

Apical Vaginal and Uterus Suspension to the Tendinous Arch of the Levator Ani and Uterosacral Ligaments by an Anchorage Device: A Proposed Method for Genital Prolapse Repair

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ABSTRACT

INTRODUCTION: We developed a new surgical method using mesh to repair the prolapsed uterus or vaginal vault, called the *TALA Suspension*. The purposes of the study were to: (1) describe the surgical procedure, and (2) determine intraoperative and postoperative complications, (3) determine overall effectiveness for women with a vaginal vault or uterine prolapse.

METHODS: The retrospective study was conducted in 2010. The patients were 21 symptomatic females with apical (vaginal vault) prolapse (n = 9) or uterine prolapse (n = 12). The mean patient age was 57.8 years (range, 54-61 years). All patients were third degree on the Baden-Walker scale and fourth degree in Pelvic Organ Prolapse Quantification (POP-Q) staging. We anchored a polypropylene mesh (Dynamesh-PR; FEG Textiltechnik GmbH, Germany) to the tendinous arch of the levator ani (TALA) to repair apical prolapse and created a suspension to the origin of the uterosacral ligaments and the lateral vaginal fornix to repair uterine prolapse. Outcome measures were intraoperative and postoperative complications and overall patient status. Postoperative outcomes were recorded at 10 days, 1 month, and 6 months.

RESULTS: The mean total operative time was 35.4 minutes. The mean intraoperative blood loss was 140 mL. Five patients (23.8%) requested postoperative analgesic for 48 hours. The mean hospital stay was 2.1 days. The mean hemoglobin at dismissal was 11.2 g/L. All patients tolerated the procedure well. There were no neurologic or vascular complications or reports of obstructed defecation, urinary infection, or urinary retention. There was 1 case of dyspareunia in the vaginal apex. Based on the follow-up clinical evaluations and vaginal examinations by speculum, there was 100% surgical success. Six months after surgery, there was no evidence of recurrent prolapse.

CONCLUSIONS: This is a preliminary evaluation of a new surgical technique. Although the results are very positive, the number of cases was small and the follow-up was limited to 6 months. We recommend that this technique be performed by experienced surgeons who are capable of shifting from similar methods. Expanded trials with longer follow-up are needed to compare TALA Suspension to other prolapse repair techniques.

KEYWORDS: Female pelvic prolapse; Vaginal vault prolapse; Gynecological surgery; Pelvic floor disorders; Menopause; Anatomic defects

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Abbreviations and Acronyms

POP-Q, Pelvic Organ Prolapse Quantification

TALA, tendinous arch of the levator ani

INTRODUCTION

Pelvic organ prolapse is an abnormal location of the pelvic organs (eg, vagina, bladder, uterus) into or outside of the vagina. In the past, surgeons resorted to hysterectomy to repair uterine prolapse even in the absence of uterine-associated pathologies. Current literature suggests the use of more conservative surgery by vaginal, laparotomic, or laparoscopic approach; these approaches may also be used for vaginal vault prolapse after hysterectomy [1].

An intravaginal or transvaginal surgical approach can be used to reconstruct an apical prolapse using transgluteal or transvaginal mesh positioning and fascial repair. The current meshes create support through a process of tissue fibrosis. They have advantages over other procedures such as a reduced surgical surface and they are less invasive and require less time for surgical implant. Nonetheless, the big debate of the moment is whether a mesh should be used or not [2]; additional research is needed. Other traditional methods used in prolapse repair involve laparoscopy or laparotomy. Both of these surgical approaches are invasive methods that require longer operating time and may lead to more serious complications when compared with a vaginal procedure [3].

In our hospitals, we recently developed a new method to suspend either the prolapsed uterus or vaginal vault to the tendinous arch of the levator ani (TALA) or to the origin of the uterosacral ligaments and the lateral vaginal fornix by using an anchorage system to a polypropylene mesh. We have named this surgical procedure the *TALA Suspension*. The purposes of the present study were to: (1) describe the surgical procedure, and (2) determine intraoperative and postoperative complications, and (3) determine the procedure's overall effectiveness for women with vaginal vault or uterine prolapse.

METHODS

The study was a retrospective evaluation of patients, conducted between January and December, 2010.

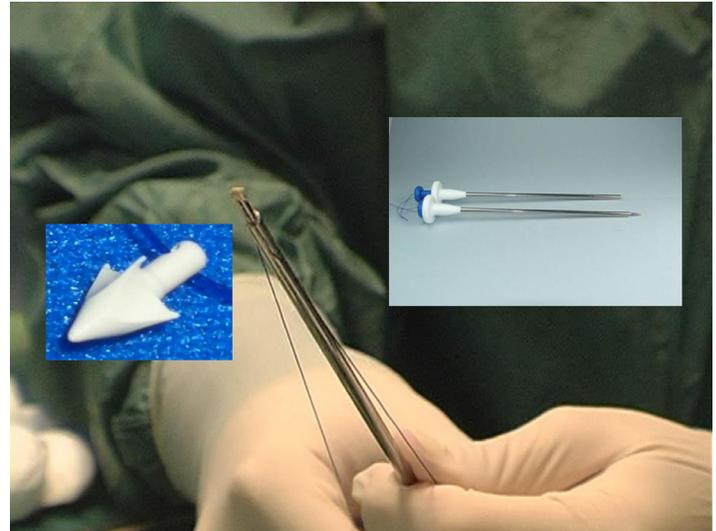
Patient Database

The patients were 21 symptomatic females: 9 patients had apical (vaginal vault) prolapse and 12 patients had uterine prolapse. The mean age of the patients was 57.8 years (range, 54-61 years). They had a mean body mass index of 24.3. There were no comorbid conditions such as diabetes, cardiovascular complication, or autoimmune disease.

The prolapse staging was described according to the Baden-Walker system [4,5] and Pelvic Organ Prolapse Quantification

Figure 1. Photograph of the anchorage device used in the surgical procedure.

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Left picture inset shows the enlarged anchor; right picture inset shows the device with a polypropylene thread; main (center) photograph shows the device with the anchor.

(POP-Q) [6]. All patients were on the third degree on the Baden-Walker scale and the fourth degree in POP-Q staging [7].

Surgical Procedures

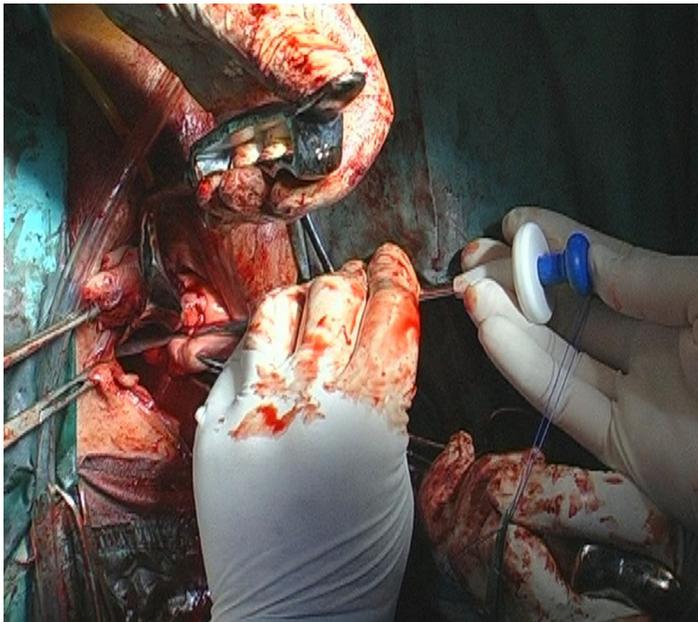
The techniques used to repair vaginal vault prolapse and a prolapsed uterus are described. We used the intravaginal approach for both procedures.

Vaginal vault prolapse. The steps to the procedure were: (1) perform a longitudinal posterior colpotomy; (2) detach the Denonvilliers' fascia (rectovaginal septum) from the posterior vaginal wall; (3) repair the Denonvilliers' fascia; (4) after removal of the exuberant flaps, suture the posterior vaginal wall suturing; (5) solidify the bulbocavernosus muscles and the superficial transverse muscles; (6) suture ligate the 2 muscles to each other for the recovery of the median fibrous nucleus of the perineum; (7) suture the perineum.

The ischial spine is identified after scarification of the same in a blunt way. Then, the surgeon palpates the origin of the tendinous arch of the levator ani and puts a finger on the ischial spine as a guide, using the Pschyrembel maneuver [8]. The anchorage device is placed in front of and slightly higher than the finger guide (Figure 1), positioning it at the origin of the tendinous arch of the levator ani (Figure 2; Figure 3).

Figure 2. Photograph of the surgeon positioning the device at the origin of the right tendinous arch of the levator ani.

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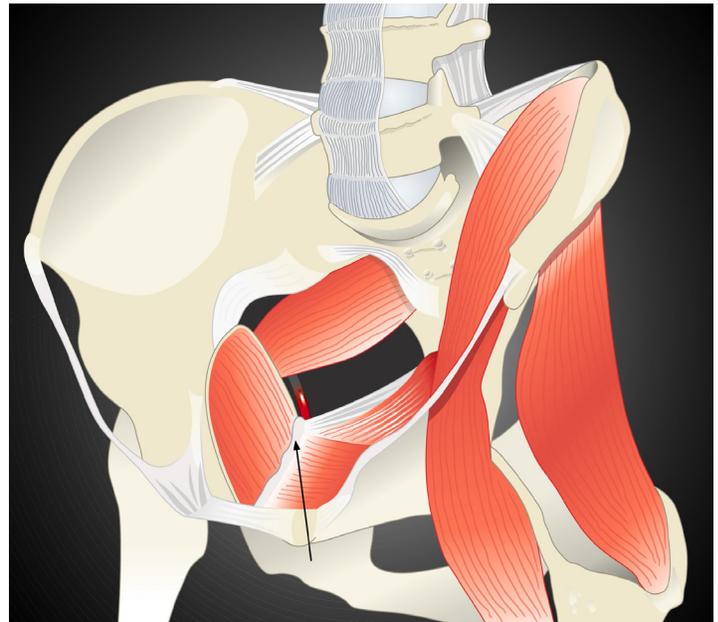


The anchorage device has a polypropylene thread linked to a mesh of 1.5 cm x 2 cm (Dynamesh-PR; FEG Textiltechnik GmbH, Germany) to promote fibrosis (Figure 4). On the prolapsed edges of the vaginal vault, the surgeons apposed (doweling) triple helicoids. Then, they wired the polypropylene thread and suspended it to the tendinous arch of levator ani (TALA suspension) by a pulley movement (Figure 5). The surgeons removed the redundant posterior vaginal vault edges and sutured the vaginal incision. To preserve the posterior vaginal angle, the surgeons sutured the bulbocavernosus and superficial transverse muscles for reconstruction of the central nucleus of the perineum. This last maneuver was to prevent the recurrence of vaginal vault prolapse, because it carries intraabdominal strength on the rectovaginal septum and not on the hiatus vaginalis. Moreover, the sling effect of the bulbocavernosus muscles allowed vaginal stretching. In our opinion, the TALA suspension is a site of apical prolapse anchorage and it prevents possible lesions of the sciatic nerve and the internal pudendal artery, both of which are possible in classical sacrospinous ligament anchorage.

Prolapsed uterus. The same technique was used for patients with a prolapsed uterus, differing in the surgeon's suture: it doweled the triple helicoids by a suspension to the origin of the uterosacral ligaments and to the lateral vaginal fornix

Figure 3. Anatomical representation of the anchor site of suspension on the tendinous arch of levator ani.

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The black arrow shows the site of insertion of the TALA suspension anteriorly to the ischial spine.

Figure 3 is adapted with permission from Gasbarro N, Leanza V. Sospensione dell'utero e della cupola vaginale prolapsati all'arco tendineo dei muscoli elevatori dell'ano (proposta di una nuova tecnica). *Italian Journal Obstet Gynecol.* 2009;21(11/12):470.

by a pulley movement. Generally in these procedures it is unnecessary to use 2 valves to show the TALA, so this operation is less invasive and more comfortable than the other [9].

The simple difference in anatomical anchorage of the method to repair the prolapsed uterus is that we use the tendinous arch of the levator ani anchorage at the origin of the uterosacral ligaments, whereas to repair a prolapsed vaginal vault we used the vaginal apex anchorage.

Outcome Measures

The outcome measures were intraoperative and postoperative complications and overall patient status. Postoperative outcomes were recorded at 10 days, 1 month, and 6 months following surgery.

RESULTS

The mean total operative time for the procedure was 35.4 minutes. The mean intraoperative blood loss was 140 mL. A

Figure 4. Photograph of the surgeon suspending the polypropylene thread to a mesh.

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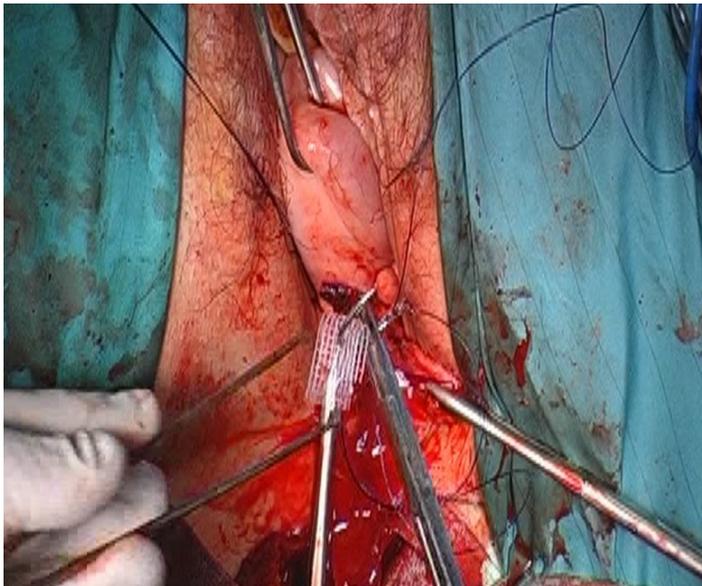
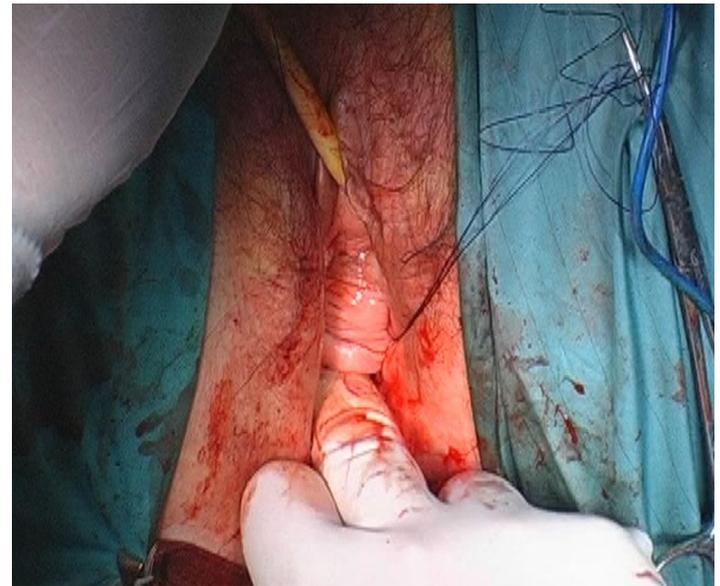


Figure 5. Photograph showing that the surgeon has wired the polypropylene thread, suspending it to the tendinous arch of the levator ani by a pulley movement.

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total of 5 patients (23.8%) requested postoperative analgesic for 48 hours. The mean duration of the hospital stay was 2.1 days; all patients were dismissed by the third day after surgery. The mean hemoglobin at dismissal was 11.2 g/L.

All patients tolerated the procedure well. There were no neurologic or vascular complications or reports of obstructed defecation, urinary infection, or urinary retention. One patient with a repaired uterine prolapse had dyspareunia in the vaginal apex, which resolved spontaneously after 1 month.

Based on the follow-up clinical evaluations and vaginal examinations by speculum, there was 100% surgical success. None of the patients developed complications except for the 1 case of dyspareunia. Six months after surgery, there was no evidence of recurrent prolapse.

DISCUSSION

Anchoring a polypropylene mesh to the tendinous arch of the levator ani to repair apical prolapse and to the origin of the uterosacral ligaments and the lateral vaginal fornix to repair uterine prolapse is an innovative vaginal technique that is less invasive than some other traditional methods [1-3,10]. The benefits may include a shorter operating time, shorter time to return to activities of daily living, and decreased cost when this procedure is compared with an abdominal approach by

laparotomy or laparoscopy.

The premise for this operation is to restore the damaged structures: the Denonvilliers' fascia and the median fibrous nucleus of the perineum. We avoid suturing the levator ani muscles because, in our opinion, this creates an anatomical artifact and not a correct reconstruction. Approaching the levator ani can cause stenosis and possible postoperative dyspareunia. Only 1 of our 12 patients with vaginal prolapse repair developed postsurgical dyspareunia during follow-up and this spontaneously resolved.

The sling activity of solidification of the bulbocavernosus muscles creates the posterior vaginal angle. The vagina changes from being a cathetus triangle to having the hypotenuse of an imaginary vaginal-perineal triangle, thereby extending itself. Posterior vaginal angle reconstruction is important in preventing prolapse of the vaginal apex after vaginal hysterectomy and in preventing uterine prolapse after isterosuspension, because intraabdominal strength generated by the Valsalva maneuver is on the Denonvilliers' fascia and not toward the hiatus vaginalis.

The number of complications reported by TALA Suspension should be less than complications following vaginal anchorage to the sacrospinous ligament, because TALA Suspension respects unsafe anatomical sites such as the sciatic nerve and

the internal pudenda artery; both of these sites are involved in the sacrospinous approach [1,11]. Moreover, TALA Suspension avoids the obstruction of the rectal ampoule, so it is possible to use it bilaterally and to reduce the depth of suspension of 1.5 cm. Furthermore, the TALA Suspension also increases the solidity of suspension because the anchorage uses the musculature and not the dense connective tissue. We think that the excellent results from this preliminary study are also due to using a mesh with light weight and a small surface area.

CONCLUSIONS

The present study is a preliminary evaluation of a new surgical technique. Although the results are very positive, the number of cases was small and the follow-up was limited to 6 months. We recommend that this technique be performed by experienced, well-trained surgeons who are capable of shifting from similar methods [1,12,13] to a new method of using TALA suspension or uterine suspension to the origin of the uterosacral ligaments. Expanded trials with longer follow-up are needed to compare TALA Suspension to other prolapse repair techniques. Future studies should include the patient's perception of prolapse symptoms to describe complications and reduce surgeon bias.

Conflict of Interest: none declared.

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