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Transvaginal high uterosacral ligament suspension: An alternative to McCall culdoplasty in the treatment of pelvic organ prolapse

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ABSTRACT

Objectives: Defects in female pelvic organ support are highly prevalent. Uterosacral ligament suspension at the time of primary prolapse repair (McCall culdoplasty) is a well-established surgical option to prevent prolapse recurrences.
Recently Shull's high uterosacral ligament suspension technique has gained increasing popularity among Uro-Gynaecologists. A study carried out in 2017 by Spelzini et al. compared these two techniques, showing proper safety and efficacy in the treatment of prolapse, with no statistically significant differences as to operative time, complication rate, anatomical, functional and subjective outcomes [1]. Our study aims at comparing the effectiveness, complication rate, recurrence rate, quality of life and functional result of the two techniques.
Study design: This is a retrospective study carried out on 224 patients who underwent vaginal cuff suspension for pelvic organ prolapse. Cases were extracted from hospital medical records of all women managed with surgical prolapse repair at our Gynaecology and Obstetrics department between January 2013 and February 2017. Shull suspension (group A) or McCall culdoplasty (group B) were performed according to surgeon's familiarity with the two suspension techniques.
Results: A total of 224 patients (69 in group A and 155 in group B) underwent surgical cuff suspension. Median operating time was 88 min for both techniques and ureteral injuries were very rare in both group A and B (1 and 0 respectively). In the evaluation of postoperative questionnaires, no statistically significant differences were found, except for "Urinary Impact Questionnaire" (UIQ), which showed significantly less urinary subjective symptoms in group A. Median follow up was 13 months in group A and 15 months in group B. Post-operative Pop-Q items analysis revealed only a higher Aa point in group A at 12 months follow up visit. Objective vaginal cuff recurrence was observed in 1 patient (1,4%) in group A and 4 patients in group B (2,6%) with no statistically significant difference between the two groups.
Conclusions: Both uterosacral ligament suspension procedures are safe and highly effective. There were no statistically significant differences concerning surgical data, complication rates, and the majority of anatomical, functional and subjective outcomes between Shull suspension and McCall culdoplasty.

Introduction

In the last few years, pelvic organ prolapse repair by transvaginal techniques with native tissues, has gained a renewed interest, especially after the recent updates about the safety and effectiveness of transvaginal placement of synthetic surgical mesh. Native tissues include structures of endopelvic fascia, such as the uterosacral ligaments, structures of the pelvic diaphragm: puborectalis, and iliococcygeus muscles and ligamentous structures: such as the sacrospinous ligament [1].

The efficacy of using native tissues in the repair of pelvic organ prolapse is well established [2]. Recently a randomised study by Carey et al. [3] showed better or similar outcomes for native tissues vaginal surgery with fewer complications compared to prosthetic surgery with synthetic mesh.

Shull's transvaginal high uterosacral ligament suspension and McCall culdoplasty are both effective in the prevention of vaginal cuff prolapse after vaginal hysterectomy, with good outcomes in 98,3% of patients [4].

A study comparing these two techniques was published in 2017 by, Spelzini et al., showing good safety and efficacy of both

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techniques in the treatment of prolapse, with no statistically significant differences in operating time, complication rate, anatomical, functional and subjective outcomes [1].

Our study aims at comparing the effectiveness, complications rate, recurrence rate, quality of life and functional results of Shull's high uterosacral ligament suspension and McCall culdoplasty.

Materials and methods

This retrospective study was carried out on 224 patients who underwent vaginal hysterectomy followed by vaginal cuff suspension for pelvic organ prolapse at the Academic Department of Gynaecology and Obstetrics at Mauriziano Umberto I Hospital, in Turin, Italy, between January 2013 and February 2017. Patient's data were extracted from hospital medical records.

Shull suspension (group A) or McCall culdoplasty (group B) were chosen according to surgeon's familiarity with the two suspension techniques. Additional surgical procedures such as anterior and/or posterior repair, and colpoperineorraphy were performed if required.

The grading of prolapse was preoperatively assessed according to Pop-Q system; concomitant urinary tract symptoms, such as stress and urge incontinence were searched and eventually confirmed by urodynamic tests. All patients had a stage $\geq$ II prolapse.

Follow-up visits were performed at 1, 3, 6, and 12 months after surgery and then annually.

Prolapse recurrence, urinary symptoms, sexual activity disorders or surgical related problems were assessed and monitored during follow up. Recurrence of anatomical prolapse was defined as any compartment descent $\geq$ stage II according to the POP-Q system.

Postoperative urodynamic evaluation was performed in case of worsening or new urinary symptoms.

Three questionnaires were used to evaluate subjective symptoms and subjective health conditions: PFIQ-7(Pelvic Floor Impact Questionnaire) [5,6], PISQ-12 (Pelvic Organ Prolapse/Urinary Incontinence Sexual Questionnaire) [6], in their short form, and SF-36 (The Short Form Health Survey) [7]; because of the retrospective study design, questionnaires were administered to the patients, during last follow up visit.

Statistical analysis

Contingency tables were created for comparison of categorical variables between groups, and the Chi-square test was used to test the statistical significance. Independent samples *t*-test was used to compare the difference between two unrelated groups on the same continuous dependent variable. For comparing differences between non parametric variables, Wilcoxon two sample test and Kruskal-Wallis test were used.

The level of significance was set to 5% two-tailed. Statistical analysis was carried out with SPSS software version 22 (SPSS Inc., Chicago, IL, USA).

Results

224 patients were included in the study: 69 patients underwent Shull's high uterosacral ligament suspension (group A), and 159 patients underwent McCall culdoplasty (group B).

The patients' demographics are presented in Table 1. The average age at diagnosis was 65.45 (±1.15) in group A and 65.45 (±0.65) in group B; 52 (75.4%) patients were post-menopausal in group A and 131 (84.5%) in group B; the mean body mass index (BMI) was 25.44 (± 3.7) in group A and 25.63 (±3.05) in group B; 6 (8.7%) patients were nulliparous in group A and 14 (9%) in group B; the total vaginal length (TVL) was 7.46 (±0.12) cm in group A and 7.34 (±01) cm in group B

Table 1
Patients' demographics in group A and B.

	A (Shull's suspension)	B (McCall)	p
BMI			
Average	25.44 (± 3.7)	25.63 (±3.05)	N.S
<25, n (%)	27 (42.19%)	74 (47.74%)	N.S
>25 x <30, n (%)	31 (48.44%)	62 (40%)	N.S
>30, n (%)	6 (9.38%)	19 (12.26%)	N.S
Parity			
Nulliparous	6 (8.7%)	14 (9%)	N.S
1-2 pregnancies	48 (69.6%)	113 (72.9%)	N.S
>2 pregnancies	15 (21.7%)	28 (18.1%)	N.S
Menopause	52 (75.4%)	51.31 (84.5%)	N.S
Age	65.45 (±1.15)	65.45 (±0.65)	N.S

Pre-operative vaginal profiles of the two groups, are summarized in Table 2. A statistically significant difference between the two groups was found in Aa length which was +2.18 ± 0.13 cm in group A and +1.65 (±0.11) cm in group B (P = 0.009) and in Pb length which was 3.03 (±0.11) cm in group A and 2.8 (±0.04) cm in group B (P 0.02).

The median time required to perform the surgical procedure, was 90 min in group A (ranging between 53 and 154 min) and 90 min in group B (ranging between 45 and 189 min) (P = 0.92). It includes vaginal hysterectomy, which was performed in all cases, and any anterior or posterior repair, when performed. The average hospitalization was 5.39 (±2.25) days in group A and 5.22 (± 1.3) days in group B (P = 0.92).

Additional anterior or posterior procedures are shown in Table 3. 65 (94.2%) patients in group A, and 139 (89.7%) patients in group B underwent concomitant anterior cystocele repair (P = 0.27). 8 (11.6%) patients in group A and 41 (26.5%) patients in group B underwent a levator ani myorraphy (P = 0.33).

As to surgical complications (Table 2), no statistically significant differences were found between the two groups except for postoperative fever with 5 (7.2%) cases in group A and 2 cases (2.3%) in group B (P = 0.01). One case of postoperative hematoma was reported in group A and 2 cases in group B. The case in group A required surgical treatment because of ureteral compression. One case of rectal perforation was reported in group A requiring surgical suture of the rectum with a protective colostomy.

Follow-up visits were scheduled at 1, 3, 6 and 12 months after surgery. 4 patients in group B were lost to follow-up. The median follow-up is 13 months (range 1–53) in group A and 15 months (range 1–72) in group B (P = 0,13).

Prolapse grading at last follow up visit is summarized in Table 4. At 12 months post-operative evaluation the only differences found between the two groups were in the Aa measurement which was −1.69 (±0.12) cm in group A and −1.35 (±0,1) in group B (P = 0.04) and in Pb measurement which was 3.01 (±0.11) cm in group A and 2.77 (±0.056) cm in group B (P = 0.03).

Table 2
Pre-operative assessment of prolapse.

Pre-operative vaginal profiles	A (Shull's suspension)	B (McCall)	p
Aa	2.18 (±0.13)	1.65 (±0.11)	<**0.05**
Ba	2.81 (±0.2)	2.44 (±0.14)	N.S
Ap	−0.82 (±0.23)	−0.58 (±0.16)	N.S
Bp	−0.73 (±0.24)	−0.57 (±0.17)	N.S
TVL	7.4 (±0.12)	7.34 (±0.1)	N.S
D	−1.3 (±0.66)	−1.9 (±0.35)	N.S
C	2.06 (±0.46)	1.59 (±0.29)	N.S
Gh	4.71 (±0.12)	4.63 (±0.08)	N.S
Pb	3.03 (±0.11)	2.8 (±0.04)	<**0.05**

Table 3
Additional anterior/posterior procedures; surgical complications.

	A (Shull's suspension)	B (McCall)	p
Anterior colporrhaphy	65 (94.2%)	139 (89.7%)	N.S
Levator ani myorraphy	8 (11.6%)	41 (26.5%)	N.S
Blood transfusions	1 (1.4%)	2 (1.4%)	N.S
Post-operative fever	5 (7.2%)	2 (1.3%)	<0,05
Hematoma	1(1.4%)	2 (1.3%)	N.S
Ureteral compression	1(1.4%)	0(0%)	N.S
Rectal damage	1(1.4%)	0(0%)	N.S

Table 4
Anatomical outcomes at last follow up visit (≥ 12 months).

Vaginal profiles at 12 months mean follow up	Shull's suspension	McCall	P
Aa	−1.69 (±0,12)	−1.35 (±0.1)	<0,05
Ba	−1.66 (±0.14)	−1.52 (±0.09)	N.S
Ap	−1.85 (±0,12)	−1.84 (±0,1)	N.S
Bp	−1.9 (±0,12)	−1.92 (±0.09)	N.S
D	−5.15 (±0,22)	−4.74 (±0.16)	N.S
Gh	4.46 (±0,12)	4.48 (±0.09)	N.S
Pb	3.01 (±0,11)	2.77 (±0.056)	<0,05
TVL	6.73 (±0.14)	6.7 (±0.1)	N.S.

Recurrences were evaluated after 1 year or at the last follow up visit (Table 5). Nine (13%) cases of anterior recurrence were found in group A and 33 (21.3%) in group B (P = 0.144). One case of vaginal cuff recurrence was reported in group A and 4 cases in group B (P = 0.597). Six (8.7%) cases of posterior recurrence were found in group A while 18 (11.6%) cases were found in group B (P = 0.515).

Postoperative questionnaires did not point out statistically significant differences between the two groups, except for "Urinary Impact Questionnaire" (UIQ), which showed significantly less urinary subjective symptoms in group A (p 0.02).

Comment

Uterosacral ligament suspension at the time of primary prolapse repair is a well-established surgical option to prevent prolapse recurrences [1] even if few data are available in the literature in comparison with the other techniques of vaginal cuff suspension.

The effectiveness of uterosacral ligaments as support structures seems to be related with the considerable amount of smooth cells expressed in these tissues [8] and with their superior stiffness at both low or high deformation compared to other native structures, such as the round or broad ligament [9].

An anatomical study performed by Buller et al. [10] showed how the optimal site for apical fixation is the intermediate portion of the uterosacral ligament, 1 cm posterior to its most anterior palpable margin, because of its distance from the ureter and other vital subjacent structures.

In this study, vaginal cuff suspension was performed by McCall culdoplasty or by Shull's technique according to surgeon's familiarity with the two techniques of suspension. In the study by Spelzini et al. in 2016 [1] Shull's technique was performed in young and sexually active patients.

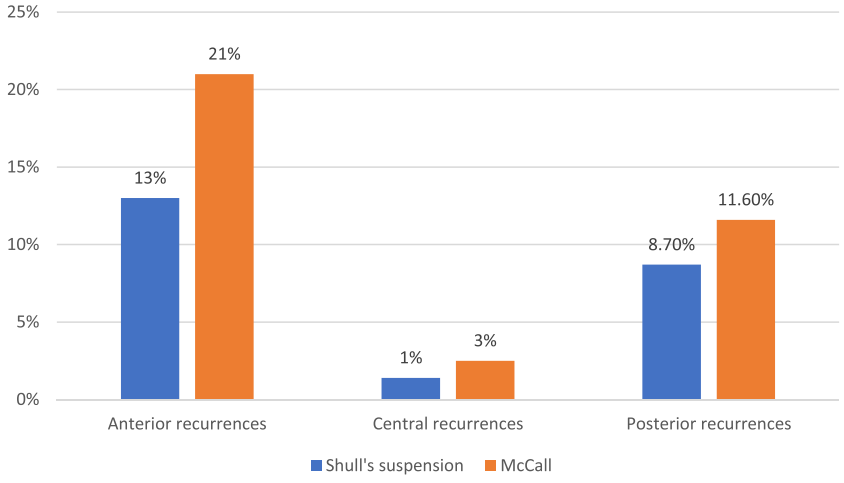
The median operating time was 88 min for both techniques a little shorter than the 106 min for McCall culdoplasty and 115 min for Shull's suspension reported by Spelzini et al. [1], 120 min for McCall culdoplasty reported by Colombo et al. [11]. and 140 min for Shull's technique in the original Shull's study [12].

A multi-compartment repair is often performed. More than 90% of patients in both groups of our study underwent anterior and/or posterior repair; these data are consistent with those reported in the literature [1,13].

Complication rates of the two techniques were similar: in particular, ureteral injuries were rare in both groups A and B (1.44% and 0% respectively). This is consistent with 1.8% of ureteral obstruction, described in a systematic review of USL (uterosacral ligament) suspension [4], with the results of the comparison between the two techniques by Spelzini[1] (1,9% with McCall technique and 0,8% with Shull suspension) and with a further study by Spelzini et al. reporting 2.6% of ureteral injuries with Shull's technique [14].

At 12 months Shull's technique and McCall culdoplasty are associated with respectively 13% and 28.4% of anterior recurrences (defined as any compartment descent ≥ stage II according to Pop-Q), 1,4% and 2,6% of vaginal cuff recurrences and 8,7% and 1,6% of posterior recurrences, with no statistically significant differences between the two groups. This is consistent with the recurrence rates reported by Spelzini et al. in 2018: 13,7% anterior recurrences, 1.2% vaginal cuff recurrences and 5% posterior recurrences at an average 32 months follow up after Shull's technique [14] and with the study by Milani et.al reporting 1.4% of vaginal cuff recurrences after modified McCall culdoplasty with an average 25 months follow up [1].

Table 5
Recurrences at last follow up visit (≥ 12 months).



Post-operative vaginal profiles, expressed with the POP-Q system, were similar in the two groups, with the exception of Aa point which was 3,4 mm higher in group A than in group B (while pre-operatively it was 5,3 mm lower in group A than in group B). No statistically significant differences were found in TVL between the two groups. This is in disagreement with Spelzini who reported TVL to be 8 mm longer in patients submitted to Shull's suspension, with no reported benefits on anterior compartment [1]· The similar TVL in our study may play a role in the analog outcomes between groups regarding sexuality found at PISQ-12 questionnaires.

Out of the outcomes evaluated with the post-operative questionnaires, only the "Urinary Impact Questionnaire" (UIQ), a subcategory of PFIQ-7, showed that patients who underwent Shull's suspension reported significantly less urinary subjective symptoms. This finding should be evaluated prospectively by performing baseline and post-operative urodynamics in future studies.

The main limitations of this study are its retrospective nature, the small number of cases, the lack of a baseline questionnaire, and the short median follow-up time.

However, this study, shows that both ligament suspension procedures are safe and highly effective. There were no statistically significant differences between Shull suspension and McCall culdoplasty as to surgical data, complication rates, and the majority of anatomical, functional and subjective outcomes, even if an improvement of urinary symptoms and a better anterior suspension seem to be associated with Shull's technique.

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