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REVIEW

Quality-of-life improvements in patients after various surgical treatments for pelvic organ prolapse

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Abstract

Objective To compare the improvements in quality of life of patients with pelvic organ prolapse (POP) treated using various surgical methods.

Materials and methods The PUBMED, MEDLINE and Cochrane Library online databases were searched using the keywords "pelvic organ prolapse", "surgery", "PFDI-20" and "PFIQ-7" for articles published from January 2010 to December 2022 that included quality-of-life scores before and after surgery.

Results Forty-nine articles were include. The mean postoperative PFDI-20 and PFIQ-7 scores decreased by 67.50% and 76.98%, respectively, compared with those before surgery. In 76.9% of patients, this change did not decrease with increased postoperative time. The improvement rate in PFDI-20 scores after colpocleisis did not differ statistically from that after sacrocolpopexy and was significantly higher than that after other procedures. The improvement rate in PFIQ-7 scores after colpocleisis did not statistically differ from that after high uterosacral ligament suspension and was significantly higher than that after other procedures. The improvement rate in PFDI-20 scores after transvaginal mesh-based repair (TVM) did not significantly differ from that after sacrospinous ligament fixation and was significantly lower than that after other procedures except traditional vaginal wall repair. The improvement rate in PFIQ-7 scores after TVM did not significantly differ from that after new procedures and was significantly lower than that after other procedures.

Conclusions Surgical treatment can significantly improve the quality of life of patients with POP. Colpocleisis may offer more advantages than those of other surgical procedures, and improvement was lower after TVM than after other procedures.

Keywords Pelvic organ prolapse · Surgery · Quality of life

What does this study add to the clinical work

The improvement of quality of life after surgical treatment of POP is a vital assessment criteria. By literature review, colpocleisis may offer more advantages than those of other surgical procedures, and improvement was lower after TVM than after other procedures.

Introduction

Pelvic organ prolapse (POP) is a disease that adversely affects patients' quality of life. As the population ages, POP prevalence has gradually increased to 30–60%, with 6–8% of patients experiencing symptoms [1, 2]. Among these symptoms, uterine prolapse is the most important factor affecting women's quality of life [3]. The quality of life of patients with moderate or severe POP is decreased significantly [4], and surgery is the main treatment option. Traditionally, surgical decisions are made based primarily on anatomical abnormalities; however, the objective examination results may not accurately reflect quality-of-life changes. Thus, various quality-of-life questionnaires have been published to help evaluate surgical effects [5]. Barber et al. [6] developed the Pelvic Floor Distress Inventory Questionnaire (PFDI) and the Pelvic Floor Impact Questionnaire (PFIQ) in 2005. The short forms PFDI-20 and PFIQ-7 are currently the most widely used and are divided into three sub-tables:

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prolapse-related questions (Pelvic Organ Prolapses Disorder Inventory, POPDI-6/Pelvic Organ Prolapses Impact Questionnaire, POPIQ-7), intestinal-related problems (Colorectal-Anal Distress Inventory, CRADI-8/Colorectal-Anal Impact Questionnaire, CAIQ-7) and urinary-related problems (Urinary Distress Inventory, UDI-6/Uric Impact Questionnaire (UIQ-7). On these forms, higher scores indicate a more adverse effect on patients' quality of life. The PFDI-20 focuses mainly on how POP influences patients' feelings, whereas the PFIQ-7 focuses more on how POP influences patients' daily life. In addition to restoration of anatomical positioning, quality-of-life questionnaires have become important criteria for evaluating POP surgery outcomes. To understand improvements in PFDI-20 and PFIQ-7 scores by surgical procedure, we searched the related literature published from January 2010 to December 2022 and analyzed.

Materials and methods

Sources

The PUBMED, MEDLINE and Cochrane Library online databases were used to search the literature published from January 2010 to December 2022 with titles/abstracts that included "pelvic organ prolapse", "surgery", "PFDI-20" or "PFIQ-7". Since randomized controlled trial (RCTs) are designed to evaluate the efficacy of an intervention, they have lower heterogeneity, the benefits observed in RCTs may be diluted [7], thus ClinicalTrials.gov was not included in this search.

Study selection

Literature that was written in English and included the number of surgical patients, surgical methods, postoperative follow-up time, and average preoperative and postoperative PFDI-20 and/or PFIQ-7 scores was screened according to the preferred system evaluation and meta-analysis (PRISMA) flow. Patients were divided into seven groups according to surgical procedure. Group A underwent traditional vaginal wall repair; group B underwent transvaginal mesh-based repair (TVM); group C underwent sacrospinous ligament fixation (SSLF); group D underwent high uterosacral ligament suspension (HUS); group E underwent sacrocolpopexy (SC); group F underwent total colpocleisis/Lefort, and group G underwent various new operations reported in the literature. Postoperative improvement rates [which calculated as (pre-operative score – post-operative score)/ pre-operative score*100%]on the PFDI-20 and PFIQ-7 were analyzed and compared among the groups.

Statistical analysis

Statistical analysis was performed using SPSS 21.0 software. Measurement data are expressed as means ± standard deviation; countable data are expressed as percentages. Pearson's correlation coefficient was calculated to verify correlations. One-way analysis of variance was used to compare the means of groups of normally distributed data; Kruskal–Wallis analysis was used to compare the means of groups of non-normally distributed data. $P < 0.05$ was considered statistically significant.

Results

In total, 728 articles met the search criteria; 49 were finally included, excluding reviews, repeated articles and articles lacking full text (Supplementary Table 1). Figure 1 shows the screening flowchart.

Figure 2 shows the publication years of the studies; 53% of them were published in the last 3 years. Among these articles, 21 (43%) used only the PFDI-20, 6 (12%) used only the PFIQ-7, and 22 (45%) used both the PFDI-20 and PFIQ-7. Of 7423 total surgical patients, 879 (11.8%) underwent colpocleisis, and 6544 (88.2%) underwent pelvic floor reconstruction. Of these, 2268 patients underwent traditional autologous tissue repair, 1550 underwent TVM, 945 underwent SC, 713 underwent SSLF, 400 underwent HUS, and 668 underwent various newly reported surgical procedures (Fig. 3).

The postoperative follow-up time ranged from 1 to 84 months. Three studies were short-term follow-up studies (61%); 9 were medium-term follow-up studies (18%), and 10 were long-term follow-up studies (20%). The mean preoperative PFDI-20 score was 80.06 (range: 15.05–173.67; median: 73.60). The mean postoperative PFDI-20 score was 28.11 (range: 1.25–107.4; median: 19.11). The mean postoperative improvement rate on the PFDI-20 was 67.50% (range: 6.95%–97.9%; median: 72.14%). The mean preoperative PFIQ-7 score was 65.50 (range: 6.80–170.00; median: 68.85). The mean postoperative PFIQ-7 score was 15.65 (range: 0.15–55.40; median: 13.54). The mean postoperative improvement rate on the PFIQ-7 was 76.98% (range: 29.12–99.20%; median: 79.63%; Fig. 4).

Pearson correlation coefficient analysis showed no significant correlations between preoperative PFDI-20 and PFIQ-7 scores and improvement rates (Table 1). However, postoperative improvement rates on the PFDI-20 and PFIQ-7 differed statistically among the groups. From each group's weighted average values, the PFDI-20

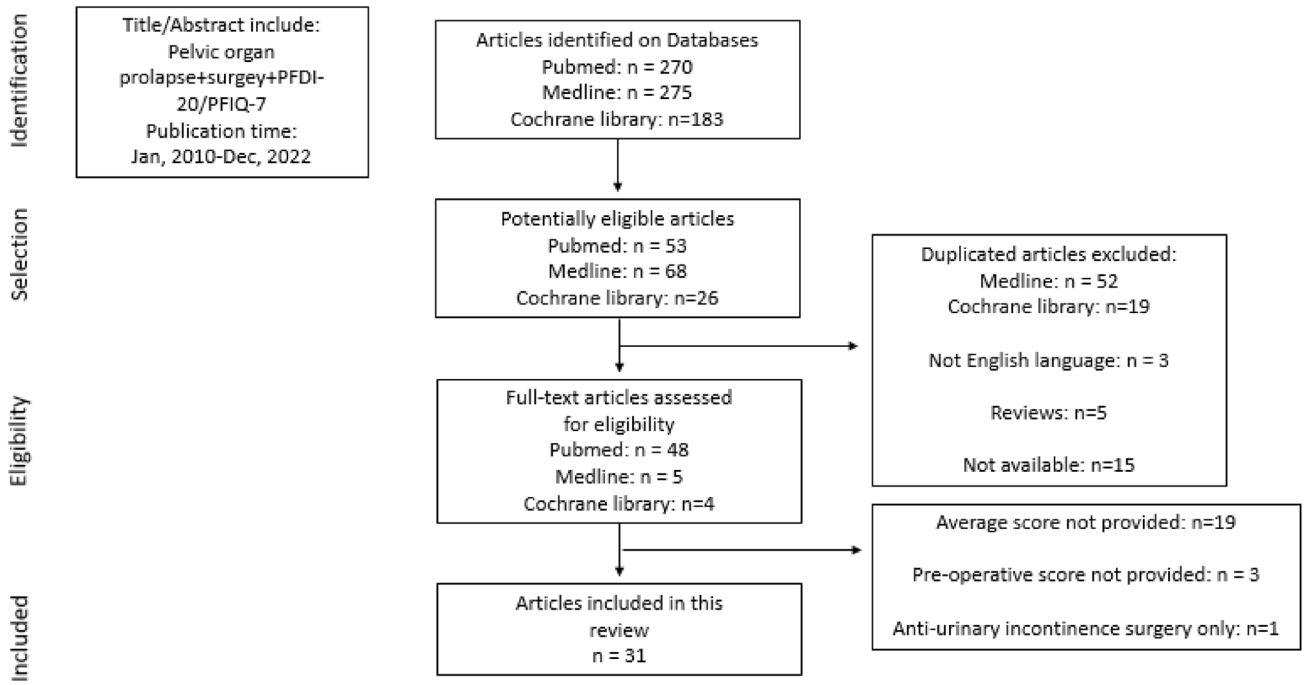

Fig. 1 PRISMA diagram in identifying the literature (2009 PRISMA Flow)

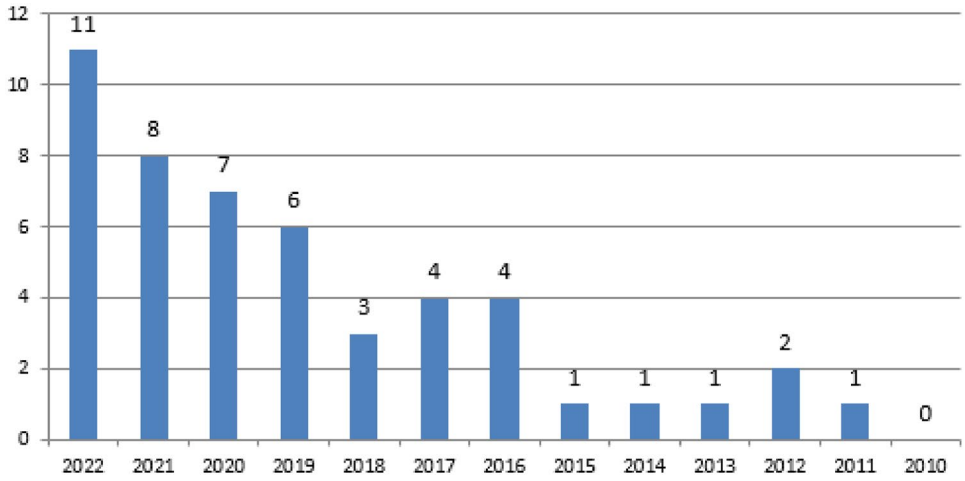

Fig. 2 Distribution of publication years

improvement rates by group were A < C, B < G < D < F, E (Table 2), and the PFIQ-7 improvement rates by group were B, G < A, C < E < D, F (Table 3).

Nine studies assessed the quality of life of surgical patients in 13 subgroups at two or more postoperative follow-up time-points. In ten subgroups (76.9%), PFDI-20 and PFIQ-7 scores did not change significantly (improvement rate < 5%) or decreased gradually with prolonged postoperative time (Supplementary Table 2).

Discussion

Surgery is the main treatment for moderate and severe POP, and its outcomes are mainly considered either "success" or "failure" according to anatomical standards, i.e., the lowest point after surgery exceeds the hymen level. However, half of patients who failed the anatomy standard thought their operation was successful, and 17% of patients who still had symptoms of postoperative vaginal

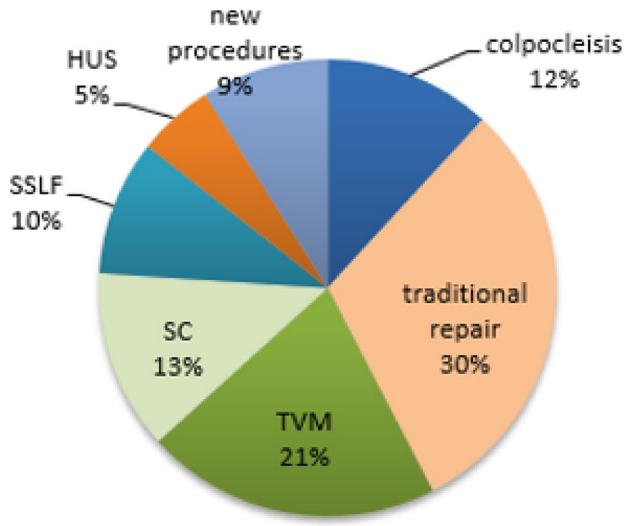

Fig. 3 Distribution of various surgical methods

protrusion actually had a successful procedure as per the anatomy standard [8]. Therefore, scholars increasingly believe that patients' quality of life after POP should be regarded as an important index for evaluating surgical effects, and new criteria have been developed to evaluate surgical outcomes. Lee's criteria for the success of POP surgery include four aspects: (1) anatomically, the lowest point of prolapse reaches above the hymen; (2) functionally, the bladder, intestines and sexual function are normal; (3) quality of life is satisfactory; and 4) no complications occur [9]. Mearini developed the satisfaction-anatomy-consistency-safety evaluation system, which evaluates the curative effect of POP surgery from these four aspects [10]. For this review, we comparatively analyzed the improvements in quality of life after POP only from surgical treatment outcome reports.

Commonly used quality-of-life questionnaires fall into two categories: overall impression scores and POP-related quality-of-life scores. The former includes mainly the 36-Item Short Form Survey and the Patient Global Impression of Improvement. The latter includes the PFDI-20 and PFIQ-7 and their subscales, the Prolapse Quality of Life(P-QoL), and the Prolapse/Urinary Incontinence Sexual Questionnaire Short Form(PISQ). Zinat et al. [11] studied patients' pre- and postoperative quality of life and use of a pessary to treat POP. The average postoperative PFDI-20 score decreased by 48.06, and the average PFIQ-7 score decreased by 33.41. A meta-analysis showed that surgery significantly improves patients' quality of life. Nina et al. [7] followed 2351 patients with POP in Finland for 2 years postoperation, and the PFDI-20 scores decreased by 55.5 (6 months) and 50.4 (2 years). Here, the average postoperative PFDI-20 score decreased by 51.95; the PFIQ-7 score decreased by 49.85, and the improvement rate in postoperative quality of life for the same group of patients was maintained over time in 76.9% of patients. Because the preoperative quality-of-life scores differed among studies, we assisted in the overall evaluation by calculating the postoperative improvement rate.

POP surgery is divided into reconstructive surgery and colpocleisis according to whether the vagina is preserved. The common methods of reconstructive surgery include traditional vaginal wall repair, TVM, SSLF, HUS, and SC.

Table 1 Correlation analysis of preoperative score and improvement rate

		Improvement rate
preoperative PFDI-20	Pearson correlation	− 0.21
	P value	0.11
preoperative PFIQ-7	Pearson correlation	0.088
	P value	0.57

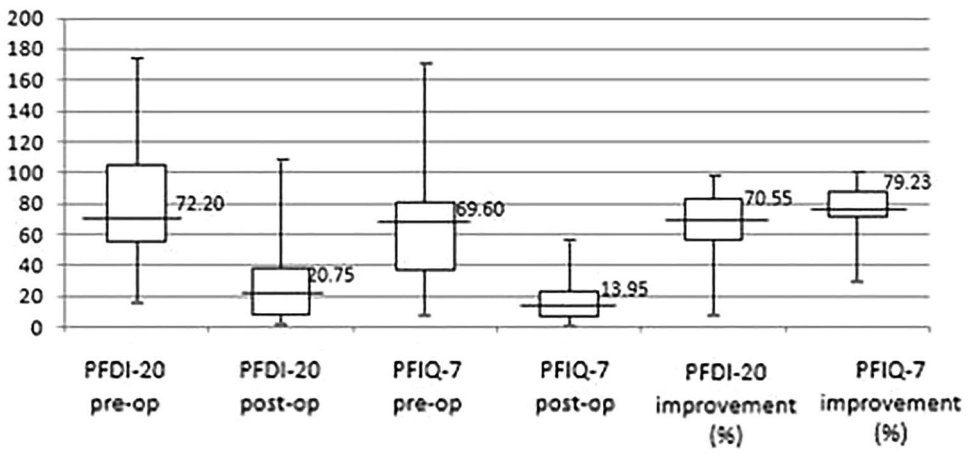

Fig. 4 Pre- and post-operative PFDI-20&PFIQ-7 score and improvement rate

Table 3 Comparison of the improvement rate of PFIQ-7 after various operations between groups

	Number	Weighted mean of improvement rate	*P* value compared with other groups					
			B	C	D	E	F	G
A	264	79.45 ± 6.78	0.049	0.44	< 0.01	0.011	< 0.01	< 0.01
B	768	72.08 ± 17.38		< 0.01	< 0.01	< 0.01	< 0.01	0.16
C	378	75.99 ± 15.39			< 0.01	0.041	< 0.01	< 0.01
D	294	85.31 ± 3.29				< 0.01	0.78	< 0.01
E	659	75.29 ± 20.90					< 0.01	< 0.01
F	58	87.53						< 0.01
G	535	73.30 ± 15.20						
Total	2956	75.79 ± 16.44						

Table 2 Comparison of the improvement rate of PFDI-20 after various operations between groups

	Number	Weighted mean of improvement rate	*P* value compared with other groups					
			B	C	D	E	F	G
A	2197	57.91 ± 6.81	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
B	1543	60.14 ± 26.37		0.063	< 0.01	< 0.01	< 0.01	0.037
C	713	58.72 ± 12.13			< 0.01	< 0.01	< 0.01	< 0.01
D	353	65.78 ± 8.24				< 0.01	0.032	0.44
E	875	75.34 ± 17.24					0.93	< 0.01
F	879	75.27 ± 7.95						< 0.01
G	621	66.43 ± 20.74						
Total	7181	63.84 ± 17.66						

Many new surgical methods have been introduced in the literature, but the sample sizes were too small to analyze. Zinat et al. [11] conducted a meta-analysis and found statistical differences by surgical method in the improvements in patients' quality of life, but they were not compared. In our study, the improvement rates were in the top two after colpocleisis and in the bottom two after TVM. Colpocleisis has the advantages of a short operation time, quick recovery, less bleeding and high postoperative satisfaction rates. The anatomical success rate can reach 98%, and patients' satisfaction rates can reach 92% [2]. However, owing to the loss of the vagina, colpocleisis is generally considered suitable only for elderly patients experiencing many complications. Over the past decade, as the population ages and people's quality-of-life requirements have increased, the proportions of colpocleisis in the United States and Canada have more than doubled. Our results suggest that colpocleisis has advantages over other operations for improving patients' quality of life. Although few patients regret undergoing colpocleisis, most regret the symptoms caused by the changes in defecation and urinary habits rather than the loss of vagina. Some patients remarried or had non-vaginal sex postoperatively, which improved family relations [2]. These results suggest that if a patient has not required intercourse for a long time, colpocleisis may better improve their quality of life. TVM is characterized by high anatomical success rates and low recurrence rates, especially in patients with severe anterior vaginal wall prolapse. Its anatomical success rate can reach 86.4%, which is significantly higher than that of traditional anterior vaginal wall repair (70.4%) [12]. However, because of mesh-related complications, literature reports on TVM's impact on patients' quality of life remain controversial [13]. TVM can be used as an alternative for patients with severe prolapse, who are relatively young or experience recurrence; they should be carefully selected and provide informed consent [9, 14]. In this study, although postoperative improvement rates on the PFDI-20 and PFIQ-7 in the TVM group were lower than those of other operations, the average still reached 60–70%, possibly because some patients with mesh-related complications were asymptomatic, and most symptoms could be relieved by conservative treatment. Additionally, the anatomical success rate of SC can reportedly reach 89%, but common complications include urinary retention and urinary system injury and infection, and the new stress of postoperative urinary incontinence is higher than that of other operations, which may affect the postoperative quality of life [15, 16]. However, in this study, the improvement rate after SC was approximately 75%, which was not significantly inferior to that of other operations.

One limitation of this study is that variables such as research population, surgical methods, evaluation indexes and follow-up times differed among studies; thus, the

statistical results may be biased. However, because no unified standard currently exists for these variables, these differences are inevitable. Second, this study focused only on the PFDI-20 and PFIQ-7 and included no other quality-of-life questionnaires such as the P-QoL and PISQ-12. Thus, a more comprehensive analysis is needed. Third, although we searched the PUBMED, MEDLINE and Cochrane Library databases, some articles, especially non-English articles, may have been missed.

Conclusion

The PFDI-20 and PFIQ-7, as quality-of-life assessment scales, have become important indicators for evaluating POP surgery outcomes. The average improvement rates in postoperative scores for various surgical methods exceeded 50%, and this change did not decrease with the extension of postoperative time in 76.9% of patients. Improvement rates in PFDI-20 and PFIQ-7 scores were relatively high after colpocleisis but relatively low after TVM. The principle of individualized and informed choice should be followed when choosing the surgical method. No uniform standard currently exists for evaluating patients' quality of life before and after POP surgery, and further studies are needed.

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Author contributions All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by YG. The first draft of the manuscript was written by YG and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Data availability All relevant data are within the manuscript and its supplementary tables.

Declarations

Conflict of interest The authors have no relevant financial or non-financial interests to disclose.

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