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Sacrocolpopexy for post hysterectomy vault prolapse: A single centre experience in south India

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Abstract
Post hysterectomy vault prolapse is the protrusion of vagina through the genital hiatus and is sometimes accompanied by bowel and bladder symptoms. Sacrocolpopexy is considered as the gold standard for surgical management of vaginal vault prolapse. This procedure can be performed by abdominal, laparoscopic or robotic route. In this study we are presenting the analysis of all the cases of vault prolapse managed by abdominal or laparoscopic sacrocolpopexy in our hospital within a period of four years and its outcome until a follow up for one year.

The majorities of the patients in our case series presented with a reducible vaginal mass and most of them had POP-Q stage III prolapse. Abdominal sacrocolpopexy and laparoscopic sacrocolpopexy was performed for seven and five cases respectively. Anatomic success rate was 100% and none of them had a recurrence of apical prolapse till one year of follow up. Immediate improvement of symptoms was observed in 86% and 100% of patients with ASC and LSC respectively; but at one year of follow up the functional improvement were retained in 57% and 80% for ASC and LSC respectively.

Sacrocolpopexy is a reliable & effective procedure for management of vaginal vault prolapse. This procedure provides relief from the symptoms of prolapse along with providing good anatomical support and is helpful in preventing recurrence of the defect.

Keywords: Vaginal vault prolapse, abdominal, laparoscopic, sacrocolpopexy

Introduction

The International continence society (ICS) defines vaginal vault prolapse (VVP) as the descent of the vaginal apex/cuff/vaginal vault below a point that is 2cm less than the total vaginal length above the plane of hymen [1]. Hysterectomy is one of the most commonly performed gynecological surgeries and vaginal vault prolapse is a well-known remote complication associated with it. The incidence of post-hysterectomy VVP ranges from 0.2% to 43% and those requiring surgical intervention has been estimated to be 36 per 10, 000 person-years [2, 3]. The prevalence of vault prolapse is estimated to be more when hysterectomy is performed for indication of prolapse rather than for other benign conditions (11.6% vs. 1.8% respectively); furthermore this risk increases with time following hysterectomy [4, 5]. Anatomically, detachment of the cardinal-uterosacral ligament complexes from pericervical ring at the level of the ischial spines is the documented cause for development of uterine descent, post hysterectomy vaginal vault prolapse, and enterocele (apical prolapse) [6].

Women with vaginal vault prolapse frequently present with local symptoms of pelvic pressure, heaviness, bulging of the vaginal wall, dragging sensation in the vagina or backache. Other modes of presentation are urinary symptoms like retention of urine and incomplete evacuation, bowel symptoms like constipation and sexual dysfunction (dyspareunia) [7]. Older patients with long standing prolapse may present with decubitus ulcer [8]. Symptoms of prolapse are at times distressing and may severely affect the quality of life of a woman; therefore an effective treatment is often needed.

Conservative or mechanical methods have limited role in VVP, but can be tried as an initial therapy [3]. Sacrocolpopexy (SC) is considered as the gold standard for surgical management of vaginal vault prolapse [9]. Currently, minimal invasive laparoscopic route is preferred over the conventional methods [10]. In this study we are presenting the analysis of all cases of sacrocolpopexy (SC) which were performed at Prathima Institute of Medical Sciences, Telangana in four years (2016-2020), on the basis of their demography, procedure adopted, outcome and follow up till 1 year post-operative period.

Materials and Methods

A total of twelve women with symptomatic vault prolapse underwent sacrocolpopexy procedure during the study period of four years (2016-2020). Patients came with the chief complaint of something coming out of vagina or bulge in the vagina after few years of undergoing abdominal or vaginal hysterectomy. Speculum examination and bimanual examination confirmed the diagnosis of vault prolapse. All patients had preoperative urogynaecological work-up, which included history taking, physical examination, and urodynamic study when relevant. Information about age, parity, details of previous hysterectomy, urinary symptoms (including stress incontinence, urge incontinence, voiding dysfunction), bowel symptoms, and sexual function was also retrieved. The staging of vault prolapse was done according to the universal pelvic organ prolapse quantification (POP-Q) system. Pre-operative investigations including ultrasonography were done as per the hospital protocol. Proper counseling regarding the procedure and follow up protocol was elaborated to the patient and her relatives. The risk of mesh erosion and recurrence of prolapse was explained. Informed written consent was obtained from all patients.

The day before surgery, pre-anesthetic checkup and bowel preparation were done. The choice of abdominal sacrocolpopexy (ASC) or laparoscopic sacrocolpopexy (LSC) was made on the basis of the patient's choice, previous surgery, previous route of hysterectomy, age and BMI of the patient. On the day of surgery, preoperative antibiotics were administered thirty minute before the procedure. General anesthesia was given for all cases. For abdominal sacrocolpopexy, laparotomy was planned with midline longitudinal incision, whereas for laparoscopic sacrocolpopexy four port entry method was performed with one 10mm port at Palmar point or supraumblical site with ancillary two port (5mm) on right side and one more 5mm port on left side of abdomen. The vault was lifted up with the help of a self-designed obturator for easy manipulation. Bladder and rectum were dissected away from the vaginal vault by sharp dissection to expose the vaginal wall. Peritoneum was dissected over the sacral promontory till the pouch of Douglas, keeping the ureter at a safe distance. Non-absorbable Y-shaped macro-porous monofilament polypropylene surgical mesh of width 3cm was used for all the cases. One end of the mesh was fixed to the anterior longitudinal ligament over the sacral promontory with proper attention to presacral vessels and the other end was fixed to the vault both anteriorly and posteriorly with prolene No 1-0 suture. The mesh was reperitonealized to prevent intraperitoneal adhesion, bowel obstruction and mesh erosion. Anterior colporraphy and Bursch colposuspension was done concomitantly in patients, who presented with SUI and significant cystocele respectively. Urinary catheter was removed after 72 hours. Abdominal sacrocolpopexy patients were discharged after suture removal on 8th postoperative day and laparoscopic sacrocolpopexy patients were discharged on 4th postoperative day. Patient global impression of improvement (PGI-I) score was recorded at time of discharge. It consists of an ordinal scale of 1 to 7; score 1 being assigned for very much better feeling and score 7 for very much worst feeling.

Patients were followed up at 6weeks, 6 months and 1 year post-operative period. At every follow up, patients were assessed with PGI-I score, clinical examination including POP-Q staging and also asked for any onset of new symptoms.

Results

A total of twelve cases of sacrocolpopexy done for post hysterectomy vault prolapse were included in the analysis. The demographic features, mode of presentation, relevant history and POP-Q staging at time of admission have been tabulated in Table-1. The mean age of the patients was 55.83 years (range, 46-65), and mean parity was 3 (range, 0-5). Most of the patients had a history of normal delivery (83%). The majority of the patients presented with a reducible vaginal mass and/or dragging sensation at the time of admission. Two patients presented with low backache and one patient each presented with complains of stress urinary incontinence and bowel symptoms. Duration of symptoms was ranging from one to six years. Eight patients had a history of abdominal hysterectomy, three had prior vaginal hysterectomy and one patient had an emergency peripartum hysterectomy. POP-Q staging revealed, majority of the cases were in stage III (67%), followed by stage II, IV (17% each).

Table 1: Demographics and clinical parameters

Sl No.	Age	Parity	Mode of delivery	Symptoms	Duration of symptoms (in Years)	Co-morbidity	Past surgery	POP-Q stage
1	65	4	NVD	Dragging sensation	6	Hypertension	VH	IV
2	55	0	-	Mass per vaginum	2	Diabetes	TAH	III
3	58	3	NVD	Dragging sensation	3	Nil	TAH + BSO	III
4	50	3	NVD + LSCS	Low backache	1	Nil	Caesarean section, TAH	III
5	60	3	NVD	Mass per vaginum	4	Nil	TAH	III
6	50	5	NVD + LSCS	Urinary symptoms	1	Hypertension	Caesarean section, TAH + BSO	II
7	46	3	NVD	Mass per vaginum	1	Nil	Peripartum hysterectomy	III
8	58	4	NVD	Mass per vaginum	2	Nil	VH	III
9	52	3	NVD	Dragging sensation	1	Treated case of TB	TAH + BSO	II
10	63	2	LSCS	Urinary symptoms	3	Nil	TAH + BSO	III
11	51	3	NVD	Bowel symptoms	2	Diabetes	VH	III
12	62	5	NVD	Dragging sensation	4	Nil	TAH + BSO	IV

Note: TAH: Total abdominal hysterectomy, BSO: Bilateral salpingo-oophorectomy, VH: Vaginal hysterectomy, NVD: normal vaginal delivery, LSCS: lower uterine cesarean section, TB: tuberculosis

Route of surgery, mean duration of the procedure and amount of blood loss has been tabulated in Table-2. Abdominal sacrocolpopexy and laparoscopic sacrocolpopexy was planned for seven and five cases respectively. Anterior colporraphy was simultaneously performed in two cases of abdominal sacrocolpopexy, and Bursch colposuspension in another case. Mean duration of surgery was less for abdominal sacrocolpopexy (135 minutes). Blood transfusion was required in two cases. The requirement of post-operative hematocrit correction was greater in patients who had abdominal sacrocolpopexy. No other intraoperative complications were observed. Mean duration of hospital stay was less (4.2 days) for

laparoscopic sacrocolpopexy. All the patients had subjective improvement of symptoms with mean PGI-I score of 1.8 at time of discharge.

Table 2: Route and outcome of surgery

Procedure	No. of patients	Mean duration of procedure (mins)	Intraoperative blood loss in ml Median (Range)	Duration of hospitalization in days Median (Range)
Abdominal sacrocolpopexy	4	135	117 (50-200)	7.2 (5-9)
Laparoscopic sacrocolpopexy	5	208	77 (30-100)	4.2 (3-5)
Anterior colporraphy with ASC	2	235	200 (100-300)	7.5 (7-8)
Bursch colposuspension with ASC	1	230	120	7

Table-3 depicts the anatomical outcome in the patients at follow up period of 6 weeks, 6 months and 1 year. Anatomic success (defined as less than POP-Q stage II) rate was 100% till one year of follow up. Moreover none of the operated patient had recurrence (defined as more than POP-Q stage II) of prolapse till 1 year follow up. The median PGI-I score was 2 at 1 week, 6 week, 6month and one year follow up.

Table 3: Post-operative anatomic outcome and follow up

POP-Q stage	Pre-operative	1 week	6 Weeks	6 months	1 year
0	Nil	12	12	11	10
I	Nil	Nil	Nil	1	1
II	2	Nil	Nil	Nil	Nil
III	8	Nil	Nil	Nil	Nil
IV	2	Nil	Nil	Nil	Nil
PGI-I score Median (IQR)	Not applicable	2 (1.25-2)	2 (2-2.75)	2 (2-3.75)	2 (2-3.75)

In Table-4 the functional outcome of the operated cases has been tabulated. Immediate improvement of symptoms was observed in 86% and 100% of patients with ASC and LSC respectively; but at one year of follow up the functional improvement were retained in 57% and 80% for ASC and LSC respectively. Three cases of ASC failed to retain the functional success at 6month follow up, out of which one case developed constipation and dyspareunia, in addition another case developed new onset of stress urinary incontinence. One case of laparoscopic sacrocolpopexy had developed urge incontinence which was managed conservatively. No case of mesh erosion was observed during the follow up period. None of the cases required reoperation due to recurrence or mesh erosion.

Table 4: Functional outcome of sacrocolpopexy

	Abdominal sacrocolpopexy	Laparoscopic sacrocolpopexy
Immediate Symptomatic improvement	86%	100%
Symptomatic improvement at 1year follow up	57%	80%
New onset stress incontinence	1 case	Nil
New onset of Urge incontinence	Nil	1 case
New onset of Constipation	1 case	Nil
New onset of Dyspareunia	1 case	Nil

Discussion

The mean age of presentation in our study was 55.83 years which is similar to other studies on pelvic organ prolapse and commonly seen among postmenopausal women [8, 11]. Majority of our patients presented at POP-Q stage III with predominant symptoms of vaginal bulge. We used pelvic organ prolapse quantification system (POP-Q) proposed by Internal continence society (ICS), which is the most comprehensive, reproducible, and standardized method for quantification of genital prolapse including VVP [3, 12, 13].

Sacrocolpopexy was planned for symptomatic cases of VVP, after proper counseling regarding other conservative, mechanical and surgical methods of VVP. At our institute we performed sacrocolpopexy for twelve cases of vaginal vault prolapse, out of them seven had abdominal sacrocolpopexy and the rest five underwent laparoscopic sacrocolpopexy. The type and route of surgery was decided based upon the patient's choice, concomitant prolapse of other compartment, sexual activity, previous abdominal surgeries, previous prolapse surgeries, total vaginal length and presence of other co-morbidities [3].

Abdominal sacrocolpopexy was first described by Lane, who used mersilene vascular graft to bridge the gap between vault and sacral promontory [14]. It is considered as gold standard procedure for management of VVP [9]. Vaginal sacrospinous colpopexy (VSC) is an alternative, which is quicker, cheaper to perform and has advantage of earlier return to activities of daily living. Recent Cochrane review of Fourteen randomized controlled trials including 1004 women, concluded that abdominal sacral colpopexy was better than vaginal sacrospinous colpopexy (VSC) in terms of a lower rate of recurrent vault prolapse (RR 0.23, 95% CI 0.07 to 0.77), less dyspareunia (RR 0.39, 95% CI 0.18 to 0.86), and a lower re-operation rate [15]. Because of deviation of normal vaginal axis VSC is associated risk of cystocele & SUI and it is not advisable for women with short vagina and dyspareunia [3].

The primary aims of surgical treatment are the restoration of normal vaginal anatomy, improvement in clinical symptoms and the restoration/maintenance of normal bladder, bowel and sexual functions [3]. Sacral colpopexy restores the De Lancy level-I support of vagina by attaching the vaginal vault to the sacral promontory through a polypropylene mesh and maintain the physiological position of the vagina. Sacrocolpopexy can also be done by laparoscopic or robotic routes with application of same principle as ASC. Laparoscopic sacrocolpopexy was first

described by Nezhat *et al* [16].

In our series we observed 100% anatomical success rate in both abdominal and laparoscopic sacrocolpopexy but the satisfaction rate was more in laparoscopic group (100% Vs 87%). No bladder and bowel injury was observed in either group of sacrocolpopexy. In LSC group the estimated blood loss was less (62 Vs 128 ml), operative time was more (130 Vs 205min) and the duration of hospitalization was less (4.2 Vs 7.2 days). Two cases of abdominal sacrocolpopexy required blood transfusion. Our study results are comparable to the available literature [5, 17, 18]. Coolen *et al*. in their systematic review and meta-analysis of nine randomized control trial of 846 women, observed that the anatomic success rate of sacrocolpopexy (abdominal, laparoscopic and robotic) are the best (62-90%) but the satisfaction rate of LSC was higher. So, LSC is preferable than ASC[17].Another systematic review and meta-analysis by Campbell *et al*, included seven studies with 1461 patients which were categorized to LSC (589) and ASC (872) group. They observed that LSC takes longer time (MD, 25 min; 95% CI, 5.43-45.07 minutes), associated with less blood loss, shorter hospital stay and reduced bowel complications; in contrast ASC had greater blood loss (MD, 107 ml; 95% CI, -139.59 to -73.73 ml), longer hospital stay (MD, 1.71 days; 95% CI, -2.21 to -1.22 days) and increased risk of postoperative paralytic ileus/small bowel obstruction [5]. An additional systematic review of three RCT with 247 patients (123 for LSC, 124 for ASC), by Ischikawa M concluded that LSC is comparable to ASC in management of apical prolapse but cystocele recurrence, repeat surgery of posterior compartment and mesh related complications were more in LSC group than ASC [18]. Because of minimal invasive nature of surgery, LSC is now considered as new gold standard for management of apical compartment genital prolapse but carries risk of recurrence of cystocele specifically in cases of POP with uterine preservation. This recurrence can be minimized by giving attention to three possible factors 1) improper fixation of mesh, 2) mesh displacement and 3) paravaginal defects [18]. There is limited evidence on the effectiveness of RSC. It is expensive, has longer operative time; therefore, should only be performed in the context of research [3, 19].

Simultaneous pelvic floor defects which may be a cystocele, rectocele or enterocele are present in 72% of patients with vault prolapse [20]. We performed additional Bursch colposuspension in a case of abdominal sacrocolpopexy with stress urinary incontinence and anterior colporraphy for another two cases of abdominal sacrocolpopexy for significant cystocele. Recent RCOG guideline concluded that," colposuspension at the time of sacrocolpopexy is an effective measure to reduce postoperative symptomatic SUI in previous continent women; however colposuspension at time of ASC for overt SUI does not appear to be effective" [3]. Concomitant repair of the anterior or posterior compartment is not required if apical repair is performed meticulously with extension of mesh to the anterior and posterior vagina [17, 21].

We followed up our patients at 6 weeks, 6 months and 1 year of surgery to check for any complaints, recurrence of prolapse by POP-Q staging (stage II or more), urinary symptoms, constipation, dyspareunia, back pain and vaginal discharge. No recurrence of vaginal vault prolapse was observed in our case series, except one case of ASC developing SUI, another case of ASC had constipation as well as dyspareunia and one case of LSC developed urge incontinence during the period of follow up. All the cases were managed conservatively and none of them required reoperation. A systematic review of observational studies of ASC reported long-term success rates of 78–100% and mesh erosion was observed in 2–11% [3, 11]. Serious complications such as bowel injury, sacral myelitis and severe bleeding have an estimated incidence of 2% (range 0–8%) [3]. Good anatomical cure rate of LSC (more than 90%) was reported in a number of observational studies and mesh erosion was observed in approximately 3% (0-9%) of cases [3, 22]. Erosion of mesh can be one of the most severe late complications of sacrocolpopexy. There was a warning issued by FDA about mesh in 2011 because of the seriousness of the problem with alloplastic materials like pain, discomfort, and sometimes erosions of the vaginal wall and intestinal obstruction secondary to the formation of adhesion [23]. But none of our patients had any of such complications till one year follow up period. The reason might be the reperitonealization of the mesh during the surgery. Prolonged follow up is needed to understand the long term patient burden associated with this surgical method and the mesh used.

Prevention is always considered better than cure. Mc Call culdoplasty and its modification have been recognised as a preventive measure during hysterectomy to prevent post hysterectomy vault prolapse [3, 24]. This involves the plication of both the uterosacral ligaments using continuous sutures, so as to obliterate the peritoneum of pouch of Douglas as high as possible.

Conclusion

Sacrocolpopexy is a reliable & effective procedure for management of vaginal vault prolapse. It is beneficial to women who are healthy, sexually active with relatively short vagina with apical prolapse. This procedure provides relief from the symptoms of prolapse along with providing good anatomical support and is helpful in preventing recurrence of the defect. Patients should be counselled preoperatively regarding the risk of recurrence of prolapse, stress incontinence and complications due to mesh erosion.

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