

Is ‘suspension plus plication’ of the uterosacral ligaments to the vaginal apex during hysterectomy a preventive measure for vaginal vault prolapse? A randomized trial

EMINE KAYHAN MERT¹, AHMET AKIN SIVASLIOGLU²

¹ İzmir Alsancak Nevval Salih İşgören State Hospital, Obstetrics and Gynecology

² İzmir Katip Çelebi University Atatürk Training and Research Hospital, Obstetrics and Gynecology

Abstract: OBJECTIVE. The purpose of this study is to investigate the effectiveness of ‘suspending+plicating’ of the uterosacral ligaments to the vaginal apex during transabdominal total hysterectomy as regards development of postoperative vaginal vault prolapse. *Materials and methods:* The study has been carried out on 60 women who have had total abdominal hysterectomy due to benign reasons between the dates of April 2013 and April 2014. The patients were randomly allocated either to ‘suspension + plication’ group (SP, Group 1) or ‘suspension’ group (S, Group 2). Pelvic Organ Prolapse Quantification (POP-Q) system was applied to all patients before and at 6th months after the surgeries. Preoperative and postoperative C point and transvaginal length (TVL) values were compared within and between groups. Wilcoxon Signed Ranks test has been used for the statistical analysis of the data. P value was set at <0.05 for statistical significance. *Results:* There were no statistically significant differences between the groups in terms of C point and TVL values before the operations ($p > 0.05$). The comparison between C points (preoperatively and at the 6th month follow up) showed statistically significant difference ($p = 0.0002$) in group 1, whereas no difference was found in group 2 regarding C point ($p = 0.1433$). However, the comparison between TVL measurements (preoperatively and at the 6th months follow up) showed no statistically significant difference in group 1 ($p = 0.4539$), but statistically significant difference was observed in group 2 concerning TVL measurements ($p = 0.0001$). *Conclusion:* The ‘suspension + plication’ of the uterosacral ligaments is prophylactic on vault prolapse in the short term.

Keywords: Vault prolapse; Uterosacral ligament; Suspension; Plication; Prevention.

INTRODUCTION

The uterosacral-cardinal ligament complex is the basic structure that supports the uterus in its normal anatomic position and the effect of uterosacral ligament (USL) is very prominent with respect to cardinal ligament regarding the De Lancey Level 1 support.¹ Actually, the cardinal ligament (CL) is a fascial envelope which entails internal iliac vessels and uterine vessels, fuses to the cervix, lower uterine segment and upper vagina. On the other hand, the USL is much denser and stronger than the CL. Hence, the USL has been becoming an important structure of interest in the management and prevention of pelvic organ prolapse. While 33% of the USL originates only from the cervix, 63% originates from both the cervix and vagina and 4% originates only from the vagina; 82% of the USL terminates at the sacrospinous ligament/coccygeus muscle complex, 7% terminates at the sacrum and 11% terminates at the m.piriformis.² The origin of the USL is fanlike at the sacrum, narrowing to its smallest width just proximal to the cervix.

The length of the USL ranges between 12-14 cm. Based on the thickness and attachments of the ligament, it can be subdivided into three sections: distal (cervical, 2-3 cm), intermediate (5 cm) and proximal (sacral, 5-6 cm).³ The intermediate part is wide, thick and has a distance of 2 cm from the ureter which makes it the most appropriate section for surgery.³

Hysterectomy is the most commonly performed surgical procedure, approximately 600,000 hysterectomies are being undertaken in each year in the United States.⁴ One of the complications of hysterectomy is the vaginal vault prolapse. Although the exact incidence is not known, the incidence ranges between 0.2% to 43%.⁵

Various surgical techniques have been proposed in order to prevent postoperative vault prolapse. The suspensions of vault to the USL or USL/CL complex are one of those techniques that can be done easily concomitant with the abdominal hysterectomy.⁶⁻⁸

In this study, we aimed to compare effectiveness of the suspension + plication of vaginal vault to the USL with the suspension of vault to the USL/CL complex (described by Richardson) on the potential development of cuff prolapse.

MATERIALS AND METHODS

This prospective, randomised study has been carried out in the Gynecology and Obstetrics clinics of the İzmir Katip Çelebi University, Atatürk Training and Research Hospital between April 2013-April 2014. The ethics committee of the hospital accepted the study (Decision Number/Date: 62 / 25.April.2013). All of the patients have signed an informed consent before participating to the study.

The study group consisted of 60 women who underwent total abdominal hysterectomy (type 1) due to benign pathologies. Once the uterus has been removed a group of patients had their vaginal apex being ‘suspended’ to the USLs, in addition to that the USLs were plicated to each other. This group was named as ‘suspension + plication group’ or Group 1. Another group of patients only had their vaginal apex being ‘suspended’ to the USL/CL complex (described by Richardson).⁷ This group was named as ‘suspension group’ or Group 2. Each group entailed 30 patients and the patients were allocated to the groups by a computer programme randomly. The study flow chart has been given (Figure 1).

Surgical procedures

Plication + suspension technique: once the uterus has been removed, a nonabsorbable suture starting from the ipsilateral cervical USL and ending at the ipsilateral vaginal vault angle was tied. The same kind of suture was repeated on the contralateral side [(first and second suture) (Figure 2)]. Then a nonabsorbable suture (1 cm. caudal to the first suture) starting from ipsilateral USL passing through the posterior vaginal wall (not entering to the vagina) and end-

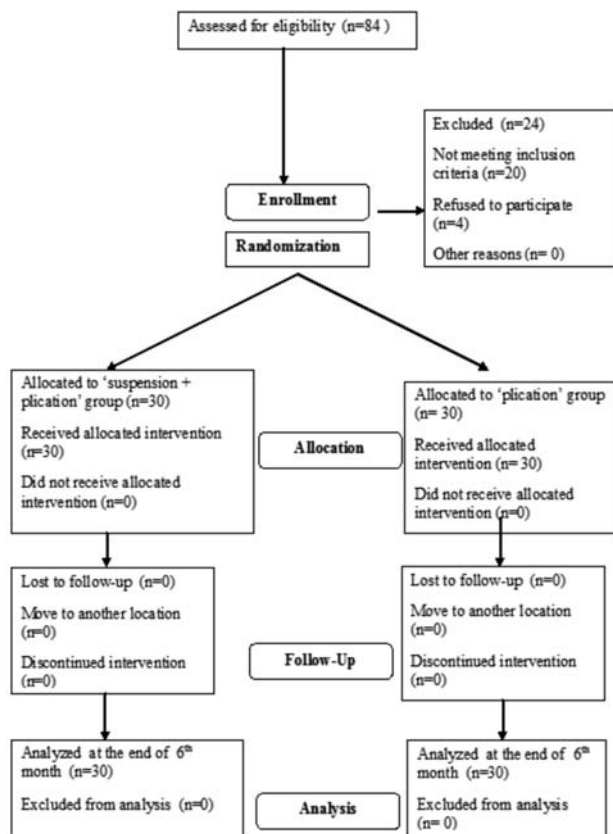


Figure 1. – The study flow chart.

ing at the contralateral USL (1 cm caudal to the ipsilateral second suture) was placed [(third suture) (Figure 2)]. Lastly another nonabsorbable suture (1 cm caudal to the third suture) starting from ipsilateral USL passing through the posterior vaginal without entering to the vagina and ending at the contralateral USL (1 cm caudal to the third suture) was placed [(fourth suture) (Figure 2)]. Then all the sutures were tied without any tension on the uterosacral ligaments so that the apical and posterior vaginal compartment support have been sustained aiming to prevent apical prolapse and/or enterocele formation.

Suspension technique: the vaginal vault angles were suspended to the ipsilateral USL/CL complex with one nonabsorbable suture which was placed and tied on each corner as described by Richardson.⁷

All patients have had Pelvic Organ Prolapse Quantification (POP-Q) system before, 3 months and 6 months after hysterectomy. The primary end point of the study was to compare the C point and total vaginal length (TVL) between the groups at the end of 6 month follow ups.

Inclusion criteria were 1) the women between the ages of 35-70, 2) having a benign pathology necessitating removal of uterus with/without ovaries abdominally.

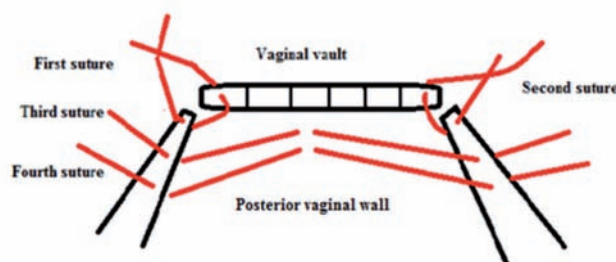


Figure 2. – The schematic drawing of the 'suspending' and 'plicating' sutures.

Exclusion criteria were 1) undergoing hysterectomy due to malign pathologies, 2) having a uterus larger than 20 weeks of gestation, 3) the leading edge of C point is <+1 or > -1cm compared to hymenal ring (Stage II), 4) having stress urinary incontinence.

Statistical analysis

SPSS 15.0 for Windows package program was used for the analysis of the data. The defining statistics for continuous variables has been defined as mean±standard deviation (min-max). Wilcoxon Signed Ranks test was used for the comparison of the data. The P value was set at <0.05 for statistical significance.

RESULTS

The mean follow up time was 5.7 ± 1.02 months (min. 4.5 - max. 6 months). The demographic parameters of the patients are given in table 1.

The preoperative POP-Q scoring of the patients is given at table 2. There were no statistically significant difference between the groups in terms of C point and TVL before the operation (p > 0.05).

At the 6th month follow up; the C point and TVL values in the suspension + plication group (Group 1) were -5.30 ± 0.25 and 8.76 ± 0.23, respectively (Table 3). The comparison between preoperative C point value and the C point value at the 6th month follow up in this group showed statistically significant difference (p = 0.0002). Whereas the comparison between preoperative TVL and the TVL at the 6th month follow up in this group did not show statistically significant difference (p = 0.4539).

Moreover, at the 6th month follow up, the C point and TVL values were -4.46 ± 0.20 and 7.03 ± 0.22, in the suspension group (Group 2), respectively (Table 3). The comparison between preoperative C value and the C value at the 6 month follow up in this group did not show statistically significant difference (p = 0.1433). However, the comparison between preoperative TVL and the TVL at the 6th month follow up showed statistically significant difference in this group (p < 0.0001).

TABLE 1. The demographic parameters of patients.

	Group 1	Group 2	p value
Age (years)	48.2 (min. 35 - max. 69)	46.9 (min.36 - max.65)	0.4720
Parity	2.46	2.33	0.6928
Body mass index (kg/m ²)	23.87 ± 1.7	24.47 ± 2.4	0.7683

TABLE 2. The preoperative POP-Q scoring of the groups.

Variable	Group 1	Group 2	p value
C point	-4.56 ± 0.25	-4.63 ± 0.20	0.84
TVL	8.56 ± 0.23	8.,73 ± 0.22	0.63

TABLE 3. The comparisons between C point and TVL values between groups.

	Suspension group	plication (Group 1)	Suspension group (Group 2)	
Preoperative	-4.56 ± 0.25	8.56 ± 0.23	-4.63 ± 0.20	8.73 ± 0.22
6th month follow up	-5.30 ± 0.25	8.76 ± 0.23	-4.46 ± 0.20	7.03 ± 0.22
P value (preop vs.6th month)	0.0002	0.4539	0.1433	< 0.0001

No complication has been seen in the patients at the intraoperative or late postoperative period.

DISCUSSION

There are some studies indicating that the uterosacral suspension which is being performed concomitant to hysterectomy would not only be used for the prophylaxis of vaginal vault prolapse but also can cure the already existing apical prolapse.^{6,7} In accordance with this; our study has showed that when the vault was suspended to the USLs and the USLs were plicated to each other as well as to the vaginal vault the C point moves upwards (cephalad) and this seems to be prophylactic against cuff prolapse. When the data regarding TVL measurements are evaluated, it will be seen that the length of the vagina has decreased (preoperatively 8.73 to 7.03 at the 6th month follow up) in group 2 and the difference was statistically significant ($p = < 0.0001$). This may be a heralding sign for the potential of vault prolapse because this type of shortening of vaginal length could not be due to surgery. We should also stress that all the surgeries have been performed by the same surgeons (AAS, EKM) by using the same technique, therefore, if the shortening of vagina in group 2 was the result of surgery, more or less a shortening of vaginal length would have been seen in group 1 as well. The decrease in TVL measurement and not observing any significant change in C point upwards in group 2 can be regarded as a forthcoming cuff desensus in the long term.

Lowenstein, *et al.*⁷ found that the suture erosion was the most common complication (9%) of uterosacral plication technique and they argued that suture erosion was associated with concomitant surgery (such as colporrhaphy posterior) and older patient. In our study we have not noticed any erosion during the follow up. However, it should be on mind that erosion is a timely phenomenon.

Uterosacral plication and ureteral kinking are a well known association. Therefore, application of intraoperative cystoscopy in order to determine this complication has been advocated.⁶ In our study, we did not perform intraoperative cystoscopy and have not seen any complication related to the ureters. We believe that the sutures that had been placed were not at a risky level for trapping ureters. We would not advocate cystoscopy to be applied intraoperatively due to the ease and low risk of our technique. Also, by not performing cystoscopy, we saved our patients the cost and complications of an invasive procedure.

Abdominal uterosacral suspension + plication is a fairly simple procedure. It does not necessitate special surgical training and can be performed with the same equipment used for hysterectomy.

CONCLUSION

To our knowledge, this is the first study comparing two techniques in order to prevent vault prolapse and we observed that uterosacral suspension + plication concomitant to abdominal hysterectomy has sustained statistically significant effect favouring its application. This simple procedure would be a preventive measure against vault prolapse. However, further studies with longer follow ups and larger sample size are required to clarify the net effect of this technique on vaginal vault prolapse.

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Correspondence to:

Ahmet Akin Sivaslioglu
Seferihisar Cad. Ege Park Konakları No.39/H
Yelki/Güzelbahçe/İZMİR - Turkey
E-mail: akinsivaslioglu@gmail.com