

Long-term outcomes of modified high uterosacral ligament vault suspension (HUSLS) at vaginal hysterectomy

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Abstract

Introduction and hypothesis The aim of this study was to prospectively evaluate long-term outcomes of a modified high uterosacral ligament suspension (HUSLS) at vaginal hysterectomy for pelvic organ prolapse (POP).

Methods POP was assessed 5 years postoperatively in 42 women who underwent vaginal hysterectomy and HUSLS for POP. Bladder, bowel, sexual function and quality of life (QoL) were evaluated.

Results Preoperatively, 27/42 women had at least BW grade 2 uterine prolapse. At a mean follow-up period of 59.4 months (range: 40–79 months), two women had undergone surgical intervention for vault prolapse, 33 had no vault prolapse and six grade 1 vault prolapse. One woman declined vaginal examination. Twenty women were sexually active and 18 completed the PISQ-31. The mean total score for all domains was 91/125. On QoL assessments high scores were noted in all domains.

Conclusions Modified HUSLS at vaginal hysterectomy is associated with satisfactory long-term objective and subjective outcomes, sexual function and quality of life scores.

Keywords Uterosacral ligament suspension · Vaginal hysterectomy · Vaginal vault prolapse · Vault suspension · Long-term outcomes

Introduction

Prolapse of the vaginal vault affects 6–11% of women [1] following vaginal hysterectomy for prolapse. Clark et al. [2] reported that the highest rates of re-operation for pelvic floor disorders occurred in women undergoing surgery for apical defects. The vaginal apex forms the capstone of support and adequate attention should be given to the re-suspension of the vault at the time of vaginal hysterectomy. A number of techniques are commonly employed at vaginal hysterectomy to prevent apical prolapse. The high uterosacral ligament suspension (HUSLS) anchors the vaginal apex to the remnants of the uterosacral ligaments at the level of the ischial spines and was popularised in the late 1990s. The original technique involved incorporation of the rectovaginal fascia and pubocervical fascia into the permanent sutures at the apex to restore the “pericervical cuff”. Shull et al. described bilateral uterosacral ligament suspension with three suspensory nonabsorbable braided sutures on each side, followed by plication of the pubocervical and rectovaginal fascia, first in the midline and then transversely by attaching it to the suspensory sutures [3]. In this study, the longest follow-up was 1.18 years. In only 85 out of 289 cases, a concurrent hysterectomy was performed, where the majority of the cases involved post hysterectomy vault prolapse. Wheeler et al. described a modification of the technique with a single polypropylene suture on each uterosacral ligament and large transverse bites to anterior and posterior fibromuscular tissue to fix the suture to the vaginal apex [4]. Of the 35 women, the majority (63%) had a previous hysterectomy. Although the mean follow-up interval was 23 months, the nonparticipation rate was over 44%, which could potentially impact on the results. Karram et al. [5] evaluated a technique that involves passage of two to four nonabsorbable sutures through each uterosacral

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ligament technique and reported recurrent apical prolapse rates of 1% (two women) and anterior or posterior segment prolapse of 4.5%. Silva et al. [6] evaluated the same technique at 5-years' follow-up and found surgical failure rates (recurrent prolapse of \geq stage 2 in one or more segments) as high as 15.3% and 2.8% recurrent apical prolapse rates of \geq stage 2. In this series, 62.5% of the patients had a previous hysterectomy.

The uterosacral vault suspension has been considered superior to the sacrospinous ligament fixation, as it preserves the vaginal axis in its natural position, thus reducing the risks of recurrent prolapse of other vaginal compartments, especially the anterior. Sacrospinous ligament suspension has been associated with postoperative rates of cystocele formation in 18–92% of women [7]. The uterosacral ligament suspension allows maximisation of the vaginal length and support by incorporating the proximal parts of the uterosacral ligaments. This is advantageous in terms of support, since the distal portions of the ligaments in women with uterovaginal prolapse may be severely attenuated or fragmented predisposing to recurrent vault prolapse [5].

We have previously evaluated a modified HUSLS technique [8] and confirmed satisfactory objective, subjective and sexual function outcomes at 15 months. The aim of the present study was to prospectively determine the 5-year outcomes as well as to evaluate quality of life parameters in the same group of women. The hypothesis of this study was that the previously studied short-term outcomes of the HUSLS procedure are maintained in the long term.

Materials and methods

Patients

This is an extended prospective follow-up series of a previous cohort of 53 consecutive women, who underwent vaginal hysterectomy for uterine prolapse and concomitant vaginal vault suspension, using the modified HUSLS technique, between December 2002 and March 2006. In this series, 42 women were included. Women, who had previously participated in the original study, had been informed that a more extended follow-up study would follow, and were invited to attend our department for a clinical assessment. The time interval from surgery to follow-up was 59.4 months (range, 40–79 months). Pre-operatively, the degree of prolapse was assessed using the Baden–Walker Halfway System (BW) [3] and the ICS Pelvic Organ Prolapse Quantification System (POP-Q) [9]. We used a standardised pelvic floor questionnaire evaluating prolapse, bladder and bowel continence and sexual function pre-and post operatively. Symptoms were assessed at interview using this proforma. The same proforma had

previously been used for the evaluation of the short-term outcomes of this technique [8]. Symptoms assessed associated with prolapse, included vaginal bulge and vaginal discomfort. Sexual activity and function was ascertained. We also noted any history of straining or splinting at defecation, digital evacuation or defecatory difficulty. At follow-up, following counselling and informed consent, prolapse was quantified again using the Baden–Walker and POP-Q systems. Anatomically, satisfactory outcome was defined as Baden–Walker grade 1 prolapse or less or POP-Q stage 0 or 1. Quality of life parameters were evaluated using the p-QoL-validated questionnaire [10]. At follow-up, all sexually active women were asked to complete the Prolapse and Incontinence Sexual Function Questionnaire (PISQ-31) [11]. The questionnaire has three domains, including a physical domain, a partner-related domain and a domain relating to emotional factors. A high score on this questionnaire represents good sexual function. All the objective and subjective parameters at follow-up were obtained and assessed by investigators (SD, AK) not involved in the index surgery to avoid bias. All data was transferred to a dedicated Microsoft 2007 Excel® database. Statistical analysis was undertaken using SPSS® 15 statistical package and *t* test and chi-square was undertaken where appropriate. This study was registered to our hospital's Audit Committee (Audit Registration No: 1658).

Description of the modified HUSLS technique

All patients were operated by or under the direct supervision of the senior author (MMF). The mean duration of the total surgical procedure (which in most cases included concomitant POP and incontinence surgery) was 115 min (SD, \pm 31 min; Figs. 1, 2 and 3).

Vaginal hysterectomy was performed according to standard surgical principles. The uterosacral pedicle is ligated using a delayed absorbable Polydioxanone Suture 0 (PDS 0) with the end left long and tagged for later use. A moist vaginal pack is then inserted into the peritoneal cavity to keep the bowel out of the operative field. Exposure of the uterosacral ligaments (USLs) is achieved using two Navratil-Breisky retractors. A Littlewood's clamp is placed on the distal portion of the ligated uterosacral ligament and the ligament is held under tension in a caudad direction, while the ligament is palpated intraperitoneally so as to determine its integrity, consistency and descent, as well as the most appropriate site for the suspension suture placement. This is usually at the level of the ischial spine approximately 3 to 4 cm from the distal end of the ligament. In those women where the vault is not supported sufficiently by the USLs or the USLs are felt to be deficient, transected or attenuated, the modified HUSLS procedure is undertaken. If the USLs appear intact and

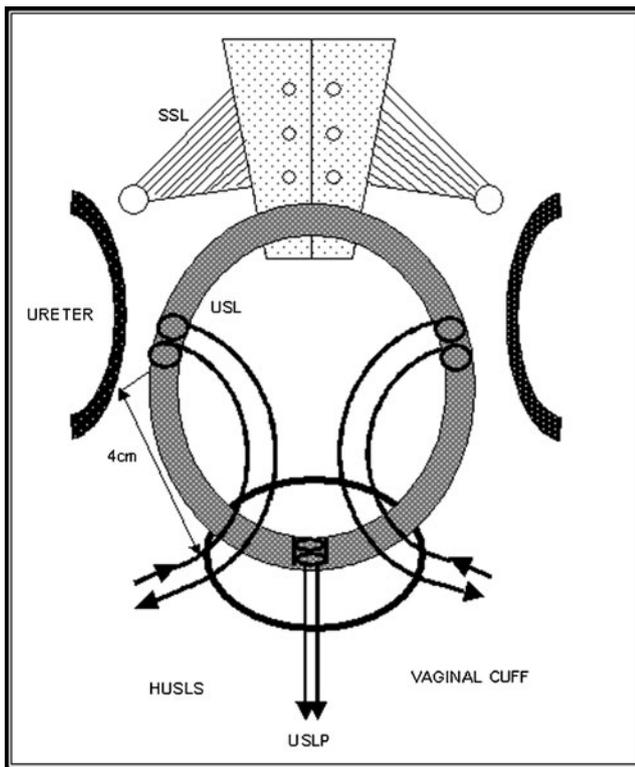


Fig. 1 High uterosacral ligament suspension. *SSL*, sacrospinous ligament; *USL*, uterosacral ligament; *HUSLS*, high uterosacral ligament suspension; *USLP*, uterosacral ligament plication

adequate support to the vault is expected to be achieved with McCall's culdoplasty, this procedure can be undertaken. In those women undergoing HUSLS, using an absorbable monofilament Polydioxanone suture 0 (PDS 0), starting on the vaginal side of the vault at about the 4-o'clock position, a 'bite' is taken through the vagina to include the parietal peritoneum. Proximal and lateral

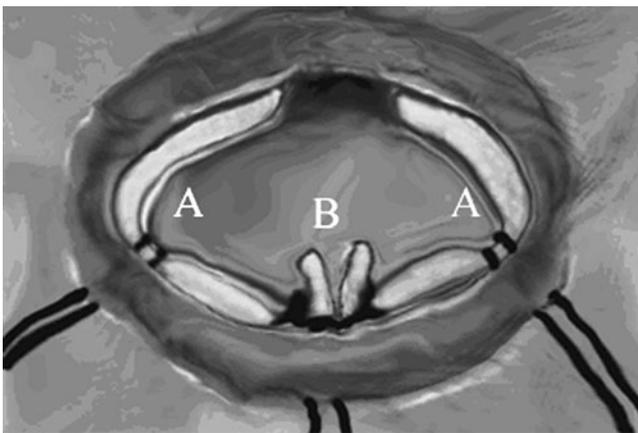


Fig. 2 Anatomical view of the vaginal vault following hysterectomy demonstrating the HUSLS and the midline uterosacral ligament plication. *A*, attachments of HUSLS sutures; *B*, attachment of uterosacral ligament plication suture

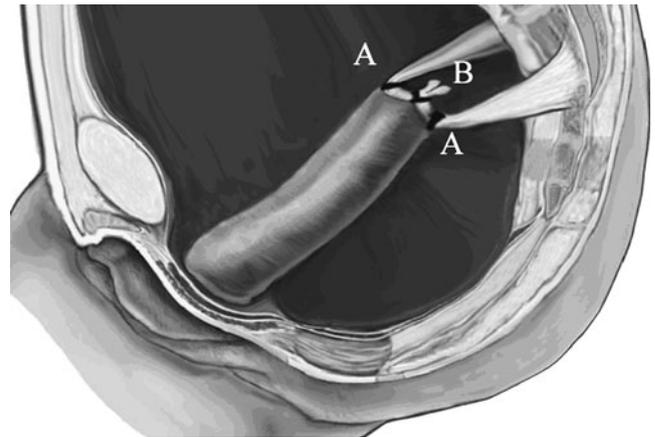


Fig. 3 Sagittal view of the vagina following hysterectomy, demonstrating the attachments for vault support. *A*, HUSLS sutures; *B*, uterosacral ligament plication suture. Figures reproduced from Jeffery et al. [8] (with permission)

placement is recommended as it is associated with lower risk of injury to the ureter [12]. The suture is inserted in an anteroposterior direction (away from the ureter) to further minimise the risk of injury. Using the first 'bite' to apply gentle traction on the uterosacral ligament a second more proximal 'bite' is taken through the ligament using the same suture. The suture is then brought back out through the vagina on the ipsilateral side, about 1 cm from the entrance point, in an inside-out fashion. This is repeated on the opposite side, using a new suture entering the vault at the 8-o'clock position. These sutures are tagged for later use. The original uterosacral ligament sutures are then tied in the midline and brought out through the posterior part of the vaginal vault, using a loose Mayo needle to prevent a postoperative enterocele by obliterating the posterior cul-de-sac. If there is an anterior compartment defect, this is repaired by extending the vaginal vault incision and an anterior repair is performed. Using a two-layer technique, the plication sutures are anchored to the plicated uterosacral ligaments to prevent an anterior enterocele or high cystocele following surgery. This technique, therefore, ensures reconstitution of the normal pericervical cuff support. The vaginal vault is then closed using an absorbable suture and the midline vault sutures are tied. It is only after the vault has been closed that the right and left HUSLS sutures are tied separately and in a fashion resembling a pulley system, elevating the vaginal vault. If the patient requires a posterior repair or perineal reconstruction to reduce hiatal size, it is performed at this point. If a mid-urethral sling is required, it may be performed at the start of the procedure. At the end of the operation, a cystoscopy with intravenous dye (methylene blue or indigo carmine) is undertaken to confirm ureteric patency by observing urinary jets from the orifices.

Results

We followed up women who had undergone modified HUSLS at vaginal hysterectomy. Of the initial cohort of 53 women studied in a previous publication, 42 women were included in the long-term follow-up group. Two of them have died, one suffers from dementia, one from hearing loss and the remaining women were unobtainable despite multiple attempts to contact directly and via their general practitioner.

Demographic data

The mean age at the time of operation was 61.9 years (range 43–79 years, SD: ± 10.6). Mean parity was 2.7 (range 1–6; SD, ± 1.2). The mean BMI preoperatively was 28.3, (SD, ± 6.64) and at the time of 5-year follow-up 27.8, (SD, ± 4.8 ; $p=0.477$). Nine women (21.4%) had previous urogynecological surgery. The mean operating time was 115 min (range, 60–180 min; SD, ± 31) and the mean blood loss 239 ml (range, 50–750 ml; SD, ± 175).

Postoperative complications

Two patients developed postoperative ureteric obstruction despite evidence of patency at cystoscopy intra-operatively. Further investigation revealed that one woman had developed ureteric obstruction due to distal kinking and edema at the vesicoureteric junction secondary to anterior vaginal repair. The other case of ureteric obstruction was due to an ischemic injury at the pelvic inlet in an elderly woman with diabetes. In the opinion of our urological colleagues, neither of these ureteric accidents was due to the HUSLS. The first case resolved with expectant management but the second required ureteric reimplantation. Finally, one woman with diverticular disease developed a sigmoid–vaginal fistula 31 months postoperatively and subsequently underwent a sigmoid colectomy. This was unrelated to her prolapse surgery.

Concomitant procedures

Concomitant procedures at the time of hysterectomy included anterior vaginal repair (34 women), posterior vaginal repair (20 women) and insertion of mid-urethral tape (seven women).

Further POP/urinary incontinence interventions

One woman had an abdominal sacrocolpopexy a year after the hysterectomy. Two women underwent transobturator tape insertion. Three women required a posterior vaginal repair. Of them, one had a concomitant bilateral ileococcy-

geous fixation (14 months after the vaginal hysterectomy) and one other woman concomitant transobturator tape insertion followed by an anterior vaginal repair and excision of the tape. Although the two cases of subsequent vault procedures appear likely to be failures of the vault suspension at the time of hysterectomy, it is not possible to ascertain whether the requirement of any subsequent surgical interventions for POP are related to this procedure, to pre-existing factors or to de novo prolapsed (Table 1).

Anatomical outcomes, symptoms and quality of life

The anatomical outcomes are presented in Table 2. Preoperatively, of the 42 women included in this cohort, one woman had no uterine prolapse, 14 had grade 1, 15 grade 2, 11 grade 3 and one grade 4. At the time of follow-up 33/39 women had no prolapse of the vault and 6/39 had a grade 1 prolapse. Comparisons between the subgroups of preoperative uterine prolapse BW grade 1/2 and BW grade 3/4 did not show any significant differences in prolapse grades of the bladder, vault and rectum at 5-years follow-up.

At follow-up, five women reported a vaginal bulge and four vaginal discomfort. Of those reporting bulge, two had undergone subsequent posterior vaginal repair, one with the concomitant bilateral ileococcygeous fixation. Of the remaining three women, one had no prolapse, one BW grade 1 cystocele, enterocele and vault prolapse and one grade 1 cystocele and grade 3 enterocele. Of the four women reporting vaginal discomfort, one was again the patient with the subsequent posterior vaginal repair and concomitant bilateral ileococcygeous fixation, one with the subsequent sigmoid–vaginal fistula repair, one had BW grade 1 cystocele and rectocele and the last one had no prolapse. Four women reported stress urinary incontinence. Of them, one developed stress incontinence immediately after surgery (vaginal hysterectomy, anterior and posterior repair), and three had a late onset. Those women who had subsequent POP/incontinence surgery were excluded from the calculations of the respective compartment, as the examination findings would reflect the outcomes of the most recent intervention and not the index surgery (vaginal hysterectomy); i.e. the following cases were excluded from the calculation of the postoperative scores:

- From BW1, those women with subsequent transobturator tape insertion.
- From BW2, those women with subsequent anterior vaginal repair.
- From all calculations, women with subsequent vault suspension procedures.
- From BW5, women with subsequent posterior vaginal repair.

Similar calculations were undertaken for POP-Q.

Table 1 Cases requiring further interventions, time intervals and grade of prolapse preoperatively and at time of second procedure

Case no	Index surgery	Further intervention	Time interval from index surgery to second intervention	Prolapse preoperatively						Prolapse postoperatively					
				BW1	BW2	BW3	BW4	BW5	BW6	BW1	BW2	BW3	BW4	BW5	BW6
1	VH and HUSLS	Abdominal sacrocolpopexy	1 year	1	1	3	1	1	0	3	3	1	2	3	0
2	VH and HUSLS and AVR	PVR + BIF	14 months	1	2	2	1	2	0	3	3	3	2	1	0
3	VH and HUSLS and AVR	PVR	1 year (other hospital)	2	2	3	2	2	2	Unknown as patient was assessed and had surgery in other hospital					
4	VH and HUSLS and AVR and PVR	TOT+PVR	19 months	2	3	1	1	2	0	1	1	1	1	1	1
5	VH and HUSLS	TOT	41 months	2	2	1	2	2	2	1	1	0	0	0	0

VH vaginal hysterectomy; HUSLS high uterosacral ligament suspension; AVR anterior vaginal repair; PVR posterior vaginal repair; TOT transobturator tape; BIF bilateral ileococcygeal fixation

For the assessment of quality of life parameters, we used the p-QoL validated questionnaire. Selected responses are shown in Table 3.

Sexual function

We evaluated the postoperative sexual function in those women who were sexually active at follow-up and also agreed to complete the sexual function questionnaire PISQ-31, as this was the tool used for the evaluation of sexual function. From the calculations, we excluded those women who had further surgery postoperatively. Preoperatively, 22 women were sexually active. Postoperatively, 20 women were sexually active. Of the women who stopped being active, one complained of loss of libido and chronic vaginal pain, one has no partner, one could not resume sexual activity due to anxiety, one lost her husband 18 months ago and one had dyspareunia.

In contrast two previously inactive women have now resumed activity. Eighteen women completed the PISQ-31, but the woman who subsequently had abdominal sacrocolpopexy was excluded from these calculations.

The mean total score for all domains was 91 (range 65–107) out of a maximum of 125. In question 11, (Do you feel pain during sexual intercourse?), nine women answered “never”, four women “seldom”, three women “sometimes” and one woman “always” (grade 3 enterocele). In question 15 (Do you avoid sexual activity because of the length of your vagina?), 14 women answered “never”, 2 women “seldom” and one “sometimes”. Finally in question 16 (Do you avoid sexual intercourse because of bulging in the vagina [either the bladder, rectum or vagina falling out?]), 15 women answered “never” one woman “sometimes” and one “usually”.

Discussion

In a previous publication [8], we demonstrated excellent subjective and objective outcomes with this modified technique of HUSLS with success rates >94% at 15 months. Our results compared favourably with other studies [3–6, 13] evaluating HUSLS involving varied techniques. However, this was the first study to assess the role of HUSLS done at hysterectomy alone, with other reports on this procedure involving heterogenous groups of patients with both uterine prolapse and post-hysterectomy vault prolapse.

Our technique for HUSLS differs from procedures previously described. The published studies describe fascial reconstruction in some or other form when performing a high uterosacral ligament suspension. Our technique differs from these authors in that we simply attach the uterosacral sutures to the vaginal vault. The only additional measure is

Table 2 Anatomical outcomes

Baden–Walker and POP-Q	Preoperative		Postoperative at 5 years		Postoperative at 5 years	
	Mean	Median	Mean	Median	BW \leq 1 or POP-Q \leq 1	BW \geq 2 or POP-Q \geq 2
BW1—urethra	2.29	2	0.36	0	34/36 ^a	2/36 ^a
BW2—bladder	2.4	2	0.55	0	36/38 ^a	2/38 ^a
BW3—apex	1.93	2	0.15	0	39/39 ^a	0/39 ^a
BW4—cul-de-sac	1	1	0.16	0	38/39 ^a	1/39 ^a
BW5—rectum	1.45	2	0.64	1	32/36 ^a	4/36 ^a
BW6—perineum	0.6	0	0.11	0	38/38 ^a	0/38 ^a
POP-Q Aa	0.67	0	-1.97	-2	29/39 ^a	10/39 ^a
POP-Q Ba	0.07	0	-1.9	-2	17/39 ^a	12/39 ^a
POP-Q C	-2.06	-3	-6.85	-7	39/39 ^a	0/39
POP-Q GH	3.94	4	4.48	5	—	—
POP-Q PB	3.3	3	2.98	3	—	—
POP-Q TVL	8.3	8	8.28	8	—	—
POP-Q Ap	-1.3	-1	-2	-2	26/37 ^a	11/37 ^a
POP-Q Bp	-1.15	-1	-1.7	-2	32/37 ^a	5/37 ^a
POP-Q D	-3.94	-5				

Four of the thirty-nine women had stage 1 vault prolapse (POP-Q—C) and 6/39 women had grade 1 vault prolapse (BW) at 5-years' follow-up

^a Those women who had subsequent POP/incontinence surgery were excluded from the calculations of the respective compartment, i.e. the following cases were excluded from the calculation of the postoperative scores: (1) from BW1 those women with subsequent transobturator tape insertion, (2) from BW2 those women with subsequent anterior vaginal repair, (3) from all calculations women with subsequent vault suspension procedures, and (4) from BW 5 women with subsequent posterior vaginal repair; similar calculations were undertaken for POP-Q

plication of the original uterosacral suture pedicles in the midline and exteriorisation through the vault. We believe this prevents development of an enterocele. Where anterior vaginal repair is required, the plication sutures are attached to the uterosacral bridge to achieve circumferential support and reconstitution of the normal support is provided by the pericervical cuff.

Another difference is that in the other studies describing vault suspension techniques, a non absorbable monofilament or multifilament suture material was used. In contrast, we used polydioxanone suture and the durability of our anatomical outcomes appears unaffected.

The longest follow-up study to date is the one by Silva et al. [6] evaluating outcomes 5 years postoperatively. However, this study cohort also consisted of mixed group of uterosacral ligament suspension at hysterectomy with post-hysterectomy vault prolapse repair. The authors used nonabsorbable sutures and admitted high (over 34%) loss to follow-up rates.

Margulies et al. [14] have recently published a systematic review evaluating uterosacral ligament suspension. In this review, studies with different techniques and various follow-up intervals and methods were included, confirming the heterogeneity of the available evidence.

In Shull's series the operative time was 2.2 h [3], whereas our technique appears quicker to perform as the

mean operative time was less than 2 h (115 min). It is also simple, as it involves a double ligation of each uterosacral ligament with a single suture and exteriorisation through the vaginal epithelium thus facilitating optimal plication of the vaginal vault and avoidance of narrowing. Our technique has comparable outcomes to the more complex procedures and is associated with maintenance of good vaginal length in the long-term.

The greatest risk associated with this procedure is ureteric injury. This concern has been raised by most authors and Margulies' et al. [14] systematic review estimated ureteric obstruction rates as high as 1.8% with the various surgical techniques. In one series [13], the incidence of ureteric damage was 11%, with Shull [3] and Karram [5] reporting lower rates of 1% and 2.4%, respectively. In our cohort, two women had ureteric obstruction, however, neither of these was considered by the urologists as a direct complication of the procedure. In the first case, the injury was related to edema at the vesicoureteric junction following anterior vaginal repair and resolved with expectant management. The second injury occurred at the pelvic inlet in an elderly diabetic woman and was felt to be related to traction on the infundibulopelvic ligament at the time of surgery. Although large series are required to determine the risk of ureteric injury, we believe that good surgical technique for high suspension of

Table 3 p-QoL questionnaire parameters

	Very good	Good	Fair	Poor	Very poor
How would you describe your health at present?	9	19	9	1	
	Not at all	A little	Moderately	A lot	
How much do you think your prolapse problem affects your life?	16	16	1	5	
To what extent does your prolapse affect your household tasks (e.g. cleaning, washing up, etc.)	30	3	4		
Does your prolapse affect your job or your normal daily activities outside the home?	34	2	1		
Does your prolapse affect your physical activities (e.g. going for a walk, run, sport, gym, etc.)	27	6	2	2	
Does your prolapse affect your ability to travel?	29	5	2	1	
Does your prolapse limit your social life?	31	4		2	
Does your prolapse limit your ability to see/visit friends?	33	2	1	1	
Does your prolapse affect your relationship with your partner?	31	4	2		
Does your prolapse affect your sex life?	31	3	2	1	
Does your prolapse affect your family life?	35	2			
Does your prolapse make you feel depressed?	29	6		3	
Does your prolapse make you feel anxious or nervous?	30	5		3	
Does your prolapse make you feel bad about yourself?	29	4	2	3	
Does your prolapse affect your sleep?	32	5	1		
Do you feel worn out/tired?	16	15	6	1	
Do you do any of the following to help your prolapse problem?					
	Never	Sometimes	Often	All the time	
Use tampons/pads/firm knickers to help?	33	2	2	1	
Do you push up the prolapse?	35	1	1	1	
Pain or discomfort due to the prolapse?	30	8			
Pain or discomfort due to the prolapse?	31	6	1		

the uterosacral ligaments, involving fewer steps, reduces the risk of ureteric damage. Aronson [12] suggests that a deep, dorsal, posterior technique of suture placement increases the margin of safety for the ureter fivefold. It remains prudent, however, to confirm ureteric patency at the end of the procedure and any surgeon performing this technique should be confident with cystoscopy with or without the use of intravenous contrast with a suitable agent (methylene blue or indigo carmine). There may also be a role for ureteric stenting in those women with complex or advanced POP. As ureteric injury may not be detected by intraoperative cystoscopy, those women with normal cystoscopies at the time of surgery, but high index of clinical suspicion should be closely monitored postoperatively with urinary tract ultrasound and blood serum biochemistry for renal function.

Silva et al. [6] report good sexual function following HUSLS, indicating good satisfaction. In our series, women scored highly on a number of specific domains on the PISQ-31, as well as on the overall scores. The high scores

indicate that this technique appears to be associated with satisfactory sexual function in the long term.

One of the strengths of the study is that the surgeons who undertook the assessment (SKD, AK) were different to those performing the procedure, in order to avoid the risk of positive outcome bias. A randomised controlled trial would, of course, provide stronger evidence on the effectiveness and outcomes of the different techniques. However, our prospective follow-up study still adds long-term evaluation data to the already published series. Furthermore, another limitation of our study is a significant loss to follow-up, which seems inevitable in studies of this type. Finally, we acknowledge that the lack of preoperative validated quality of life and sexual function data makes quantitative comparisons between preoperative and long-term postoperative scores impossible. However, the prospective comparisons between the first and the extended follow-up would remedy this weakness as the focus of this study is the durability of our technique rather than just the operative success rates in terms of anatomical success, symptoms and quality of life.

In conclusion, we describe satisfactory long-term outcomes using a modified technique for vault suspension at the time of vaginal hysterectomy. This technique could become part of a standard vaginal hysterectomy for POP, in order to improve the long-term outcomes of POP surgery.

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Conflicts of interest None.

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