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Long-Term Clinical Outcomes, Recurrence, Satisfaction, and Regret After Total Colpocleisis With Concomitant Vaginal Hysterectomy: A Retrospective Single-Center Study

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Objective: This study aimed to investigate long-term study outcomes of colpocleisis along with concomitant vaginal hysterectomy for pelvic organ prolapse (POP).

Methods: A retrospective cohort study was conducted in elderly women with advanced POP who underwent total colpocleisis with or without hysterectomy from 2012 to 2017.

Results: A total of 242 elderly women were included in this study, of which 172 underwent total colpocleisis along with concomitant vaginal hysterectomy (CH group) and 70 underwent partial colpocleisis-retained uterus (LeFort group). More than one comorbidity was observed among 154 (85.9%) patients in the CH group and 56 (81.4%) patients in the LeFort group. The difference between 2 groups (CH and LeFort) in mean length of hospital staying, mean day of removing urinary catheter, mean day of farting time after operation, and postoperative complications was not statistically significant. In total colpocleisis along with hysterectomy group, a case (0.6%) of early asymptomatic endometrial cancer was diagnosed unexpectedly by pathology after hysterectomy. Median follow-up was 43.0 (19.0–85.0) months in the CH group and 45.0 (26.0–79.0) months in the LeFort group. Only one patient reported recurrence. Subjective satisfaction rate was 98.8% (CH group) versus 98.6% (LeFort group). Regret rate was 0.58% (CH group) versus 0% (LeFort group). No significant difference was observed between the 2 groups.

Conclusions: Both colpocleisis along with hysterectomy and partial colpocleisis-retained uterus are safe, with fewer complications and high long-term satisfaction. Colpocleisis along with hysterectomy is more conducive to discovery of early asymptomatic malignant tumors of the uterus, which is a suitable alternative for elderly frail women with severe POP.

Key Words: total colpocleisis, hysterectomy, patient satisfaction, pelvic organ prolapse, regret

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Among the pelvic floor disorders, pelvic organ prolapse (POP) is a highly prevalent condition affecting the quality of life in elderly women.^{1,2} Approximately 40% of women older than

50 years are diagnosed with POP,³ and the lifetime risk of surgery for POP is estimated to be 12.6%.⁴ On the basis of the current estimates, for the women who underwent POP surgery, the risk is expected to increase by 45% in the next 40 years with a substantial increase in the population of elderly women.^{5,6}

In addition, for women older than 80 years, the risk of death has been increased by 13.6 times compared with younger patients, which makes elderly population often not suitable for surgery.^{7,8} Hence, colpocleisis is an ideal procedure for sexually inactive elderly women or those who do not desire to preserve vaginal anatomy for coitus.⁹ Compared with pelvic reconstructive surgery, colpocleisis is associated with less morbidity,¹⁰ improved pelvic floor symptoms and body image, low regret, and higher satisfaction.^{11,12}

Total colpocleisis along with concomitant vaginal hysterectomy can eliminate the risk of endometrial and cervical cancer and can also avoid the risk of pyometra, a rare but potentially serious complication because of canal blockage after a LeFort procedure.⁹ However, some gynecologists have expressed their concern that concomitant hysterectomy may have a longer operative time and length of hospital stay and increase the risk of surgical complications compared with those who do not undergo hysterectomy.^{13–15} Some studies have also reported that colpocleisis may affect body image, cause regret, and ultimately lead to patient dissatisfaction.^{16,17}

In China, because of urban and rural economic disparity, some elderly patients do not have insurance coverage and some of them are not suitable for multiple surgeries because of their frailty, comorbidities, and poverty. Therefore, elderly women with advanced prolapse are more likely to choose hysterectomy at the time of colpocleisis to prevent the risk of malignant tumor and pyometra of uterus; although the incidence of these diseases after POP is very low,^{18–20} but if it occurs, it will be life-threatening and can lead to huge costs. Hysterectomy along with colpocleisis can also prevent future recurrence and avoid the trauma of the second surgery in frail elderly women. Therefore, the total economic cost of total colpocleisis along with concomitant vaginal hysterectomy is lower than other types of surgery for POP.

At present, a lot of colpocleisis along with vaginal hysterectomy has been performed, but perioperative safety, efficacy, and long-term patient satisfaction are lacking. This study aimed to evaluate the perioperative safety, recurrence, long-term satisfaction, and regret of women undergoing total colpocleisis with concomitant vaginal hysterectomy.

MATERIALS AND METHODS

Study Design

A retrospective cohort study was conducted after the approval from the institutional ethics committee of Peking University People's Hospital. A written or oral informed consent was obtained from all the participants, and the study was conducted in accordance with the Declaration of Helsinki.

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Patient Population

Sexually inactive women with advanced prolapse who underwent colpocleisis along with or without concomitant vaginal hysterectomy from January 2012 to June 2017 were included in this study. Patients were included if they were previously treated with conservative treatment (pessary and topical estrogen therapy) and they were unable to tolerate reconstructive surgery because of frailty and multiple comorbidities.

Outcomes and End Points

Clinical outcomes, recurrence, and patient satisfaction/regret were the outcomes evaluated. Clinical outcomes were assessed using the average operative time, mean blood loss, and mean length of hospital stay, whereas the incidence of postoperative complications and recurrence were used as the end points for safety and efficacy. Patient satisfaction/regret was assessed using questionnaires.

Data Collection

As a standard surgical procedure, a detailed medical history and physical examination along with pelvic organ prolapse quantitative (POP-Q) system for the evaluation of POP was conducted at the initial visit. In addition, transvaginal ultrasound and urinary incontinence assessment were also performed before surgery. Urinary incontinence requires a comprehensive assessment, such as the history of urinary leakage after coughing or increasing abdominal pressure, a cough test with the reduction of prolapse, or urodynamic testing.

The operation was carried out by experienced doctors according to the standard procedure. In total colpocleisis along with concomitant vaginal hysterectomy (CH group), a rectangular area of the anterior and posterior wall of the vagina was marked, which circumscribed by an incision of 2 to 3 cm from the hymen ring; the epithelium of the rectangular areas and the uterus were completely removed. Then, a series of sutures were placed to close the vagina. In partial colpocleisis-retained uterus (LeFort group), a rectangular area of the anterior and posterior wall of the vagina was marked, which extended from 2 to 3 cm from the tip of the cervix to approximately 3 cm below the external orifice of the urethra. The epithelium of the rectangular areas was removed, and the cut edges of the anterior and posterior walls of the vagina were sewn to close the vagina, and 2 channels with a width of approximately 1 to 2 cm were reserved on both sides for providing drainage tracts for cervical or other upper genital discharge. Otherwise, after both CH and LeFort procedures, if the patient had advanced prolapse of the posterior wall of the vagina or the genital hiatus was obviously widened, high perineorrhaphy would be performed. In patients with stress urinary incontinence (SUI), antiurinary incontinence surgery was recommended. These patients were treated with shaving the perineal skin, prophylactic antibiotics before the surgery, and thromboprophylaxis after the surgery. Postoperative voiding dysfunction was defined as a residual urine volume of >100 mL examined by B-scan ultrasonography. The postoperative morbidity rate was defined as the occurrence of body temperature >38°C twice every 4 hours after 24 hours of the surgery. Patients were asked for postoperative visits at 6 weeks, 6 months, and 1 year and subsequently followed up as needed. Medical records were reviewed to obtain the essential information and operation-related information, such as operation time, bleeding volume, length of hospital stay, exhaust time after surgery, time to pull out the urinary catheter, postoperative morbidity, and surgical complications.

The additional patient information on patients' satisfaction, regret, pelvic symptoms, and recurrence was collected by

contacting eligible patients through telephone from 1 to 7 years. Moreover, patients were asked to complete the Chinese version of the Pelvic Floor Distress Inventory—Short Form 20 (PFDI-20) questionnaire containing 20 questions, including 3 separate subscales: the Pelvic Organ Prolapse Distress Inventory, the Colon Rectal Anal Distress Inventory, and the Urinary Distress Inventory,^{21,22} which contained 6, 8, and 6 questions, respectively. The cumulative sum of the scores of the 3 subscales was the PFDI-20 score, which ranged from 0 to 300. In addition, these patients were also asked to complete a modified Decision Regret Scale to evaluate the satisfaction of the operation, in which a scale of 1 was considered as very unsatisfactory and 5 was considered as very satisfied. Furthermore, regret was assessed by asking the patients if they regretted the choice of colpocleisis surgery for prolapse (yes/no) in the modified Decision Regret Scale.

Statistical Analysis

The statistical analyses were performed using SPSS Version 26.0 (SPSS, Inc, Chicago, Illinois). Depending on the type of data, descriptive statistics were calculated as median with interquartile range or frequencies and proportions. Data were also expressed as mean and SD. Paired *t* test was performed to compare the outcomes before and after the surgery. Fisher exact or χ^2 test was performed to analyze the categorical data. A *P* value of <0.05 was considered statistically significant.

RESULTS

Patient Demographics and Baseline Characteristics

A total of 198 eligible patients underwent total colpocleisis along with concomitant vaginal hysterectomy (CH group) at our institution, of which 7 (3.5%) were deceased because of age or medical complications and 19 (9.6%) had no valid contact information. The remaining 172 (86.9%) patients were followed up and asked to take part in the questionnaire survey. One hundred eleven patients underwent colpocleisis without concomitant hysterectomy, of which 35 (31.5%) underwent hysterectomy previously because of prolapse or other diseases, 3 (2.7%) were deceased because of complications (heart failure), and 3 (2.7%) had no valid contact information. These patients were excluded from the study, and the remaining 70 (63.1%) patients who underwent colpocleisis with the uterus preserved (LeFort group) were followed up and asked to take part in the questionnaire survey. These patients were diagnosed with stage II, III, or IV POP according to the POP-Q system before the surgery, and 9 (5.2%) patients in the CH group and 2 (2.9%) patients in the LeFort group had a history of pelvic reconstruction because of prolapse in the past; they underwent colpocleisis ultimately.

All these patients were of Chinese Han nationality, with an average age of 76.0 ± 4.9 years (CH group) and 76.7 ± 5.4 years (LeFort group). One hundred sixty-three (94.7%) women in the CH group and 65 (92.9%) women in the LeFort group had a history of more than 2 deliveries. Most of these patients had advanced prolapse; 95.9% of patients in the CH group and all patients in the LeFort group were diagnosed with stage III or IV POP according to POP-Q system. In addition, 154 (85.9%) patients in the CH group and 56 (81.4%) patients in the LeFort group had more than one comorbidity. These comorbidities include hypertension, diabetes, heart disease, cerebral infarction, renal insufficiency, chronic lung disease, and malignant tumor. Additional demographic and clinical data are presented in Tables 1 and 2.

Clinical Outcomes

Ninety-two (53.5%) patients in the CH group and 23 (32.9%) patients in the LeFort group were diagnosed with SUI. Among them, 33 (19.2%) patients in the CH group and 14 (20%) patients in the LeFort group agreed to undergo antiurinary incontinence surgery at the same time. Besides, 81 (47.1%) patients in the CH group and 26 (37.1%) patients in the LeFort group underwent perineorrhaphy. In the CH group, 25 (14.5%) patients were subjected to other concomitant surgical procedures, including 23 (13.4%) adnexal excision for adnexal tumor, 1 hemorrhoidectomy for hemorrhoids, and 1 inguinal hernia repair. In the LeFort group, 4 (5.8%) patients underwent dilation and curettage procedures for a thickened endometrium. For total colpocleisis with vaginal hysterectomy, the average operative time was 66.7 ± 24.2 minutes and the mean blood loss was estimated to be 53.6 ± 38.5 mL, whereas for LeFort colpocleisis, the average operative time was 59.9 ± 16.7 minutes and the mean blood loss was 35.2 ± 40.8 mL, and this difference was statistically significant. For concurrent surgeries, such as total colpocleisis with concomitant vaginal adnexal hysterectomy, the median operative time was 75 minutes and the median blood loss was 50 mL. In the CH and LeFort groups, the mean lengths of hospital stay was 5.5 ± 2.1 and 5.9 ± 2.4 days, respectively; the removal of urinary catheter was 4.2 ± 2.4 and 3.60 ± 1.6 days, respectively; and the farting time after operation was 1.6 ± 0.6 and 1.8 ± 0.3 days, respectively. The difference was not statistically significant. In addition, in the CH group, 1 (0.6%) woman was unexpectedly diagnosed with early endometrial cancer by pathology after hysterectomy, although she had no clinical symptoms such as vaginal bleeding and there was no abnormality in Doppler ultrasound before the surgery. Perioperative characteristics are presented in Table 3.

Surgical complications were rare. According to the Clavein-Dindo classification system, there was 1 (0.6%) patient with grade III complication. In the CH group, 1 patient underwent removal of bilateral adnexa because of the tumor. After the surgery, the blood pressure and hemoglobin level of the patient were progressively decreased. Then she underwent laparoscopy surgery, and active bleeding was observed at the suture of ovariectomy. Considering when the transvaginal ovariectomy was performed, because of the adhesion around the ovarian tumor, the ovary was located deep in the abdominal cavity and the vision of the vaginal operation was limited; inadequate suture and hemostasis led to active bleeding. The surgery lasted for 175 minutes, and the blood loss was 1700 mL. The patient received 2 units of red blood cell transfusion. The rest complications are of grades I to II. In the LeFort group, 1 patient had bladder injury because of sling puncture during the antiurinary incontinence surgery; she recovered and left the hospital after conservative treatment. Eight (4.7%) patients in the CH group and 3 (4.2%) patients in the LeFort group had postoperative morbidity. Three (1.7%) patients in the CH group and 1 (1.4%) patient in the LeFort group had acute urinary tract infection. Their symptoms were relieved after antibiotic treatment. Five (2.9%) patients in the CH group and 3 (4.2%) patients in the LeFort group had postoperative urinary retention (residual urine ≥ 100 mL) with spontaneous remission after 1 week of indwelling catheter. One (0.6%) patient in the CH group had postoperative bladder hemorrhage. For which, cystoscopy was performed, and it revealed that the bladder and urethra muscle layers were intact and there was active bleeding in the surface mucosa near the urethral opening because of mucosal contusion during insertion of the catheter. Two patients in each group (1.2% vs 2.8%) with a history of embolism had embolism after the surgery (one case had left leg intramuscular vein thrombosis, and the other had pulmonary embolism), and anticoagulation

TABLE 1. Demographic and Clinical Characteristics of the Patients

Baseline Characteristics	Colpocleisis Along With Hysterectomy (CH)	Partial Colpocleisis-Retained Uterus (LeFort)
No. patients	n = 172	n = 70
Mean age at time of procedure, y	76.0 \pm 4.9	76.7 \pm 5.4
Body mass index, kg/m ²	24.3 \pm 2.9	24.4 \pm 3.1
Nonsmokers	168 (97.7%)	69 (98.6%)
Gravidity		
0	0	0
1	3 (1.7%)	2 (2.9%)
≥ 2	169 (98.3%)	68 (97.1%)
Parity		
0	1 (0.6%)	1 (1.4%)
1	8 (4.7%)	4 (5.7%)
≥ 2	163 (94.7%)	65 (92.9%)
POP-Q stages III–IV	165 (95.9%)	70 (100.0%)
Prolapse of anterior wall of vagina	156 (90.7%)	67 (95.8%)
Uterine prolapse	105 (61.0%)	51 (72.9%)
Prolapse of posterior wall of vagina	64 (37.2%)	41 (58.6%)
Prior prolapse surgery	9 (5.2%)	2 (2.9%)
SUI	92 (53.5%)	23 (32.9%)
Comorbidities		
0	18 (10.5%)	13 (18.6%)
1	69 (40.1%)	31 (44.3%)
≥ 2	85 (49.4%)	26 (37.1%)

The data are presented as the mean \pm SD or n (%). The body mass index is the weight in kilograms divided by the square of the height in meters.

TABLE 2. Comorbidities of Patients

Comorbidities	Colpocleisis Along With Hysterectomy (CH)	Partial Colpocleisis-Retained Uterus (LeFort)
No. patients	n = 172	n = 70
Hypertension	108 (62.8%)	43 (61.4%)
Diabetes	57 (33.1%)	19 (27.1%)
Coronary heart disease	27 (15.7%)	9 (12.9%)
Arrhythmia	15 (8.7%)	2 (2.9%)
Cerebral infarction	15 (8.7%)	5 (7.1%)
Pulmonary embolism	5 (2.9%)	1 (1.4%)
Chronic lung disease	13 (7.6%)	2 (2.9%)
Renal insufficiency	1 (0.6%)	1 (1.4%)
Malignant tumor	4 (2.3%)	3 (4.3%)
Coagulation disorders	1 (0.6%)	1 (1.4%)
Ascites of portal hypertension	0	1 (1.4%)
Mental disorders	4 (2.3%)	0

was not restored in time after the surgery. After active conservative treatment, the condition was relieved. None of the patients had any serious complications, such as death. Additional perioperative characteristics are presented in Table 4.

The median follow-up was 43.0 (19.0–85.0) months in the CH group and 45.0 (26.0–79.0) months in the LeFort group. Ninety-two (53.5%) patients in the CH group and 23 (32.9%) patients in the LeFort group were diagnosed with SUI. Among them, 33 (19.2%) patients in the CH group and 14 (20%) patients in the LeFort group agreed to undergo antiurinary incontinence surgery at the same time. Of the 47 patients, 44 (93.6%) had no urinary incontinence and 3 (6.4%) had improvement of symptom after the surgery (2 in the CH group and 1 in the LeFort group). During the follow-up, 10.0% (8/80) of patients in the CH group and 6.4% (3/47) of patients in the LeFort group had de novo SUI (6 cases had mixed urinary incontinence and 5 had SUI). However,

because of weakness and complications, these patients discontinued the treatment of urinary incontinence. Moreover, 170 (98.8%) patients in the CH group and 69 (98.6%) patients in the LeFort group were satisfied with the operative procedures. Only 3 patients expressed dissatisfaction because of de novo SUI (2 [1.2%] patients in the CH group and 1 [1.4%] patient in the LeFort group). In addition, 171 (99.4%) patients in the CH group expressed no regret, whereas only 1 (0.6%) patient reported regret because of loss of sexual function. One patient had recurrence after total colpocleisis along with concomitant vaginal hysterectomy because the patient started physical work after 1 month of surgery, leading to her prolapse again. A statistically significant difference among the PFDI-20, Pelvic Organ Prolapse Distress Inventory-6, Colon Rectal Anal Distress Inventory-8, and Urinary Distress Inventory-6 scores before and after the surgery was observed in our study (Supplementary Tables S1, S2 <http://links.lww.com/FPMRS/A156>). Overall,

TABLE 3. Perioperative Characteristics of Patients

Parameters	Colpocleisis Along With Hysterectomy (CH)	Partial Colpocleisis-Retained Uterus (LeFort)	P
No. patients	n = 172	n = 70	
Concurrent midurethral sling	33 (19.2%)	14 (20%)	
Concurrent other surgery	25 (14.5%)	4 (5.8%)	
High perineorrhaphy	81 (47.1%)	26 (37.1%)	
Operative time, min			
Without other concurrent surgery	66.7 ± 24.2	59.9 ± 16.7	<0.05
With other concurrent surgery*	79.2 ± 27.1	75.0 (50.0–175.0)†	
Bleeding, mL			
Without other concurrent surgery	53.6 ± 38.5	35.2 ± 40.8	<0.05
With other concurrent surgery*	144.4 ± 336.9	50.0 (10.0–1700.0)†	
Farting time after operation, d	1.6 ± 0.6	1.8 ± 0.3	>0.05
Removal of urinary catheter, d	4.2 ± 2.4	3.60 ± 1.6	>0.05
Length of hospital stay, d	5.5 ± 2.1	5.9 ± 2.4	>0.05
Postoperative pathological diagnosis of malignant tumor	1 (0.6%)	0	

*Other surgeries such as salpingo-oophorectomy, inguinal hernia repair, and hemorrhoids surgery.

†One of the patients underwent removal of bilateral adnexa because of tumor; the operative procedure lasted for 175 minutes, and the suture of ovaries was actively bleeding, which caused a blood loss of 1700 mL.

TABLE 4. Postoperative Complications

Clavein-Dindo Classification System	Complications	Colpocleisis Along With Hysterectomy (CH)	Partial Colpocleisis-Retained Uterus (LeFort)	P
No. patients		n = 172	n = 70	
Grade I	Postoperative morbidity	8 (10.0%)	3 (6.4%)	>0.05
	Acute urinary retention	5 (2.9%)	3 (4.2%)	>0.05
	Acute urinary tract infection	3 (1.7%)	1 (1.4%)	>0.05
	Pelvic hematoma	1 (0.6%)	0	>0.05
	Contusion of bladder mucosa	1 (0.6%)	0	>0.05
Grade II	Deep vein thrombosis	1 (0.6%)	1 (1.4%)	>0.05
	Pulmonary embolism	1 (0.6%)	1 (1.4%)	>0.05
	Bladder injury	0	1 (1.4%)	>0.05
Grade III	Hemorrhage and blood transfusion	1 (0.6%)	0	>0.05
Grade IV	Life-threatening complications	0	0	
Grade V	Death	0	0	

the long-term follow-up results showed improvement in both urinary and intestinal symptoms.

DISCUSSION

Through the first case of total colpocleisis by “panhysterocolpocleisis” in 1901 by Edebohls et al^{23,24} to the recent reports²⁵ of 91% to 100% success rate, total colpocleisis with hysterectomy has been an excellent approach among elderly women with advanced POP. However, some studies have expressed their concern that patients who undergo hysterectomy have a longer operative time and extended length of hospital stay, as well as increased risk of surgical complications.^{14,26} Some studies have also claimed that the risk of endometrial cancer and precancerous lesions after colpocleisis is very low.^{18,27} Therefore, colpocleisis with hysterectomy remains controversial. However, with the development of modern surgical techniques, improvements in anesthetic techniques, and the use of effective antibiotics, this view may not be appropriate. As it is evident from the findings from this study, with controlled patients' selection and with well-experienced physicians, colpocleisis with hysterectomy is safe, with fewer complications, high long-term satisfaction, low recurrence, and low regret rate. Hence, colpocleisis with hysterectomy is a suitable alternative for elderly frail women with severe POP.

In line with our surgical approach, colpocleisis with concomitant hysterectomy demonstrated by Rouhier remains to be a safe, fast, and reproducible procedure for patients with advanced POP.²⁸ A study by Bochenska et al¹³ compared the perioperative complications after colpocleisis with and without concomitant hysterectomy and revealed that no significant difference in preoperative comorbidities was observed between both the groups and recommended to perform concomitant hysterectomy to prevent future uterine malignancy.

In this study, the average age of the patients in the CH and LeFort groups was 76.0 ± 4.9 and 76.7 ± 5.4 years, respectively; 154 (89.5%) patients in the CH group and 57 (81.4%) patients in the LeFort group had more than one type of complications, indicating that their tolerance to major surgeries such as pelvic floor reconstruction was extremely poor. The mean time of total colpocleisis with concomitant hysterectomy without adnexectomy or other surgical procedures was 66.7 ± 24.2 minutes, and the mean bleeding loss was estimated to be 53.6 ± 38.5 mL, whereas the mean time of LeFort colpocleisis was 59.9 ± 16.7 minutes, and the mean bleeding loss was estimated to be 35.2 ± 40.8 mL. Although the difference between the 2 groups is statistically

significant, we thought that there is not much difference in clinical significance. The difference in the mean length of hospital stay, mean days of removal of urinary catheter, and mean days of exhaust time after surgery was not statistically significant. According to the Clavein-Dindo classification system, the postoperative complications of the patients undergoing hysterectomy are almost grades I and II, and all of them are recovered after conservative treatment. None of them have serious postoperative complications, such as life-threatening complications or death, which signifies the safety associated with our surgical approach. In addition, in the CH group, a case (0.6%) of early endometrial cancer was diagnosed unexpectedly by pathology after hysterectomy; for this patient, hysterectomy was beneficial. The postoperative regret rate for colpocleisis ranges from 0% to 13.8% according to different studies.^{11,29,30} The possible causes of regret include inability to have sex, recurrence of prolapse, surgical complications, and postoperative urinary symptoms. However, in this study, only one patient expressed regret because of loss of sexual function.

Previous studies have shown that the incidence of new-onset SUI after colpocleisis ranges from 1% to 26.7%.^{31,32} In this study, 11 patients had postoperative de novo SUI and its incidence was 10% and 6.4%, respectively, in both the groups, which was likely be the reason for patient dissatisfaction. As many subject experts have pointed out that prophylactic antiurinary incontinence surgery cannot prevent the occurrence of postoperative SUI, prophylactic antiurinary incontinence surgery was not recommended to the patients without symptoms of urinary leakage in this study. Some scholars³³ have also suggested that the occult urinary incontinence is manifested when the bladder bulge is corrected. In addition, the downward traction of urethra during the surgery may lead to an increase in the angle between the bladder and the urethra, leading to de novo SUI. Therefore, it is suggested that incision in the epithelium of the anterior wall of the vagina should not be too close to the external urethral orifice during the surgery. Although it is difficult to predict de novo urinary incontinence after surgery, preoperative screening of occult urinary incontinence with urodynamic examination and a cough test are recommended to reduce the dissatisfaction rate of patients.

This study indicated that colpocleisis with hysterectomy not only is safe, with fewer complications, high long-term satisfaction, low recurrence, and low regret rate, but also can prevent the risk of malignant tumor and pyometra of uterus; although the incidence of these diseases after POP is very low, but if it occurs, it will be life-threatening and can lead to huge costs and

trauma of reoperation. Therefore, it is recommended to perform hysterectomy as much as possible with colpocleisis surgery in elderly patients. A recent study has also reported the incidence of perioperative complications and postoperative spontaneous urination to be similar among patients who had undergone colpocleisis with or without hysterectomy.³⁴

The main strength of this study was the long-term follow-up with an average of 43.0 (19.0–85.0) months, which was longer than the previous reports. The sample size was 172 cases, which was also larger than the previous studies, increasing the evidence base of the current study. However, this study had some limitations. First, as a retrospective study, the study design involved certain inherent limitations. Second, the patients with de novo SUI after the surgery were not further studied because of smaller sample size.

In conclusion, both colpocleisis along with hysterectomy and partial colpocleisis-retained uterus are safe, with fewer complications and high long-term satisfaction. Colpocleisis along with hysterectomy is more conducive to the discovery of early asymptomatic malignant tumors of uterus, which is a suitable alternative for elderly frail women with severe POP.

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