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Short original – Voiding dysfunction

Impact of sacrospinous vaginal vault suspension on the anterior compartment

E. Benedito de Castro[a], *P. Palma*[a*], *C. Riccetto*[a], *V. Herrmann*[a], *M.A. Bigozzi*[b] *and J.M. Olivares*[c]

[a]*Department of Gynecology and Urology, Universidade Estadual de Campinas, São Paulo, Brazil*
[b]*Servicio de Ginecología, Hospital Bernardino Rivadavia, Buenos Aires, Argentina*
[c]*Policlínico Bancario, Buenos Aires, Argentina*

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A B S T R A C T

Objectives: A prospective study was conducted to assess the efficacy of sacrospinous vaginal vault fixation and its impact on the anterior compartment. The Pelvic Organ Prolapse Quantification (POP-Q) system was used to quantify pelvic organ prolapse in the apical and anterior vaginal compartments.
Methods: Fifty-eight patients underwent a procedure to correct apical prolapse from March 2003 to February 2006. Mean preoperative and postoperative POP-Q scores were respectively: Aa (+0.74; –1.45); Ba (+3.17; –1.36); C (+3.41; –7.71) ($p<0.001$).
Results: Cure rate was 93.1%. Preoperative and postoperative evaluation of the anterior vaginal compartment was respectively: stage 1 (5.2%; 48.3%), stage 2 (6.9%; 34.5%), stage 3 (74.1%; 5.2%), and stage 4 (13.8%; 0%). De novo cystocele occurred in 87.9% of cases. An improvement was seen in lower urinary tract symptoms of urgency, nocturia, and urge incontinence.
Conclusions: Sacrospinous vaginal vault suspension is effective for the treatment of apical prolapse and leads to formation of cystocele in most cases

Impacto de la suspensión de la cúpula vaginal al ligamento sacroespinoso sobre el compartimiento anterior

Palabras clave:
Suspensión de cúpula vaginal al ligamento sacroespinoso
Síntomas del tracto urinario inferior
POP-Q
Cistocele

R E S U M E N

Objetivos: Se realizó un estudio prospectivo para evaluar la eficacia de la fijación de la cúpula vaginal al ligamento sacroespinoso, y la repercusión sobre el compartimiento anterior. Se utilizó, el sistema (POP-Q) para cuantificar el prolapso de órganos pélvicos del compartimiento vaginal: apical y anterior.
Métodos: Cincuenta y ocho pacientes fueron sometidas al procedimiento de corrección del prolapso apical entre marzo del 2003 y febrero del 2006. La media de puntuación de POP-Q en el preoperatorio y postoperatorio varió, respectivamente: Aa (+0,74; –1,45); Ba (+3,17; –1,36), C (+3,41; –7,71); ($p < 0,001$).

*Author for correspondence.
E-mail: ppalma@uol.com.br (P. Palma).

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Resultados: La tasa de curación fue del 93,1%. La evaluación del compartimiento anterior de la vagina en el preoperatorio y postoperatorio fue respectivamente: etapa 1 (5,2%; 48,3%), etapa 2 (6,9%; 34,5%), etapa 3 (74,1%; 5,2%) y etapa 4 (13,8%; 0%). El cistocele se produjo *de novo* en el 87,9%. Hubo mejoría de los síntomas del tracto urinario, como urgencia, nocturia e incontinencia de urgencia.

Conclusiones: La suspensión al ligamento sacroespinoso de la cúpula vaginal es efectiva en el tratamiento del prolapso apical y determina la formación de cistocele en la mayoría de los casos.

Introduction

Under normal conditions, the upper third of the vagina lies horizontal, and the uterus is positioned perpendicular over the plateau of the anal elevator muscle, along the cardinal ligament and the uterosacral ligaments. The plateau of the anal elevator is responsible for absorbing the transmission of abdominal pressure towards the uterus and vagina. In the presence of weakness of the endopelvic fascia and plateau of the anal elevator, the uterus and vaginal apex become positioned on the same oblique axis as the lower two-thirds of the vagina – culminating in apical genital prolapse[1,2].

The incidence of total vaginal vault or dome prolapse following hysterectomy is not known, though the estimate is 2.0-3.6 cases per 1000 women-years. In the presence of some associated type of prolapse, vault prolapse shows a high incidence, reaching up to 15 cases per 1000 women-years in women in which hysterectomy was indicated for management of the prolapse[3,4].

The treatment of uterovaginal prolapse and vault prolapse involves the creation of a new insertion point for these structures, in order to restore coverage of the pelvic diaphragm. The two most widely used techniques are fixation to the vaginal sacrospinous ligament and abdominal sacral colpopexy.

In an article published by the Cochrane Library incontinence group, including 14 randomized studies with a total of 1004 women, abdominal sacral colpopexy was found to be better than vaginal sacrospinous colpopexy, with lesser dyspareunia and vault prolapse recurrence rates. However, no statistically significant differences were seen with respect to the reintervention rates due to prolapse. In any case, sacrospinous colpopexy involved lower costs and shorter surgery times, as well as a faster return to work activity[5].

Transvaginal sacrospinous colpopexy was introduced in the United States in 1971 by Randall and Nichols[6]. Nichols and Cruikshank recommended sacrospinous fixation after vaginal hysterectomy, in the presence of weakened uterosacral and cardinal ligaments[7,8]. In 1979, Sze and Karram published a review describing several late complications and healing rates of between 8-97%[9]. In a series of 293 women subjected to surgery, Lovatsis and Drutz recently showed that this technique offers a high healing rate, with few complications when performed by experienced surgeons[10]. Prolapse of the anterior vaginal wall is the most frequent late complication of sacrospinous colpopexy, due to deviation of the posterior axis of the vagina[11-14].

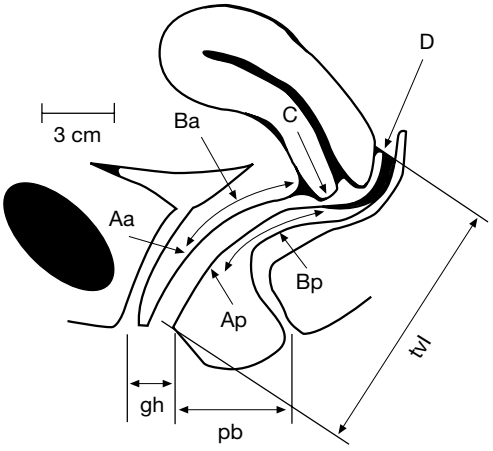

Figure 1 – Reference points of the POP-Q.

In 1996, a measurement system (Pelvic Organ Prolapse Quantification, POP-Q) was approved by the International Continence Society, the American Urogynecological Society and the Society of Gynecological Surgeons[15], on quantitatively evaluating the stages of site-specific prolapse of the pelvic organs in women (fig. 1). With the use of this new classification of female genital prolapse it is possible to more precisely evaluate the three vaginal compartments (apical, posterior and anterior). In addition, the staging system allows better description of the population, with application to research – thus making it possible to universalize pre- and postoperative evaluation and affording a better assessment of the surgical results obtained.

Material and method

A prospective study was made in 2006 in the Sector of Urogynecology of Sumaré State Hospital (Campinas State University, Brazil).

The case histories of 58 women with antecedents of sacrospinous colpopexy performed between March 2003 and February 2006 were analyzed. The mean patient age was 63 years (range 39-85).

Mean parity was 5.5 (range 1-15), with 5.1 (range 0-13) vaginal deliveries and 0.2 (range 0-3) cesarean sections. Of

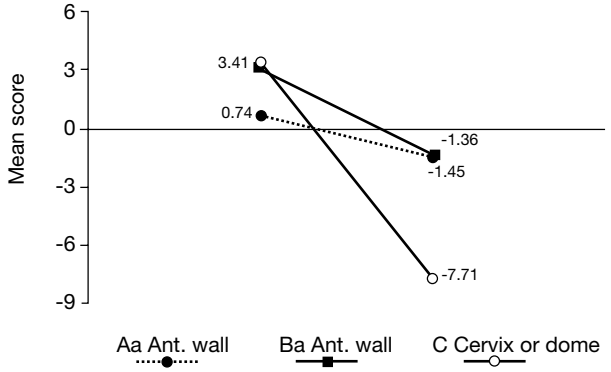

Figure 2 – Stages of apical prolapse before and after surgery.

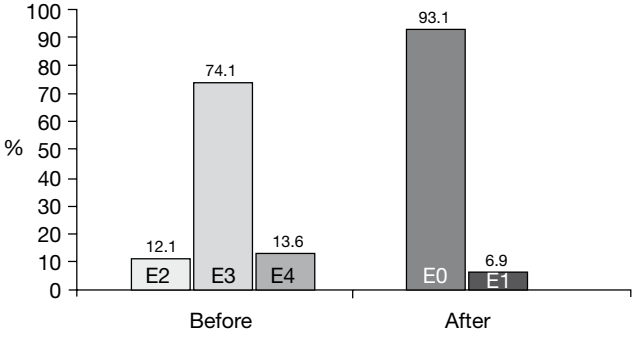

Figure 3 – Stages of apical prolapse before and after surgery.

Table 1 – Preoperative and postoperative results corresponding to points Aa, Ab and C

POP Q	Preoperative	Postoperative
Aa	+0.74	–1.45
Ba	+3.17	–1.36
C	+3.41	–7.71

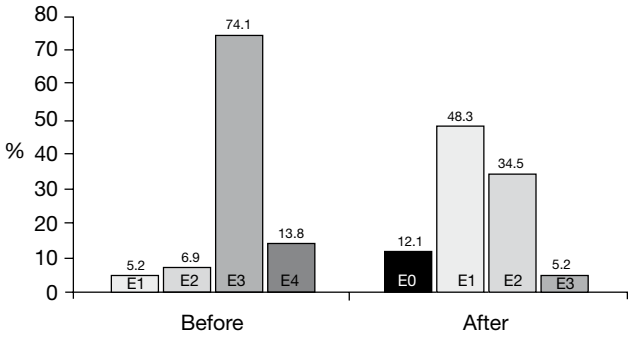

Figure 4 – Stages of anterior wall prolapse before and after surgery.

the 58 operated cases, 13 had a history of total abdominal hysterectomy, one patient had undergone subtotal abdominal hysterectomy, 7 underwent vaginal hysterectomy, and 21 had been subjected to anterior and posterior colporrhaphy.

Of these 58 women, 28 had uterine prolapse, one presented cervical prolapse, and 18 had a prolapsed vaginal vault. The patients with uterine prolapse were subjected to vaginal hysterectomy.

The vaginal prolapse stages ranged from 1-4 in the anterior compartment and from 2-4 in the apical compartment.

All the patients complained of genital prolapse on occasion of the preoperative visit. Twenty-six cases were subjected to anterior colporrhaphy and 23 underwent repair of the paravaginal defect. Posterior colporrhaphy was carried out in 12 patients, and the same number of women underwent surgical enterocele correction.

All the women were subjected to myorrhaphy of the elevator muscles.

Patients presenting other defects were offered repair before undergoing sacrospinous colpopexy. These patients were evaluated by the investigator before and after surgery.

On the first visit the patients were questioned about their age, parity and history of gynecological surgery.

The urinary symptoms were evaluated (urinary stress incontinence, urgency, urge and nocturnal incontinence, and nocturnal enuresis) based on a visual analog scale (VAS), during both the pre- and the postoperative period.

In this way we categorized the symptoms as either improved or worsened, using the McNemar test to compare the results.

The results of the POP-Q points Aa, Ba, C were evaluated on the first visit and again on the postoperative visit. The mean duration of postoperative follow-up was 912.5 days (range 438-1460).

The Wilcoxon test was used to compare the points and stages of genital prolapse before and after surgery.

The complications during and after surgery were also described.

Surgery was carried out by the residents in training, under direct supervision of the investigator.

As regards the material used, vaginal vault fixation was carried out with polyglactin 00 sutures with needle to the right sacrospinous ligament, under visual guidance through the dissection of the homolateral ischiorectal fossa.

The study was approved by the Research Ethics Committee of the Medical School of Campinas State University.

Results

On comparing the results of the POP-Q among the operated cases during the pre- and postoperative period, the mean scores were found to be: Aa +0.74 versus –1.45 cm; Ba +3.17 versus –1.36 cm; and C +3.41 versus –7.71 cm ($p < 0.0001$ in all cases) (fig. 2 and Table 1). The apical prolapse stages were E2 in 12.1% of the cases (7), E3 in 74.1% of the cases (43), and E4 in 13.8% of the cases (8) in the preoperative period – this in turn

changing to E0 in 93.1% of the cases (54) and to E1 in 6.9% of the cases (4) in the postoperative period (fig. 3).

As regards the anterior vaginal compartment, prior to surgery 5.2% of the cases (3) corresponded to stage E1, 6.9% of the cases (4) to E2, 74.1% of the cases (43) to E3, and 13.8% of the cases (8) to stage E4. This in turn changed to 12.1% of the cases (7) in stage E0, 48.3% of the cases (28) in E1, 34.5% of the cases (20) in E2, and 5.2% of the cases (3) in stage E3 in the postoperative examination (fig. 4).

Two patients complained of genital prolapse on occasion of the postoperative visit. Thirteen of the 14 women with micturition urgency showed improvement after surgery ($p = 0.0045$).

Of the 44 women who did not complain of this symptom, two became symptomatic.

In turn, of the 10 patients complaining of urge incontinence, 9 showed complete symptoms remission after surgery ($p = 0.0027$).

Improvement in nocturia was recorded in 8 of the 9 cases after surgery ($p = 0.0196$). Of the 49 asymptomatic cases, one developed symptoms in the postoperative period.

As regards stress urinary incontinence, there were no statistically significant differences before and after surgery.

Of the 12 women with stress incontinence, 8 improved after surgery ($p = 0.0578$), while of 46 asymptomatic patients, two began to show this symptom.

Only one patient suffered an intraoperative complication, caused by damage to the inferior gluteal vein on passing the suture needle through the sacrospinous ligament. Blood loss was under 100 ml, no transfusions were needed, and bleeding was controlled by compression.

Two patients complained of pain in the right gluteal zone, but this problem decreased three months after surgery.

Discussion

This prospective study of fixation to the sacrospinous ligament evaluated patients based on the POP-Q system, showing the technique to offer a high healing rate in application to apical prolapse, even when performed by a resident under direct supervision of the specialized surgeon. In our series of 58 surgical cases, only four patients showed lowering of the vaginal vault. These women were in prolapse stage 4, which was reduced to stage 1 by surgery, leaving them free of symptoms. We were not able to demonstrate whether fixation to the sacrospinous ligament should be performed prophylactically in association to vaginal hysterectomy in cases of uterine prolapse, with a view to avoiding vaginal vault prolapse. However, the patients subjected to this procedure suffered no serious complications either during or after surgery, and showed no recurrence of apical prolapse.

No vascular lesions were observed during blunt digital dissection of the right ischiatic fossa. In all patients, two polyglactin 00 stitches were used to fix the vault to the right sacrospinous ligament – this being sufficient to maintain the structure in the desired position.

Only one patient suffered bleeding of the inferior gluteal vein on passing the suture needle through the sacrospinous ligament. This happened because the needle was inserted laterally instead of medially, in order to avoid the pudendal neurovascular bundle. No changes were observed in the incidence of prolapse in the patients requiring anterior and posterior colporrhaphy and sacrospinous fixation, in comparison with the patients who did not require this type of correction. All the women were subjected to myorrhaphy of the elevator muscles. Two patients complained of pain in the right gluteal zone, but this problem decreased three months after surgery with the use of antiinflammatory drugs.

The most frequent late complication was the high cystocele rate recorded after surgery, as can be seen in Figure 3. However, considerable improvement was noted in relation to anterior vaginal wall prolapse, as was well established after surgery by point Aa, which changed from +0.74 to –1.45, and by point Ba, which changed from +3.17 to –1.36. This result can be explained by the deviation of the posterior axis of the vagina, determined by the surgical technique employed. All patients were asymptomatic in relation to the cystocele.

Two patients complained of genital prolapse on occasion of the postoperative visit.

The sacrospinous ligament proved to be an accessible structure for fixing the vaginal vault, maintaining the upper third of the vagina over the muscles of the pelvic floor – thereby preventing the relapse of apical prolapse. A high cystocele rate was observed, which can be explained by the vaginal retroversion produced by the surgical technique. Posterior deviation of the genital axis exposed the anterior vaginal wall to increased abdominal pressure, thus favoring its descent[16].

According to the integral continence theory of Petros and Ulmsten[17,18], there are to force axes in the pelvic floor: the anterior axis, responsible for continence and mainly represented by the pubourethral and urethropelvic ligaments and the pubococcygeal muscle, and the posterior axis, represented by the uterosacral ligaments and the plateau of the anal elevator muscle, which helps in supporting the vaginal apex, and in micturition. Damage to the anterior ligaments can cause stress urinary incontinence due to predominance of the force of the posterior axis. In contrast, weakness of the uterosacral ligament, as in situations of apical prolapse, leads to displacement of the force towards the anterior axis, with the consequent compression of the urethra over the pubic symphysis – triggering irritative urinary symptoms as a result.

Statistically significant improvement was observed in the irritative urinary manifestations among the women after vaginal vault suspension surgery. This improvement in the irritative urinary symptoms was due to restoration of the posterior portion of the supporting axis, provided by fixation of the vault to the sacrospinous ligament.

Conclusions

Fixation to the sacrospinous ligament offers a high healing rate and low morbidity, in application to apical prolapse.

Statistically significant improvement was observed in the irritative urinary manifestations, though in contraposition

an increased cystocele rate was recorded due to posterior displacement of the vault, as reflected by the POP-Q results. Although we consider that the POP-Q overestimates the anterior prolapse rate, in our experience only two cases were symptomatic, and no surgical treatment was required.

REFERENCES

1. Weber AM, Abrams P, Brubaker L, Cundiff G, Davis G, Dmochowski R et al. The standardization of terminology for researchers in female pelvic floor disorders. Int Urogynecol J. 2001;12:178-86.
2. DeLancey JOL. Anatomic aspects of vaginal eversion after hysterectomy. Am J Obstet Gynecol. 1992;166:1717-28.
3. Mant J, Painter R, Vessey M. Epidemiology of genital prolapse: observations from the Oxford Family Planning Association Study. Br J Obstet Gynaecol. 1997;104:579-85.
4. Richer K. Massive eversion of the vagina: pathogenesis, diagnosis and therapy of the "true" prolapse of the vagina stump. Clin Obstet Gynecol. 1982;25:897-9.
5. Maher C, Baessler K, Glazener CMA, Adams EJ, Hagen S. Surgical management of pelvic organ prolapse in women. Cochrane Database Syst Rev. 2005.
6. Randall CL, Nichols DH. Surgical treatment of vaginal eversion. Obstet Gynecol. 1971;38:327-32.
7. Nichols DH. Sacrospinous fixation for massive eversion of the vagina. Am J Obstet Gynecol. 1982;142:901-4.
8. Cruikshank SH, Cox DW. Sacrospinous Fixation at the Time of Transvaginal Hysterectomy. Am J Obstet Gynecol. 1990;162:1611-9.
9. Sze EHM, Karram MM. Transvaginal repair of vault prolapse: a review. Obstet Gynecol. 1997;89:466-75.
10. Lovatsis D, Drutz HP. Safety and efficacy of sacrospinous vault suspension. Int Urogynecol J. 2002;13:308-13.
11. Shull BL, Capen CV, Riggs MW, Kuehl TJ. Preoperative and postoperative analysis of site-specific pelvic support defects in 81 women treated with sacrospinous ligament suspension and pelvic reconstruction. Am J Obstet Gynecol. 1992;166:1764-71.
12. Carey MP, Slack MC. Transvaginal sacrospinous colpopexy for vault and marked uterovaginal prolapse. Br J Obstet Gynaecol. 1994;101:536-40.
13. Holley RL, Varner RE, Gleason BP, Apffel La, Scott S. Recurrent pelvic support defects after sacrospinous ligament fixation for vaginal vault prolapse. J Am Coll Surg. 1995;180:444-8.
14. Paraiso MFR, Ballard LA, Walters MD, Lee JC, Mitchinson AR. Pelvic support defects and visceral and sexual function in women treated with sacrospinous ligament suspension and pelvic reconstruction. Am J Obstet Gynecol. 1996;175:1423-31.
15. Bump RC, Mattiasson A, Bo K, Brubaker LP, DeLancey JOL, Klarskov P, et al. The standardization of terminology of female pelvic organ prolapse and pelvic floor dysfunction. Am J Obstet Gynecol. 1996;175:10-7.
16. DeLancey JO, Morgan DM, Fenner DE, Kearney R, Guire K, Miller JM, et al. Comparison of levator ani muscle defects and function in women with and without pelvic organ prolapse. Obstet Gynecol. 2007;109:295-302.
17. Petros PE, Ulmsten U. The posterior fornix syndrome: a multiple symptom complex of pelvic pain and abnormal urinary symptoms deriving from laxity in the posterior fornix of the vagina. An integral theory and its method for the diagnosis and management of female urinary incontinence. Scand J Urol Nephrol. 1993; Suppl 153: 89-93.
18. Petros PE. New ambulatory surgical methods using an anatomical classification of urinay dysfunction improve stress urge and abnormal emptying. Int Urogynecol J. 1997;8:270-8.