher in the subgroup that underwent an isolated posterior repair than in the group whose index posterior colporrhaphy was performed with an apical suspension procedure (4.5% vs. 0.4%, respectively, $p < 0.01$). Conversely, there was a higher rate of reoperation (anterior + apical procedure) for the group whose index prolapse surgery was posterior colporrhaphy combined with an apical support procedure versus the group whose initial surgery was posterior colporrhaphy alone (2.1% vs. 0.0%, respectively, $p = .029$). We did not observe any significant difference in rate of pessary placement between groups.

DISCUSSION

Reoperation for recurrent prolapse is significantly reduced when a concomitant vaginal apical suspension procedure is performed at the time of prolapse surgery. We analyzed a representative cohort of Medicare beneficiaries that provides novel, population-based information regarding the association of vaginal apical support with long-term prolapse recurrence.

Our results on a large national sample of patients reinforce and strengthen previous single center findings that apical descent is a significant contributor to prolapse of the anterior compartment, and that correcting apical descent significantly reduces anterior compartment reoperation rates (7–10). The highest cumulative reoperation rate of 20% in our cohort occurred after an isolated anterior colporrhaphy. This rate was decreased by almost half when an apical suspension procedure was performed at the time of index surgery. A number of the subsequent operations after failed anterior colporrhaphy with or without apical suspension occurred in the posterior compartment, which may actually represent prolapse of an initially unreinforced compartment rather than a true recurrence. However, when we

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examined the group who had combined anterior–posterior colporrhaphy with and without apical suspension, a significant reduction in treatment for recurrent prolapse was again noted.

Interestingly, an apical suspension procedure performed at the time of posterior colporrhaphy also markedly reduced the overall rate of reoperation for recurrent rectocele. The reoperation rate after a posterior repair combined with an apical procedure was 10-fold lower than after an isolated posterior colporrhaphy (0.4% vs 4.5%, $p<0.01$). However, this did not hold true for all subgroups. Patients whose reoperation was colpocleisis, anterior colporrhaphy with an apical procedure, anterior and posterior colporrhaphy, or an apical procedure alone did not benefit from an apical procedure at the time of posterior colporrhaphy. Although loss of apical support in the pathogenesis of posterior compartment prolapse is less well established than for the anterior compartment, our finding of an overall decreased reoperation rate when posterior colporrhaphy is combined with an apical procedure suggests a significant impact of apical support on posterior vaginal wall prolapse as previously observed by Lowder, *et al* (8).

Our analysis of patients treated with a pessary was restricted to those who had a CPT code for an initial pessary fitting as there is no specific code for pessary follow-up visits. Our group has previously addressed coding issues related to pessary use in the Medicare population (12). The observation that pessary use was similar between groups that did and did not have an apical suspension procedure at the time of initial surgery may have been due to a pessary placed for incontinence and not prolapse, or a pessary may have been inserted for more severe symptoms prior to surgery. Hence, the data we report on reoperation may represent a more accurate reflection of POP recurrence than pessary data.

The strength of our study lies in the fact that the CMS Public Use File data enables analysis of a large sample of patients within a broad geographic distribution as well as assessment of long-term outcomes. However, there are inherent limitations to a claims-based analysis. Specifically, diagnoses are identified by ICD-9-CM codes that do not provide complete clinical details. As such, it is not possible to assess the degree or severity of prolapse which clearly influences reoperation rates. Furthermore, procedures are identified by ICD-9-CM and CPT-4 codes that may be used in different ways by different clinicians because of coding ambiguities. This is particularly true when multiple codes exist for a given operation or combination of procedures. For example, in order to capture all apical procedures we categorized enterocele and hysterectomy as apical procedures. Although these are not apical support procedures *per* se, many providers perform other procedures such as uterosacral plication at the time of vaginal hysterectomy that effectively supports the apex but is not necessarily coded as such. In addition, the index year in this study (1999) occurred well before the CPT code for mesh insertion (CPT-4 code 57267) was created (2005) and therefore we were unable to identify if any of the cases utilized mesh. However, we anticipate that mesh use was low overall in 1999. Despite these aforementioned limitations, the findings in our study suggest that the observed, clinically relevant outcomes indeed depend on vaginal apical support. Supporting the vaginal apex at the time of prolapse surgery may fill the void that biologic and synthetic grafts have been unable to. Prospective studies are needed to confirm these findings. This analysis of a representative, national cohort of Medicare beneficiaries suggests that the appropriate use of a vaginal apical support procedure at the time of surgical treatment of POP might reduce the long-term risk of prolapse recurrence.

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Table 1

Patient Demographics

	Prolapse Patients With Any Surgery (n=3244)	
Age, mean, SD	72.2	(5.9)
Age, n (%)		
65–69	1178	(36.3)
70–74	887	(27.3)
75–79	710	(21.9)
80–84	352	(10.9)
85+	117	(3.6)
Race, n (%)		
White	2981	(91.9)
Black	114	(3.5)
Other	56	(1.7)
Asian	9	(0.3)
Hispanic	58	(1.8)
North American Native	3	(0.1)
Unknown	23	(0.7)
Charlson Comorbidity Index, n (%)		
0	1477	(45.5)
1	533	(16.4)
2	577	(17.8)
3	283	(8.7)
4	374	(11.5)

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Table 2

Cumulative Reoperation Rates After Index Prolapse Surgery

	Anterior	**Anterior + Apical**	***P* Value: Anterior vs. Apical**	**Posterior**	**Posterior + Apical**	***P* Value: Posterior vs. Posterior + Apical**	**Anterior–Posterior**	**Anterior–Posterior + Apical**	***P* Value Anterior–Posterior vs. Anterior–Posterior + Apical**
Number of procedures for recurrence	382	258		246	241		469	1160	
Cumulative reoperation rate all procedures	**20.2%**	**11.6%**	0.005	14.6%	12.9%	0.600	14.7%	10.2%	0.013
Cumulative reoperation rate per procedure									
Pessary insertion	6.0%	5.0%	0.727	6.1%	5.0%	0.693	4.3%	5.0%	0.609
Colpocleisis	1.3%	0.8%	0.707	0.0%	1.2%	0.120	0.9%	0.5%	0.486
Anterior	4.2%	1.9%	0.173	3.3%	2.5%	0.788	2.3%	1.8%	0.554
Anterior + apical	1.0%	0.0%	0.152	**0.0%**	**2.1%**	0.029	0.6%	1.3%	0.307
Posterior	4.7%	3.1%	0.415	**4.5%**	**0.4%**	0.006	1.7%	1.4%	0.651
Posterior + apical	4.7%	2.3%	0.140	1.6%	1.2%	1.000	1.5%	1.4%	0.820
Anterior–posterior	2.9%	1.6%	0.425	1.6%	3.7%	0.170	1.9%	1.0%	0.153
Anterior–posterior + apical	4.2%	1.6%	0.066	2.0%	1.7%	1.000	3.2%	2.1%	0.209
Apical	4.7%	3.1%	0.415	2.4%	3.7%	0.443	3.4%	2.9%	0.635

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Appendix 1

International Classification of Diseases-9-Clinical Modification and Current Procedural Terminology, 4th Edition Procedure Codes Used to Identify Patients Treated for Vaginal Prolapse

	ICD-9-CM Codes	CPT Codes
Nonsurgical		57160 Insertion pessary
		57150 Irrigation after pessary
		57415 Removal impacted pessary
		A4561/A462 outpatient pessary
Colpocleisis	70.8 Le Fort	57120 Le Fort
Anterior repair	70.51 Repair cystocele	57240 Anterior colporrhaphy
	70.54 Repair cystocele with graft or prosthesis	57289 Pereyra
	618.00 Unspecified prolapse of vaginal walls	57284 Paravaginal defect repair (abdominal)
	618.01 Cystocele, midline	
	618.02 Cystocele, lateral	
	618.02 Urethrocele	
		57285 Paravaginal defect repair (vaginal)
		57423 Paravaginal defect repair (laparoscopic)
Anterior + posterior repair	70.50 Repair cystocele and rectocele	57260 Combined anteroposterior colporrhaphy
	70.53 Repair of cystocele and rectocele with graft or prosthesis	
Anterior + posterior + apical repair		57265 Combined anteroposterior colporrhaphy with enterocele repair
Posterior repair	70.52 Repair of rectocele	45560 Repair of rectocele
	70.55 Repair of rectocele with graft or prosthesis	56810 Perineoplasty, non-obstetric
	618.04 Rectocele	57250 Posterior colporrhaphy with/without perineorrhaphy
	618.05 Perineocele	
	618.09 Other prolapse of vaginal walls without mention of uterine prolapse	
Apical repair	70.92 Repair of vaginal enterocele	57268 Repair of enterocele (vaginal)
	70.93 Repair of vaginal enterocele with graft of prosthesis	57270 Repair of enterocele (abdominal)
		57280 Colpopexy (abdominal)
	70.77 Vaginal suspension and fixation	57282 Colpopexy (vaginal; extra-peritoneal)
	70.78 Vaginal suspension and fixation with graft or prosthesis	57283 Colpopexy (vaginal; intra-peritoneal)
		57425 Colpopexy (laparoscopic)
	69.22 Uterine suspension	58400 Uterine suspension
		58410 Uterine suspension with presacral sympathectomy
	683.1 Laparoscopic supracervical hysterectomy	58150 Total abdominal hysterectomy (TAH)
	68.39 Other unspecified subtotal abdominal hysterectomy	58152 TAH with colpo-urethrocystopexy
		58180 Supracervical abdominal hysterectomy
		58541/58570 Lap hys (<250 g)
		58543/58571 Lap hys (>250 g)

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ICD-9-CM Codes	CPT Codes
68.3 Subtotal hysterectomy	58260 Vaginal hysterectomy (<250 g)
68.5 Vaginal hysterectomy for prolapse	58267 Vag hys with colpo-urethrocystopexy
68.51 Lap vag hys	58270 Vag hys with repair of enterocele
68.59 Other unspecified vag hys	58280 Vag hys and partial vaginectomy with repair of enterocele
618.1 Uterine prolapse without mention of vaginal wall prolapse	
618.2 Uterovaginal prolapse, incomplete	58290 Vag hys (>250 g)
618.3 Uterovaginal prolapse, complete	
618.4 Uterovaginal prolapse, unspecified	
618.5 Prolapse of vaginal vault after hysterectomy	58292 Vag hys (>250 g) with removal tube +/− ovary and repair of enterocele
618.6 Vaginal enterocele, congenital or acquired	58293 Vag hys (>250 g) with colpo-urethrocystopexy
618.7 Old laceration of muscles of pelvic floor	58294 Vag hys (>250 g) with repair of enterocele
618.81 Incompetence or weakening of pubocervical tissue	
618.82 Incompetence or weakening of rectovaginal tissue	
618.83 Pelvic muscle wasting	
618.84 Cervical stump prolapse	
618.89 Other specified genital prolapse	
618.9 Unspecified genital prolapse	

ICD-9-CM, International Classification of Diseases, 9th revision, Clinical Modification; CPT, current procedural terminology.