



# Laparoscopic high uterosacral ligament suspension: an alternative route for a traditional technique

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## Abstract

**Introduction and hypothesis** Uterovaginal prolapse treatment is a challenge for the urogynecologist. Surgical management for apical prolapse can be successful with native tissue and uterosacral ligament (USL) fixation. However, some complications have been described, especially with use of the vaginal approach. The aim of this video is to describe an alternative laparoscopic approach to a traditional vaginal procedure to reduce nerve injury and ureteral complications.

**Methods** A 75-year-old woman was referred to our unit for symptomatic stage III apical prolapse and underwent laparoscopic USL fixation, according to the technique described herein.

**Results** This surgical technique was successful in correcting apical prolapse.

**Conclusions** This video tutorial may be useful to urogynecologists for improving surgical technique, thus leading to a reduction in the risk of nerve and ureteral complications. The technique offers the possibility of a correct under-vision suture positioning. Laparoscopic USL fixation can be safely performed to treat apical prolapse.

**Keywords** Laparoscopic uterosacral ligament suspension · Pelvic organ prolapse · Apical suspension · Native tissue repair

## Introduction

Treatment of the vaginal vault and uterovaginal prolapse is a challenge for the urogynecologist. Apical prolapse affects up to 11% women [1]. Many procedures, abdominal,

laparoscopic, or transvaginal, have been described for the treatment of apical suspension.

Uterosacral ligament (USL) suspension is one of the two most commonly reported transvaginal apical (uterus or vault) prolapse repair procedures, performed using native tissue [2]. The USLs have three parts: near the cervix (smooth muscle, vessels, and nerves), an intermediate portion (connective tissue), and the proximal part (connective tissue, fat, lymphatic) [3]. The surgical technique was first described by Shull in 1994 [4] and involves placing sutures in the intermediate portion of the USLs.

Subsequently, a number of modifications to this technique have been described [5, 6], including the high utero-sacral ligament suspension (HUSLS), which provides attachment in the proximal part of the USLs.

This modification has led to a more stable point of fixation and guides the surgeon toward better suspension of the vaginal vault [7]. However, this surgery is burdened by the risk for hypogastric nerve and ureteral injury, especially with use of the vaginal approach. Indeed, ureteral damage of up to 11% has been reported [8].

The laparoscopic approach allows these vaginal complications to be overcome. Anatomical and surgical knowledge is essential to reduce morbidity associated with USL fixation.

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**Electronic supplementary material** The online version of this article (<https://doi.org/10.1007/s00192-018-3588-4>) contains supplementary material. This video is also available to watch on <http://link.springer.com/>. Please search for this article by the article title or DOI number, and on the article page click on ‘Supplementary Material’

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The aim of this video is to suggest an alternative approach to the traditional vaginal procedure, to improve awareness of the surgical anatomy of key structures and to reduce nervous and ureteral complications, thanks to a direct visualization of the key structures that the laparoscopic approach permits.

In this video, we show laparoscopic high USL fixation for the treatment of stage III apical prolapse, performed at the time of hysterectomy.

## Materials and methods

A 75-year-old woman was referred to the author's unit for symptomatic apical prolapse. She had not undergone previous gynecological surgery. She complained of antero-apical prolapse-related symptoms, such as a feeling of vaginal bulging and incomplete bladder emptying. She was first examined by an urogynecologist in the standing and lithotomy positions, both at rest and during straining. The evaluation demonstrated anterior stage II, apical stage III, and posterior stage I prolapse (POP-Q: Aa 0, Ba +1, C +2, gh 4, pb 2, tvl 9, Ap -3, Bp 0, D -2) [9].

Preoperative urodynamics, gynecological ultrasound, urinary tract ultrasound, and a pap smear test were performed. Urodynamic study confirmed voiding dysfunction. She did not present with urinary incontinence. After obtaining informed consent, the patient was admitted for laparoscopic hysterectomy followed by USL suspension, according to the technique described below. A Foley catheter was inserted. Broad-spectrum intravenous antibiotic therapy was administered preoperatively, and she received general anesthesia. The technique included the following steps:

1. Preparation of the retroperitoneal space laterally to both USLs.
2. Isolation of the USLs for their entire course, until the insertion of each USL into the cervix (*torus uterinus*); in this way, the recto-vaginal fascia is prepared, and the retroperitoneal space is ready.
3. Once the hysterectomy has been performed, insertion of the first polydioxanone 1 suture stitch (PDS®; Ethicon, Somerville, NJ, USA) into the cervico-vaginal fascia and the second into the cardinal ligament.
4. Duplication of the USL for the entire course, both laterally and medially.
5. Extrusion of the thread through the vagina.
6. Suture of the vaginal cuff transvaginally. Once the vault is closed, the USLs are tied separately with the stitches extruding before the vaginal suspension is performed.

## Results

This innovative surgical nerve- and ureter-sparing technique was successful at correcting apical prolapse at the time of hysterectomy. At the postoperative 1- and 6-month examinations there was excellent apical support (POP-Q: Aa -3, Ba -3, C -8, gh 3, pb 2, tvl 9, Ap -3, Bp -3, D /) with preservation of the vaginal length and complete satisfaction of the patient, in terms of quality of life, sexual function, urinary and prolapse-related symptoms, and a Patient Global Impression of Improvement score of 3.

## Conclusions

This video-tutorial may be useful to urogynecologists for improving surgical technique, thus leading to a reduction in the risk of complications. In fact, the laparoscopic approach offers the possibility of inserting a correct under-vision suture into the middle and the high parts of the USLs, preserving the ureter with its sheath and hypogastric nerve and, at the same time, allowing the surgeon to anchor the vaginal vault to the upper part of the USLs, performing a better suspension than with the vaginal approach.

In conclusion, laparoscopic high USL fixation is a safe and feasible procedure to correct apical prolapse.

## Compliance with ethical standards

**Conflicts of interest** None.

**Consent** Written informed consent was obtained from the patient for publication of this video article and any accompanying images.

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