

# Laparoscopic sacrocolpopexy for uterine and post-hysterectomy prolapse: anatomical and functional outcomes

Cindy MY Chan 陳美茵

Helen HX Liang 梁慧新

WW Go 吳榮華

William WK To 杜榮基

KM Mok 莫嘉明



A video of laparoscopic sacrocolpopexy is available at <[www.hkmj.org](http://www.hkmj.org)>.

**Objective** To evaluate the anatomical and functional outcomes following laparoscopic sacrocolpopexy in a local unit.

**Design** Retrospective case series.

**Setting** A regional hospital in Hong Kong.

**Patients** All women who underwent laparoscopic sacrocolpopexy for symptomatic uterine or post-hysterectomy prolapse from January 2003 to December 2008.

**Main outcome measures** Anatomical outcomes, functional outcomes including complications.

**Results** A total of 31 patients were recruited. The success rate in treating apical vaginal wall prolapse was 100%. There were no recurrences of vault prolapse (defined as stage II or higher). Approximately 19% of women had anterior vaginal wall prolapse and 23% had urinary stress incontinence postoperatively; 6% had a second operation because of anterior vaginal wall prolapse. The rates of dyspareunia and constipation were low. The mean hospital stay was 4 (range, 2-11) days. Two patients sustained bladder injuries and one rectal injury resulting in a rectovaginal fistula. For three patients the procedure was converted to a laparotomy.

**Conclusions** Laparoscopic sacrocolpopexy is feasible in our population and has a high success rate for treating apical vaginal wall prolapse. The incidence of complications was acceptable.

## New knowledge added by this study

- This series provides local data on laparoscopic sacrocolpopexy for the treatment of uterine and post-hysterectomy prolapse.

## Implications for clinical practice or policy

- Laparoscopic sacrocolpopexy is a feasible procedure in our population in whom it achieves a high success rate, a low rate of major complications, and good medium-term results.

## Introduction

Vaginal vault prolapse is defined as the descent of the vaginal cuff scar below a point that is 2 cm lower than the total vaginal length above the plane of the hymen.<sup>1</sup> It is reported to follow 11.6% of hysterectomies performed for prolapse and 1.8% of those performed for other indications.<sup>2</sup> Abdominal sacrocolpopexy and vaginal sacrospinous colpopexy are two of the most common treatments for vaginal vault prolapse. A recent Cochrane review<sup>3</sup> suggested that abdominal sacrocolpopexy was better than vaginal sacrospinous colpopexy in terms of a lower rate of recurrent vault prolapse (relative risk [RR]=0.23; 95% confidence interval [CI], 0.07-0.77) and less dyspareunia (RR=0.39; 95% CI, 0.18-0.86). However, vaginal sacrospinous colpopexy was quicker and less costly to perform, and women returned to activities of daily living earlier.<sup>3</sup> Overseas data have suggested that laparoscopic sacrocolpopexy, which also allows a quicker recovery, can be considered a safe and effective procedure for the treatment of vaginal vault prolapse with a success rate of 95%.<sup>4</sup> There are no such data for our local population. The aim of this study was to evaluate the treatment outcomes and complication rates of laparoscopic sacrocolpopexy in a local hospital.

## Methods

Records of all patients, who had laparoscopic sacrocolpopexy procedures performed

### Key words

Laparoscopy; Pelvic organ prolapse/surgery; Sacrococcygeal region; Surgical mesh; Treatment outcome

*Hong Kong Med J* 2011;17:301-5

Department of Obstetrics and Gynaecology, United Christian Hospital, Kwun Tong, Hong Kong  
**CMY Chan**, MB, ChB, MRCOG  
**HHX Liang**, MRCOG, FHKAM (Obstetrics and Gynaecology)  
**WW Go**, FRCOG, FHKAM (Obstetrics and Gynaecology)  
**WWK To**, FRCOG, FHKAM (Obstetrics and Gynaecology)  
**KM Mok**, FRCOG, FHKAM (Obstetrics and Gynaecology)

Correspondence to: Dr CMY Chan  
 Email: [chanmy7@ha.org.hk](mailto:chanmy7@ha.org.hk)

## 經腹腔鏡骶骨陰道固定術治療子宮脫垂及子宮切除術後的子宮脫垂：解剖學及功能結果

- 目的** 評估本地醫院內進行經腹腔鏡骶骨陰道固定術後的解剖學及功能結果。
- 設計** 回顧病例系列。
- 安排** 香港一所分區醫院。
- 患者** 2003年1月至2008年12月期間，因呈現子宮脫垂病徵或接受子宮切除術後出現子宮脫垂的所有病人。
- 主要結果測量** 解剖學和功能結果（包括併發症）。
- 結果** 研究共31位病人的紀錄。治療陰道壁頂部脫垂的成功率達100%，亦沒有復發穹窿脫垂（二期或以上）。術後約有19%的病人出現陰道前壁脫垂，其中6%的病人須再次進行手術；另23%的病人有壓力性尿失禁。術後出現性交困難及便秘的比率相當低。病人平均住院時間為4天（介乎2-11天）。2名病人有膀胱損傷，1名病人因直腸損傷須進行直腸陰道瘻修。3名病人需改為進行剖腹術。
- 結論** 經腹腔鏡骶骨陰道固定術治療陰道壁頂部脫垂的成功率高，其併發比率屬可接受範圍。此固定術在華籍病人中是可行的。

for symptomatic uterine or post-hysterectomy vault prolapse at the Department of Obstetrics and Gynaecology, United Christian Hospital during the 6-year period between January 2003 and December 2008, were retrospectively reviewed.

All the patients had undergone preoperative urogynaecological work-up, which included history taking, physical examination, and urodynamic study. Information about age, parity, details of previous hysterectomy, urinary symptoms (including stress incontinence, urge incontinence, voiding dysfunction), bowel symptoms (constipation), and sexual function (dyspareunia) was also retrieved. The degree of pelvic organ prolapse including the anterior, apical, and posterior vaginal wall prolapse was quantified using the POP-Q system.<sup>5</sup> Notably, uroflowmetry and cystometry had been performed preoperatively when clinically indicated.

All procedures had been performed using a polypropylene (Prolene; Ethicon EndoSurgery, Inc, Somerville [NJ], US) or a polypropylene/polyglactin mesh (Vypro II, Johnson & Johnson, St Stevens-Woluwe, Belgium). The presacral ligament overlying the sacral promontory was exposed and acted as an anchoring point for the mesh. Careful dissection was performed to avoid bleeding from presacral vessels. The peritoneal incision was then extended to the right side of the Pouch of Douglas. The vaginal vault was dissected to expose the pubo-cervical fascia, the uterosacral/cardinal complex and the rectovaginal fascia. The mesh was then sutured to the posterior

vaginal wall with six stitches of non-absorbable sutures (Ethibond 1; Ethicon, Inc, Somerville [NJ], US), three on each side of the vaginal wall at its lower, middle, and upper part. It was then anchored to the presacral ligament without tension by two stitches of Ethibond 1. The peritoneum overlying the mesh was closed by continuous sutures of 2-0 Vicryl (Ethicon Inc).

Intravenous co-amoxiclav (Augmentin; GlaxoSmithKline, Worthing, UK) 1.2 g was given on induction as prophylaxis. A 14-/16-French Foley catheter was inserted before the procedure and removed after 24 hours.

Patients were followed up 1, 6, and 12 months postoperatively and annually thereafter. Any recurrent symptom (vaginal lump; urinary, bowel, and sexual dysfunction) or any complication of the operation were reviewed. Anatomical support and possible long-term complications such as mesh erosion were assessed at each follow-up on physical examination.

### Results

A total of 31 cases were included in the analysis. The mean age of the study patients was 56 (range, 41-80; standard deviation, 9) years, and mean parity was 3 (range, 1-5). Seven (23%) of the women had undergone a prior hysterectomy and 3 (10%) had had a colposuspension.

All the patients presented with a reducible vaginal lump; 11 (35%) also complained of urinary stress incontinence, of whom six (19%) had urge incontinence. Five (16%) women had voiding

TABLE I. Preoperative POP-Q stages

Compartment	Stage	No. (%) <sup>*</sup>
Apical	0	0
	I	0
	II	16 (52)
	III	10 (32)
Anterior	IV	5 (16)
	0	4 (13)
	I	5 (16)
	II	4 (13)
Posterior	III	18 (58)
	IV	0
	0	28 (90)
	I	0
	II	1 (3)
	III	2 (6)
	IV	0

\* Because of rounding, not all percentages total 100

TABLE 2. Surgical treatment, mean duration of operations and blood loss

Additional procedures*	No. of women	Mean (range) duration of operation (mins) <sup>†</sup>	Mean (range) blood loss (mL) <sup>‡</sup>
Sacrocolpopexy alone	6	228 (135-365)	125 (20-400)
Colposuspension	1	290	50
LAVH <sup>‡</sup>	6	247 (210-320)	140 (50-200)
LAVH, colposuspension	1	325	100
LAVH, AR <sup>§</sup>	14	313 (180-410)	238 (50-550)
LAVH, TVT/TOT	1	360	900
LAVH, AR, TVT/TOT	2	308 (300-315)	650 (500-800)

\* AR denotes anterior colporrhaphy, LAVH laparoscopic-assisted vaginal hysterectomy, TOT transobturator tape, and TVT tension-free vaginal tape

<sup>†</sup> Cases with conversion to laparotomy were not included

<sup>‡</sup> One case was converted to laparotomy

<sup>§</sup> One case was converted to laparotomy and one to mini-laparotomy

difficulties and six (19%) had irritative urinary symptoms. Two (6%) had constipation before surgery but none complained of dyspareunia.

Preoperative assessment findings pertaining to apical, anterior, and posterior vaginal wall prolapse are summarised in Table 1. Sixteen women (52%) had stage II apical prolapse, whilst 10 (32%) and 5 (16%) of the women had stage III and stage IV apical prolapse, respectively.

Twenty-seven women had urodynamic studies performed before the operation, five of whom had urodynamic stress incontinence, four had detrusor overactivity, four had decreased bladder compliance, and two had voiding dysfunction.

Corresponding mean durations of the operations and blood loss are presented in Table 2. Among 31 patients, 25 had other surgical procedures at the same setting (Table 2). The mean duration for the laparoscopic sacrocolpopexy procedure alone was 228 minutes. When additional procedures were performed at the same setting, the mean duration of the operations increased by up to 132 minutes. The mean blood loss was 125 mL.

The mean hospital stay was 4 (range, 2-11) days. Two bladder injuries were encountered intra-operatively—one during adhesiolysis and was successfully repaired laparoscopically, while the other (perforation) was sustained during insertion of tension-free vaginal tape and was managed conservatively. These two patients stayed in hospital for 7 and 11 days, respectively. Three procedures were converted to a laparotomy, because of significant subcutaneous emphysema during the laparoscopy in two cases and one due to failure to put in stitches laparoscopically that was converted to a mini-laparotomy.

During postoperative recovery, two women developed vault haematomas (both had laparoscopic-assisted vaginal hysterectomy at the same time), which resolved on conservative treatment with antibiotics.

TABLE 3. Anatomical outcomes after treatment

Type of prolapse*	Recurrence	New appearance
Apical	0	0
Anterior	2 (6%)	4 (13%)
Posterior	1 (3%)	0

\* When prolapse  $\geq$  stage II

TABLE 4. Functional outcomes after treatment

Functional outcome	No. of cases	Persistent symptom	New symptom
Stress incontinence	7 (23%)	3	4
Urge incontinence	3 (10%)	2	1
Constipation	4 (13%)	0	4
Dyspareunia	1 (3%)	0	1

One woman developed a wound infection at the port site.

Regarding our 31 patients, one was lost to follow-up at 7 months. At a median follow-up time of 32 (range, 7-72) months, there were no recurrences of vault prolapse (defined as stage II or higher). The success rate was 100%. Six women had anterior vaginal wall prolapse, which was not present before the operation in four of them. Five of them were symptomatic. Two of them had subsequent surgery for anterior vaginal wall prolapse at 14 and 28 months postoperatively, of which one entailed tension-free vaginal tape insertion for urinary stress incontinence. One woman was noted to have posterior vaginal wall prolapse 36 months postoperatively (Table 3).

Seven women had urinary stress incontinence at a median time of 5 months after the procedure (range, 1-24 months). While three of these patients had persistence of prior symptoms after the operation, four had developed de-novo urinary stress incontinence. In five, symptoms improved with pelvic floor exercises, and two underwent tension-free vaginal taping 12 and 28 months postoperatively. Three women had urge urinary incontinence, two of

whom had had similar symptoms preoperatively. Four women had constipation 1 month postoperatively, which improved over the ensuing 6 months. One woman had dyspareunia at 12 months and tenderness could be elicited at the anchorage site of the mesh at the introitus (Table 4).

Major long-term operative complications included one instance of rectovaginal fistula. The woman was 76 years old at the time of the index operation, and had had previous abdominal hysterectomy in 1970 and a colposuspension in 1999. At operation, her bowels were noted to be adherent to the Pouch of Douglas. She reported per rectal bleeding 10 days after the sacrocolpopexy. Sigmoidoscopy revealed gas bubbling from vagina and colonoscopy confirmed a rectovaginal fistula 4 cm from anal verge. Transrectal repair with an endorectal advancement flap performed 4 months after the sacrocolpopexy failed to correct the lesion. A low anterior resection with loop ileostomy was subsequently performed to relieve her symptoms. No other cases of mesh erosion were encountered during the follow-up period.

## Discussion

In our series, the success rate for laparoscopic sacrocolpopexy in treating apical vaginal wall prolapse was high. The mean hospital stay was 4 days, which is comparable to other published results.<sup>6-9</sup> The main intra-operative complications of laparoscopic sacrocolpopexy were due to bladder injury and a rectovaginal fistula; after excluding the patient injured by insertion of a tension-free vaginal tape and rectal, each of these injuries occurred in 3% of our patients. Bladder injury rates of 0 to 7% were reported in other laparoscopic series,<sup>10-12</sup> which were similar to those encountered during open sacrocolpopexy.<sup>13</sup> We could not directly compare the rate of rectal injury in this series with that of open sacrocolpopexy documented in the literature (0.4-2.5%) due to the small number of cases involved. Nevertheless, it is important to note that our patients with a rectal injury had a history of two prior laparotomies and dense bowel adhesions to the Pouch of Douglas.

In this study, the operations were mainly performed by two surgeons with a special interest in urogynaecology. The major complications as described above occurred in the initial one third of the cases. There was a significant decrease in major complications thereafter, implying the presence of a learning curve period and possibly better case selection.

The frequency of mesh erosion after laparoscopic sacrocolpopexy reported in other studies was 3% (range, 0-9%).<sup>14</sup> Some authors

advocated supracervical hysterectomy instead of total hysterectomy at sacrocolpopexy, because of the theoretical risk of mesh contamination and erosion by opening the vaginal cuff.<sup>9</sup> In our series, the mesh erosion frequency was seemingly low, although total hysterectomy was performed at the same setting in around 80% of the patients.

Recurrence of apical vaginal wall prolapse was not encountered in our series. However, there was a 6% rate of recurrence and a 13% rate of new occurrence for anterior vaginal wall prolapse, two (6%) of the affected patients had a second operation to repair their prolapse. Thus the 6% re-operation rate for prolapse in our series was comparable to other series (reported to be 0-21%).<sup>14</sup>

The rate of postoperative urinary stress incontinence was 23% in our series. In a review evaluating nine studies of laparoscopic sacrocolpopexy, the postoperative urinary stress incontinence rate was estimated as about 18% (range, 2-44%).<sup>14</sup> It has been suggested that in women without stress incontinence who are undergoing abdominal sacrocolpopexy for prolapse, having a Burch colposuspension significantly reduced postoperative symptoms of stress incontinence, without increasing other lower urinary tract symptoms.<sup>15</sup> However, only one trial suggested this practice, so it remains unclear whether prophylactic continence surgery is beneficial. Taking into account the possible complications of continence surgery, it should not be recommended routinely.<sup>16</sup>

The rate of postoperative bowel dysfunction including constipation in our series was 13%, which was comparable to other results (reported to be 0-25%).<sup>14</sup> Most of the bowel symptoms in our patients resolved within 6 months, which was also in line with reports from other similar studies.

An advantage of sacrocolpopexy over sacrospinous colpopexy is that sexual function is better preserved as the vaginal axis is not deviated. In our series, sexual activity after laparoscopic sacrocolpopexy was affected only in one woman who had significant dyspareunia.

Our results are comparable to those obtained after open abdominal sacrocolpopexy. In our series, the rates of recurrent apical and anterior vaginal wall prolapses were 0% and 19%, respectively. The rate of bladder injuries was 3%, as was the mesh erosion rate, and the re-operation rate for urinary stress incontinence was 6%. In a comprehensive review of abdominal sacrocolpopexy,<sup>13</sup> the rate of recurrent apical vaginal wall prolapse and anterior vaginal wall prolapse after open abdominal sacrocolpopexy was reported as 0-22% and 29%, respectively. According to that review, bladder injury rates ranged from 0.4 to 16%, mesh erosion rates were about 3%, the re-operation rate for urinary stress incontinence was

5%, and the rate of bowel injury was reported to be 0.4 to 2.5%. In contrast, the rate of bowel injury in our series was 3%, which may be explained by a possible learning curve being involved.

The advantages of minimally invasive surgery apply well to abdominal sacrocolpopexy. The procedure provides a magnified vision and possible use of delicate instruments which allow accurate dissection and minimal tissue damage. This is particularly useful for exposing the presacral ligament overlying the sacral promontory. Before starting the laparoscopic sacrocolpopexy in 2003, we performed open abdominal sacrocolpopexy for uterine or apical vaginal wall prolapse, in which case the mean hospital stay was 8 days (unpublished data). With the benefits of laparoscopic sacrocolpopexy, postoperative pain is reduced and recovery is faster.

It is known that abdominal sacrocolpopexy is superior to vaginal sacrospinous colpopexy in terms of a lower rate of recurrent vault prolapse and less dyspareunia. We selected patients for laparoscopic sacrocolpopexy, instead of vaginal sacrospinous colpopexy, based on their age, severity of prolapse, and their preference. Most of our patients having laparoscopic sacrocolpopexy were relatively young and had stage II or more severe prolapse, who would prefer a treatment offering a lower rate of recurrence

and a better sexual life. These relatively young patients could have tolerated major abdominal surgery as well.

The major weaknesses of this case series were its retrospective nature and the small sample size. However, the rate of loss to follow-up was low (3%), and the outcome data were well documented and complete for all cases. Regrettably, we did not assess subjective cure rates, as we did not have any protocol for routine assessment using validated questionnaires. As objective and subjective cure rates are not necessarily the same,<sup>4,17</sup> we believe that both rates should be evaluated in future prospective studies.

In conclusion, our data demonstrated that laparoscopic sacrocolpopexy is a feasible procedure in our population; it has a high success rate, a low rate of major complications, and good medium-term results. The results are comparable to those of open abdominal sacrocolpopexy and enable a faster recovery. More prospective studies with larger numbers of cases are needed to evaluate the long-term outcome and the precise incidence of major complications. In addition, the value of prophylactic incontinence procedures at the time of sacrocolpopexy requires assessment by randomised controlled trials.

## References

- Abrams P, Cardozo L, Fall M, et al. The standardisation of terminology of lower urinary tract function: report from the Standardisation Sub-committee of the International Continence Society. *Neurourol Urodyn* 2002;21:167-78.
- Marchionni M, Bracco GL, Checcucci V, et al. True incidence of vaginal vault prolapse. Thirteen years of experience. *J Reprod Med* 1999;44:679-84.
- Maher C, Baessler K, Glazener CM, Adams EJ, Hagen S. Surgical management of pelvic organ prolapse in women. *Cochrane Database Syst Rev* 2007;(3):CD004014.
- Granese R, Candiani M, Perino A, Romano F, Cucinella G. Laparoscopic sacrocolpopexy in the treatment of vaginal vault prolapse: 8 years experience. *Eur J Obstet Gynecol Reprod Biol* 2009;146:227-31.
- Bump RC, Mattiasson A, Bø K, et al. The standardization of terminology of female pelvic organ prolapse and pelvic floor dysfunction. *Am J Obstet Gynecol* 1996;175:10-7.
- Rozet F, Mandron E, Arroyo C, et al. Laparoscopic sacral colpopexy approach for genito-urinary prolapse: experience with 363 cases. *Eur Urol* 2005;47:230-6.
- Higgs PJ, Chua HL, Smith ARB. Long term review of laparoscopic sacrocolpopexy. *BJOG* 2005;112:1134-8.
- Rivoire C, Botchorishvili R, Canis M, et al. Complete laparoscopic treatment of genital prolapse with meshes including vaginal promontofixation and anterior repair: a series of 138 patients. *J Minim Invasive Gynecol* 2007;14:712-8.
- Sarlos D, Brandner S, Kots L, Gygax N, Schaer G. Laparoscopic sacrocolpopexy for uterine and post-hysterectomy prolapse: anatomical results, quality of life and perioperative outcome—a prospective study with 101 cases. *Int Urogynecol J Pelvic Floor Dysfunct* 2008;19:1415-22.
- Gadonneix P, Ercoli A, Salet-Lizée D, et al. Laparoscopic sacrocolpopexy with two separate meshes along the anterior and posterior vaginal walls for multicompartiment pelvic organ prolapse. *J Am Assoc Gynecol Laparosc* 2004;11:29-35.
- Cosson M, Bogaert E, Narducci F, Querleu D, Crépin G. Laparoscopic sacral colpopexy: short-term results and complications in 83 patients [in French]. *J Gynecol Obstet Biol Reprod (Paris)* 2000;29:746-50.
- Von Theobald P, Chéret A. Laparoscopic sacrocolpopexy: results of a 100-patient series with 8 years follow-up. *Gynecol Surg* 2004;1:31-6.
- Nygaard IE, McCreery R, Brubaker L, et al. Abdominal sacrocolpopexy: a comprehensive review. *Obstet Gynecol* 2004;104:805-23.
- Ganatra AM, Rozet F, Sanchez-Salas R, et al. The current status of laparoscopic sacrocolpopexy: a review. *Eur Urol* 2009;55:1089-103.
- Brubaker L, Cundiff GW, Fine P, et al. Abdominal sacrocolpopexy with Burch colposuspension to reduce urinary stress incontinence. *N Engl J Med* 2006;354:1557-66.
- The management of post hysterectomy vaginal vault prolapse. Green-top Guideline No. 46. London: Royal College of Obstetricians and Gynaecologists; 2007.
- Beer M, Kuhn A. Surgical techniques for vault prolapse: a review of the literature. *Eur J Obstet Gynecol Reprod Biol* 2005;119:144-55.