Colporrhaphies versus Colpocleisis Following Vaginal Hysterectomy for the Treatment of Advanced Pelvic Organ Prolapse: A Comparative Study

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ABSTRACT **Background:** Obliterative vaginal procedures may offer lower perioperative morbidity and equal success rates as reconstructive procedures for frail and elderly women who no longer desire future coital function. The combination of vaginal hysterectomy with either reconstructive or obliterative vaginal procedures has not yet been investigated.

Objectives: To compare peri- and postoperative outcomes of vaginal hysterectomy with pelvic floor reconstruction (VHR) vs. vaginal hysterectomy with colpocleisis (VHC).

Methods: We conducted a retrospective study comparing medical and surgical data of patients undergoing either VHR or VHC between 2006 and 2015. Data were obtained from inpatient and outpatient medical records including peri- and postoperative course, as well as long-term (24 months) follow-up data.

Results: We identified 172 patients who underwent VHR and 44 who underwent VHC. Patients in the VHC group were significantly older (71.3 ± 4.5 vs. 68.6 ± 6.5 years, $P = 0.01$), and more likely to have medical co-morbidities ($P = 0.001$ and $P = 0.029$, respectively). Patients in the VHC group experienced shorter operative time (2.3 ± 0.58 vs. 2.7 ± 1.02 hours, $P = 0.007$), lower perioperative blood loss ($P < 0.0001$), shorter hospital stay ($P < 0.0001$), and lower rates of postoperative urinary retention. Long-term pelvic organ prolapse (POP) recurrence rates were significantly higher among the VHR group. Postoperative resolution of both stress urinary incontinence and overactive bladder were common in both groups.

Conclusions: VHC is associated with lower perioperative blood loss, shorter operative time, shorter hospital stay, shorter time with an indwelling catheter, and lower long-term objective POP recurrence rates.

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KEY WORDS: colpocleisis, colporrhaphy, pelvic floor reconstruction, pelvic organ prolapse (POP), vaginal hysterectomy

Pelvic organ prolapse (POP) is an age-dependent condition manifesting as a protrusion of the pelvic organs through the introitus. With the growing proportion of aged individuals in developed countries, this condition is expected to become more prevalent and attract more attention [1,2]. Surgical interventions for POP are generally categorized as being either reconstructive or obliterative. While the former is performed in most patients with POP, the latter are reserved for non-sexually active patients [3]. To date, Le Forte colpocleisis is one of the most common obliterative procedures performed worldwide [4]. This procedure includes resection of the vaginal epithelium from both the anterior and posterior vaginal walls followed by approximation of these walls to each other using absorbable sutures. While this type of surgery is considered safer than most pelvic reconstructive procedures [5], there is an ongoing debate regarding the benefits and risks associated with adding a concomitant vaginal hysterectomy (VH). The main reason to perform a concomitant hysterectomy is to eliminate the risk of developing future malignancy, although the rate of occult malignancy in these cases is generally low [6,7]. Studies comparing colpocleisis alone to colpocleisis with concomitant VH (VHC) have found that the latter was associated with a longer operative time and greater blood loss. The procedure might be responsible for some extra perioperative adverse events such as urinary tract infections, cardiac complications, and venous thromboembolism [3,8,9].

To date, there are few studies comparing reconstructive and obliterative techniques for POP repair [2,5,10]. We recently reported improved perioperative and long-term outcome of colpocleisis compared to vaginal hysterectomy with pelvic floor reconstruction (VHR) [11]. Nevertheless, no studies have yet compared outcomes of VHR vs. VHC. The aim of this study was therefore to

compare perioperative and long-term outcome of VHR vs. VHC for the treatment of advanced POP in the setup of an academic tertiary medical center. We hypothesized that the latter would be associated with shorter operative time, reduced perioperative morbidity, and improved long-term outcome.

PATIENTS AND METHODS

This retrospective study compared patients who underwent either VHR or VHC for POP at our institution between January 2006 and December 2015. Women aged 60–90 years were included in the study while younger patients or those in whom surgery was performed for other indications apart from POP were excluded from the study. During this period all procedures were performed by a single surgeon (YA) or under his direct supervision. Data were obtained from computerized medical records and included demographics, clinical characteristics, severity of POP (by the Baden–Walker Halfway Scoring System and the Pelvic Organ Prolapse Quantification system), and type of surgery, as well as concomitant surgical procedures (such as apical support, tension free vaginal tape (TVT), or mesh augmentation). Intraoperative data including length of surgery, estimated blood loss, and perioperative complications as well as long-term follow-up data were recorded. During the study period patients were required to answer the validated Pelvic Floor Distress Inventory Questionnaire-20 (PFDI-20) before surgery and at every postoperative follow-up visit thereafter. Statistical analyses were performed using Statistical Package for the Social Sciences software version 18 for Windows (SPSS Inc., Chicago, IL, USA). Continuous variables were compared using Student's *t*-test, while categorical variables were compared using chi-square or Fisher's exact tests. A *P*-value < 0.05 was considered statistically significant for all comparisons. The study was approved by the Institutional Review Board Committee for Human Subjects (confirmation No. 0090-19-CMC).

RESULTS

A total of 415 patients were identified, of whom 216 met the inclusion criteria and were included in the study. Of these patients, 172 had undergone VHR and 44 had undergone VHC. Patient demographic and clinical characteristics are presented in Table 1. The VHC group was significantly older than the VHR group (71.3 ± 4.5 vs. 68.6 ± 6.5 years, respectively, $P = 0.01$) and none of these patients were sexually active or desired future coital function. Patients from the VHC group presented with significantly higher medical co-morbidity rates including diabetes (17.4% vs. 30.9%, $P = 0.001$) and hypertension (57% vs. 75%, $P = 0.029$) but lower obesity rates (33% vs. 70%, $P < 0.0001$) [Table 1].

Patients belonging to the VHC group had higher rates of preoperative overactive bladder (OAB) (63% vs. 47% respectively, $P = 0.05$) and stress urinary incontinence (SUI) (88% vs. 51% respectively, $P < 0.0001$). These patients also had a higher degree of uterine prolapse (4 [2–4] vs. 3 [1–4], $P < 0.0001$), and rectocele (2 [1–4] vs. 2 [0–4], $P < 0.0001$) [Table 2]. A concomitant TVT procedure was performed more frequently among the VHC group as compared to the VHR group (90% vs. 48%, respectively, $P < 0.0001$) [Table 3]. Among the VHC group, perioperative blood loss was significantly lower (223 ± 107 ml vs. 315 ± 117 ml, $P < 0.0001$), length of surgery was significantly shorter (2.3 ± 0.57 vs. 2.6 ± 1 hours, $P = 0.007$), and the time needed with an indwelling catheter was significantly shorter (3.1 ± 1.5 vs. 4.8 ± 4.5 days, $P < 0.0001$). Moreover, a smaller proportion of patients from this group required an indwelling urinary catheter after their discharge from the hospital (7% vs. 27%, $P = 0.006$). Total hospital stay was also significantly shorter in this group (3.2 ± 0.85 vs. 4.5 ± 2.2 days, $P = 0.0001$) [Table 3].

Other peri-operative complication rates such as infection, pelvic hematoma, cardiovascular complications, and readmission to the hospital within one month did not differ between the two study groups [Table 3].

Long-term data were available for 144 patients from the

Table 1. Demographic and clinical characteristics of the study population

	VHR (n = 172)	VHC (n = 44)	*P*-value
Age	68.62 ± 6.5	71.30 ± 5.5	**0.012**
Parity, n (range)	3 (0–12)	3 (0–12)	0.334
Body mass index > 30 kg/m², n (%)	61 (70.9)	14 (33.3)	**< 0.0001**
Diabetes, n (%)	30 (17.4)	18 (30.9)	**0.001**
Hypertension, n (%)	98 (57)	33 (75)	**0.029**
Ischemic heart disease, n (%)	30 (17.4)	6 (13.6)	0.546
Steroid use, n (%)	4 (2.3)	1 (2.3)	> 0.99

VHC = vaginal hysterectomy with colpocleisis, VHR = vaginal hysterectomy with pelvic floor reconstruction

Values are presented as mean ± SD, median (range), or number (%)

Bold signifies statistical significance

Table 2. Preoperative clinical characteristics

	VHR (n = 172)	VHC (n = 44)	*P*-value
Uterine prolapse (degree)	3 (1–4)	4 (2–4)	**< 0.0001**
Anterior wall prolapse (degree)	3 (2–4)	4 (1–4)	0.101
Posterior wall prolapse (degree)	2 (0–4)	2 (1–4)	**< 0.0001**
Stress urinary incontinence	89 (51.7)	39 (88.6)	**< 0.0001**
Overactive bladder	81 (47.1)	28 (63.6)	0.05
POP-Q			
Aa (cm)	3 (-2–4)	3 (1–3)	0.364
Ba (cm)	4 (-2–13)	6 (-3–10)	**< 0.0001**
Ap (cm)	-1 (-3–3)	2 (-2–3)	**< 0.0001**
Bp (cm)	-1 (-3–13)	3 (-2–9)	**< 0.0001**
C (cm)	3 (-6–15)	5 (0–11)	**< 0.0001**
D (cm)	1(-7–12)	5 (-1–9)	**< 0.0001**
Pb (cm)	2.5 (2–5)	3 (2–3)	**< 0.0001**

POP-Q = Pelvic Organ Prolapse Quantification system, VHC = vaginal hysterectomy with colpocleisis, VHR = vaginal hysterectomy with pelvic floor reconstruction

Values are presented as mean ± SD, median (range), or number (%)

Bold signifies statistical significance

Table 3. Intraoperative data

	VHR (n=172)	VHC (n=44)	*P*-value
Additional surgical procedures			
Anterior colporrhaphy, n (%)	171 (99.4)	0	**< 0.0001**
Posterior colporrhaphy, n (%)	107 (62.2)	0	**< 0.0001**
Tension free vaginal tape, n (%)	83 (48.3)	38 (90.5)	**< 0.0001**
Operative time (hours)	2.7 ± 1.02	2.3 ± 0.58	**0.007**
Blood loss (ml)	315 ± 117.8	223.8 ± 107	**< 0.0001**
Hospital stay (days)	4.5 ± 2.2	3.2 ± 0.85	**< 0.0001**
Time with an indwelling catheter (days)	4.7 ± 4.53	3 ± 1.5	**< 0.0001**
Discharge with an indwelling catheter, n (%)	46 (26.7)	3 (7)	**0.006**
Readmission within 30 days, n (%)	12 (7)	4 (9)	0.7
Fever, n (%)*	19 (11)	3 (6.8)	0.58
Excessive bleeding, n (%)**	2 (1.2)	0	> 0.99
Pelvic hematoma, n (%)	9 (5.2)	2 (4.5)	> 0.99
Cardiac complication, n (%)	4 (2.3)	0	0.58
Vascular complications, n (%)	4 (2.3)	0	0.58

VHC = vaginal hysterectomy with colpocleisis, VHR = vaginal hysterectomy with pelvic floor reconstruction

Values are presented as mean ± SD, median (range), or number (%)

Bold signifies statistical significance

*Body temperature ≥ 38°C

**> 500 ml

VHR group and 35 patients from the VHC group, with a mean follow-up time of 24 months [Table 4]. While subjective POP recurrence rates were not significantly different between the two groups, objective recurrence (≥ 2nd degree) rates were significantly more common among the VHR group (7% vs. 0%, 21% vs 0% and 5.5% vs 0%, for the anterior, posterior, and apical compartments, respectively, $P < 0.001$). While postoperative resolution rates of both SUI and OAB were similarly high (95% vs. 97%, $P = 0.89$, 70% vs. 57%, $P = 0.55$), postoperative de novo SUI and OAB occurrence was similarly low in both groups (0.7% vs. 0%, 0.2% vs. 0%, respectively). Postoperative resolution and de novo occurrence of both constipation and fecal incontinence were not significantly different between the two patient groups.

DISSCUSION

Obliterative vaginal procedures for POP have been associated with relatively low surgical morbidity and high success rates with the single contraindication being the patient's desire to preserve vaginal patency and sexual function [12]. Unfortunately, to date there are only a few studies comparing obliterative and reconstructive procedures in a head-to-head fashion, and most of the available data are descriptive. In a recent study [11], we compared 32 women who underwent colpocleisis to 175 women who underwent VHR for advanced POP. Regardless of their worse baseline health status, perioperative morbidity was substantially lower among patients from the colpocleisis group, including lower perioperative blood loss, lower rates of postoperative urinary retention, lower total complication rates, and shorter hospital stay. These results concurred with other formerly published studies indicating that colpocleisis is related to substantially lower perioperative morbidity compared to reconstructive vaginal procedures [8]. Furthermore, in our previous study and in others, objective POP recurrence rates were found to be lower in the colpocleisis as compared to the VHR group [13-15].

In the current study, we showed that many of the inherent advantages of colpocleisis vs. reconstructive procedures remain intact even when performed in combination with VH. When compared to the VHR group, the VHC group was found to have significantly shorter operative time, lower amount of blood loss, shorter period with an indwelling catheter, and shorter hospital stay. Long-term results were also more favorable for the VHC group showing lower objective prolapse recurrence rates compared to VHR.

Table 4. Long-term postoperative data*

	VHR (n=144)	VHC (n=35)	*P*-value
Subjective POP recurrence, n (%)	4 (2.8)	0 (0)	> 0.99
Objective POP recurrence (compartment)			
Anterior, n (%)	10 (7)	0 (0)	**0.002**
Posterior, n (%)	30 (21)	0 (0)	**0.001**
Apical, n (%)	8 (5.5)	0 (0)	0.2
Any objective POP recurrence			
Stress urinary incontinence, n (%)	48 (33.3)	0 (0)	**< 0.0001**
Resolved, n (%)	132 (95)	34 (97.14)	0.89
Remained, n (%)	6 (4.3)	1 (3)	1
De novo, n (%)	2 (0.7)	0 (0)	1
Overactive bladder			
Resolved, n (%)	100 (70)	20 (57.1)	0.55
Remained, n (%)	41 (29)	15 (42.9)	0.26
De novo, n (%)	3 (0.2)	0 (0)	1
Constipation			
Resolved, n (%)	19 (13)	5 (14.3)	1
Remained, n (%)	24 (17)	7 (20)	0.8
De novo, n (%)	13 (9)	1 (2.9)	0.47
Fecal incontinence			
Resolved, n (%)	4 (2.7)	4 (11.4)	0.06
Remained, n (%)	2 (1.4)	2 (5.7)	0.18
De novo, n (%)	2 (1.4)	0 (0)	1

POP = pelvic organ prolapse, VHC = vaginal hysterectomy with colpocleisis, VHR = vaginal hysterectomy with pelvic floor reconstruction

Values are presented as mean ± SD, median (range), or number (%)

*Mean follow-up time ± 24 months

Bold signifies statistical significance

It is likely that the addition of VH (with or without adnexectomy) to standard colpocleisis increases operative risk and convalescence time to some degree. Bochenska and colleagues [8] reported increased rates of medical, but not surgical, complications in patients undergoing VHC compared to patients undergoing colpocleisis alone. Nevertheless, the addition of VH may also offer some advantages, such as reducing or even eliminating the risk for neoplastic transformation in the uterus and adnexa. This risk, while being relatively low, is not negligible. Several previous studies assessed the risk of endometrial neoplasia specifically in patients who underwent surgery for POP. One study [16] reported 17 cases (2.6%) of uterine pathology among 644 patients who underwent hysterectomy for POP, two of whom (0.3%) had endometrial carcinoma. Another study reported an incidence of 0.35% for uterine neoplasia in patients undergoing Le Fort colpocleisis [17]. Two other studies [6,18] reported a 0.8–2.9% risk for premalignant or malignant uterine pathology in women undergoing POP repair. It should be acknowledged that obliterative procedures block potential access to the genital organs and thereby hamper the ability of both physical and sonographic examinations to detect malignant or premalignant processes in the pelvis.

Previous studies have found that obliterative procedures alleviate voiding dysfunction by relieving bladder outlet obstruction. Moreover, irritative lower urinary tract symptoms such as urinary frequency and urgency improved in about one half of these patients [4]. In contrast, de novo SUI was reported in some series following Le Fort colpocleisis [10,15]. Concerning the influence of VHR on voiding dysfunction and lower urinary tract symptoms, data are less definitive [19]. A previous epidemiologic study showed a substantially increased risk for de novo stress urinary incontinence following VHR. This risk peaked during the first few years after surgery and persisted for 10 years postoperatively [20]. In the current study, postoperative de novo SUI and OAB were similarly rare, while improvement in SUI and OAB was similarly common in both patient groups. This finding may be because most patients underwent concomitant TVT procedures. Regarding defecatory symptoms, past studies have shown some improvement in constipation following obliterative procedures [3]. In contrast, VHR has been related to more severe defecatory symptoms, including fecal and flatal incontinence. In the current study improvement rates of defecatory symptoms were relatively high while de novo occurrence rates of these symptoms were relatively low in both patient groups.

A main strength of the current study is that it is comparative, with a concurrent control group of patients undergoing reconstructive vaginal surgery. To the best of our knowledge, and after Medline search of the English literature from 1966 until 2021, ours is the first reported study to compare VHR with VHC. Another advantage is the deployment of the validated PFDI-20 questionnaire to evaluate patient defecatory and urinary symptoms pre- and postoperatively. Few studies have reported urinary and defecatory symptoms in patients undergoing obliterative vs. reconstructive procedures using validated questionnaires. The study limitations include its retrospective design and its relatively small sample size. Furthermore, baseline POP

was more severe and health status was significantly inferior among the VHC group. Nonetheless, operative time and the amount of blood loss was significantly lower. Length of hospital stay and the time with an indwelling catheter were significantly shorter in this group, demonstrating the advantages of this procedure over VHR for the treatment of POP in frail and aged women. A previous epidemiologic study [20] suggested that integrating frailty into preoperative decision making is imperative for improving both objective and subjective results among aged patients undergoing POP repair procedures [20].

CONCLUSIONS

VHC is an effective and safe procedure for elderly women and for those with substantial co-morbidities who do not desire future coital function. Moreover, this procedure has a distinct advantage over VHR with regard to both short- and long-term outcomes. In view of the steady rise in life expectancy and the rapid growth of the elderly population in developed countries, obliterative surgeries are expected to become more widespread in the future. Further prospective trials are required to increase our knowledge regarding the role of obliterative vs. non-obliterative vaginal surgeries and to determine the benefits of combining hysterectomy with obliterative procedures for the treatment of advanced POP in different patient populations.

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Maybe all one can do is hope to end up with the right regrets.
Arthur Miller (1915–2005), playwright and essayist

The softer you sing, the louder you're heard.
Donovan Phillips Leitch (born 1946), known mononymously as Donovan, is a Scottish musician, songwriter, and record producer