

Bilateral iliococcygeus fixation technique for enterocele and vaginal vault prolapse repair

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Abstract: **OBJECTIVE:** To evaluate our surgical experience with iliococcygeus fixation for enterocele and vaginal vault prolapse repair. **DESIGN:** Prospective longitudinal study. **SETTING:** Tertiary care referral centre, St. George's Hospital, London. **METHOD:** Comprehensive questionnaire for pre- and postoperative prolapse, urinary, bowel, and sexual symptoms, a pre and postoperative site-specific vaginal examination following the standardized International Continence Society scoring for prolapse, preoperative urodynamic studies, analysis of surgical results. **POPULATION:** 32 consecutive women who underwent bilateral iliococcygeus fixation. **OUTCOME MEASURES:** Feasibility of the procedure, intra- and postoperative complications, short-term postoperative prolapse-associated symptoms and pelvic organ prolapse quantification. **RESULTS:** Three patients were lost for follow-up. The mean postoperative follow up for the remainder 29 patients (90.6%) was 11.5±6.25 months (range 6-25). Twenty-five patients (78.1%) had a previous hysterectomy. Concomitant surgery was performed in 30 patients (93.7%). The iliococcygeus fixation was completed successfully in all cases. The mean blood loss per surgical procedure was 224±104 ml (range 100-400). There were no intraoperative complications. Postoperatively, one patient needed a blood transfusion, one had transitory left leg pain, and four had temporary voiding difficulty. The mean hospitalization time was 4.5±1.9 days (range 3-9). There was a statistically significant improvement in all pelvic organs prolapse quantification measurements ($p<0.0001$). Three patients (10.3%) had recurrence of vault prolapse or enterocele. The mean total vaginal length was shorter postoperatively (7.2±0.8 cm versus 8.6±1.0 preoperatively, $p<0.001$). **CONCLUSIONS:** iliococcygeus fixation is a relatively safe vaginal surgery for the treatment of enterocele and vaginal vault prolapse.

Key words: Iliococcygeus fixation; Enterocele; Vaginal vault prolapse; POP; ICS

INTRODUCTION

The exact incidence of post-hysterectomy vaginal vault prolapse is unknown, with rates ranging from 0.2% to 43%.¹ Many abdominal, vaginal and laparoscopic techniques have been described to correct this condition.² The vaginal approach has a swifter and less painful recovery. The most common vaginal techniques are sacrospinous fixation (SSF) and uterosacral suspension (USS). Iliococcygeus fixation (ICF) is an alternative vaginal technique for vault prolapse and enterocele repair first described by Inmon in 1963.³

The aim of this study was to describe our experience with iliococcygeus fixation (ICF) technique.

METHODS AND PATIENTS

Between July 1998 and May 2001, 32 consecutive women underwent ICF at St. George's Hospital for the treatment of symptomatic vaginal vault prolapse or enterocele.

Preoperative evaluation

Preoperatively, all patients underwent a standardized comprehensive urogynecologic review and complete physical, pelvic and site-specific vaginal examinations in the left lateral position using a Sim's speculum during a valsalva manoeuvre. The prolapse was graded using the standardized International Continence Society (ICS) scoring system for pelvic organ prolapse.⁷ Each compartment (anterior, middle, and posterior) was evaluated and assessed for defects in pelvic support. All patients underwent preoperative multi-channel urodynamic evaluation with prolapse reduction to identify occult urinary stress incontinence or voiding difficulties. In case of combined vaginal defect and stress incontinence, additional surgery was performed as needed. All patients were fully informed and consented beforehand. All data were documented and registered on electronic datasheet.

Operative technique

All patients received preoperative prophylactic antibiotics (metronidazole 500 mg and cephadrine 1 gr) and 5000 units

of fractionated heparin for deep vein thrombosis prophylaxis. Surgery was performed under general anesthesia with the patients in the dorsal lithotomy position. All patients were catheterised before the operation. In patients with uterine prolapse, a routine three-pedicle vaginal hysterectomy with or without bilateral salpingo-oophorectomy (BSO) was performed before the ICF. In patients with a previous hysterectomy, the posterior vaginal wall was opened via a midline longitudinal incision, and the recto-vaginal fascia was freed from the vagina by sharp dissection which was continued to the pelvic sidewall, where the ischial spine served as the landmark for identifying the iliococcygeus fascia (Figure 1). The surgeon then palpated the ischial spine and the right iliococcygeus fascia with his index finger. Using a regular needle holder with no. 0 polydioxanone (PDS) suture, a stitch was placed in the iliococcygeus

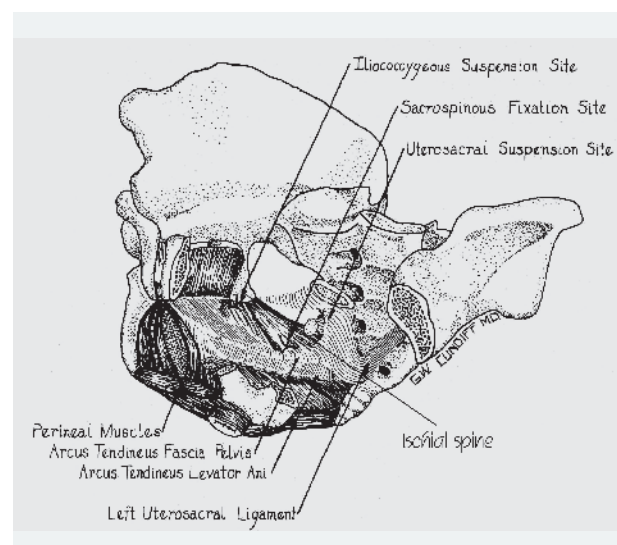


Fig. 1. - Sites for attachment during surgery for vaginal vault prolapse and enterocele repair including the iliococcygeus fascia (from Stanton & Monga, 2000, with permission).

fascia, about 1 cm medial and caudal to the ischial spine. Once the suture was secured, it was placed through the full thickness of the vaginal mucosa at the vault to anchor that side, later tied. This procedure was repeated on the other side. If a posterior or anterior repair was required it was then performed. After closure of the posterior vaginal wall, the iliococcygeus sutures were tied on either side to elevate the vault. In patients with stress incontinence, a Tension-Free Vaginal Tape (TVT) procedure was performed after the prolapse surgery. For secondary prolapse repair, we used prolene mesh (Johnson & Johnson, Brussels, Belgium) to reinforce the endo-pelvic fascia. All patients were advised to avoid strenuous activities and coitus for 6 weeks.

Postoperative follow-up

Patients were re-evaluated with a comprehensive urogynecological questionnaire and site-specific pelvic examination. Outcome measures included the feasibility of the procedure, intraoperative and postoperative complications, prolapse-associated symptoms and pelvic organ prolapse quantification (POP-Q).

Statistical analysis

A computerized database was created and all clinical data were collected prospectively and evaluated at the end of the study period. The results were analyzed by Stata 5.0 statistical software (Stata Corp., College Station, Texas). Statistical analysis was performed on the paired observation for each woman, before and after the operation. In addition, for a given symptom or physical finding, the proportion of women who improved was calculated. Improvement was defined as subjective symptoms and the objective physical findings before and after the operation. The Wilcoxon signed rank test was used to compare pre- and postoperative symptoms and POP-Q measurements. A p value of <0.05 was considered statistically significant.

RESULTS

Three other patients were lost to follow-up. The mean duration of follow-up in the remaining 29 patients (90.6%), was 11.5±6.3 months (range 6-25), mean age was 64.2±12.4 years (range 34-85), median parity was 2 (range 1-5), and mean body mass index was 22.8±3.7 kg/m² (range 20.8-31.1). Twenty-nine patients (90.0%) were menopausal, 14 (48.2%) used hormone replacement therapy, and only one

TABLE 1 - Preoperative and postoperative symptoms.

Symptoms	Preop. (n=32)	%	Postop. (n=29)	%	P value ^a
Vaginal bulge	32	100	5	17.2	0.0001
Stress incontinence	5	15.6	1 ^b	3.4	NS
Voiding difficulty	5	15.6	0	0	NS (0.6)
Urgency, frequency and/or nocturia	8	25	5	17.2	NS
Incomplete bowel emptying	7	21.7	2	6.8	NS (0.7)
Constipation	7	21.7	4	13.7	NS
Decreased sexual activity ^c	9	64.2	3	37.5	0.02
Dyspareunia	2	14.2	2 ^d	25	NS

^a Wilcoxon signed rank test
^b Was not diagnosed before the operation.
^c 14 patients were potentially sexually active preoperatively and 8 post operatively.
^d One patient had dyspareunia preoperatively.
 NS=none significant

was a smoker. Twenty-five patients (78.1%) had a previous hysterectomy (8 vaginal and 17 abdominal hysterectomy), 17 (53.1%), had previous prolapse surgery, and 11 (32.4%) had a previous continence surgery (Burch colposuspension in 10 and sling procedure in 1). Preoperative urodynamic evaluation showed stress incontinence in 9 patients, detrusor overactivity in 3, mixed incontinence in 1, and voiding difficulty in 2. Preoperatively all patients complained of a vaginal bulge. Postoperatively there was a decrease in prolapse sensation, voiding difficulty, urgency, frequency, incomplete bowel emptying, and constipation (Table 1). The findings on pre- and postoperative vaginal examination are shown in Table 2. There was a statistically significant improvement in all POP-Q measurements (p<0.0001). The ICF was completed in all cases. The mean blood loss per surgical procedure was 224±104 ml (range 100-420). Concomitant surgery was performed in 30 patients (93.7%) (Table 3). There were no intraoperative complications. Postoperatively, one patient had left leg pain that completely resolved after 6 weeks. This pain was attributed to the leg positioning during surgery. One patient had uncomplicated cystitis, 1 needed a blood transfusion for symptomatic anemia, and 4 patients had temporary voiding difficulty. Table 4 summarizes the operative data. Preoperatively, all patients had symptomatic apical prolapse (uterine, vaginal vault or enterocele) greater than grade 1. Postoperatively, only 3 patients (10.3%) had apical prolapse greater than grade 1, but 2 of them were symptomatic. However, on follow-up examination, other 6 patients (17.4%) had

TABLE 2 - Preoperative and postoperative vaginal examination findings.

Site of prolapse	Preop. (n=32) Grade of prolapse					Postop. (n=29) Grade of prolapse					P value*
	0	1	2	3	4	0	1	2	3	4	
Cystocele/ cystourethrocele	5	9	6	9	0	18	9	2	0	0	<0.0001
Rectocele	0	9	11	9	0	19	4	4	2	0	<0.0001
Enterocele	0	12	13	4	0	22	5	2	0	0	<0.0002
Uterus/ Vaginal vault	0	14	12	0	0	21	5	2	1	0	<0.0001
<i>Other vaginal parameters Mean±SD (range)</i>											
Total vaginal length (cm)	8.6±1.0 (7-10)					7.2±0.8 (6-8)					<0.0001
Vaginal introitus (cm)	4.6±0.9(4-7)					3.9±0.6 (3-6)					NS
Perineal body (cm)	3.4±1.1 (2-6)					3.3±0.6 (2-4)					NS

* Wilcoxon signed rank test
 NS=not significant

TABLE 3 - Concomitant surgery.

Procedure *	No. of patients (n=32)
Vaginal hysterectomy	6
Bilateral salpingo-oophorectomy	5
Anterior repair	16
Posterior repair+perineorrhaphy	22
TVT**	9
Mesh interposition	6

* 29 patients had more than one surgical procedure
 ** Tension-free vaginal tape

TABLE 4 - Surgery data.

Variables	No. patients/mean±SD
Feasibility	All patients
Estimated blood loss (cc)	224.6±104.8
Intraoperative complication	None
Postoperative complication	Blood transfusion for symptomatic anemia - 1 patient Left leg pain * - 1 patient Low urinary tract infection - 1 patient Voiding difficulty ** - 4 patients
Hospitalization (days)	4.6±0.9 (3-9)

* Resolved after 3 months

** One patient after TVT, all resolved in less than 2 months

TABLE 5 - Analysis of patients with postoperative prolapse greater than grade 1.

No. pts.	Postop. site and grade of prolapse	Symptoms	Preop. site and grade of prolapse	Operation for this compartment	Use of Mesh	Previous prolapse surgery
1	R2	Yes	R2	Yes	Yes	Yes
2	R3	No	R1	No	No	No
3	R3,E2,VP3	Yes	R2,E2,VP1	No	No	No
4	R2,E2,VP2	Yes	R3,E2	Yes	No	No
5	E2,VP2	No	E2	Yes	No	Yes
6	R2	No	R2	No	No	No
7	R2	Yes	R2	Yes	Yes	Yes
8	CU2	Yes	CU0	No	No	No
9	CU2	No	CU1	No	No	No

CU= cystoureterocele, R= rectocele, E= enterocele, VP= vault prolapse

TABLE 6 - Comparison between patients with poor and successful surgical results.

Variable	Successful group (n=20)	Failed group (N=9)	P value*
Follow-up (months)	11.1±3.3 (6-25)	12.2±3.8 (7-18)	NS
Age (years)	63.4±13.3 (42-85)	69.0±6.6 (66-79)	NS
Parity (median)	2 (1-5)	3 (1-4)	NS
Weight of the largest child (grams)	3284±185 (2990-3600)	3392±431 (2780-3800)	NS
BMI** (kg/m ²)	23.4 (19.2-39.3)	24.1 (20.3-36.1)	NS
Previous hysterectomy	17/20 (85%)	6/9 (66.6%)	NS
Previous prolapse surgery	11/20 (55%)	3/9 (33.3%)	NS

No significant difference was found in: smoking, hormone replacement therapy, hospitalization time, estimated blood loss during surgery and intra- and postoperative complications.

* Chi-square test

** BMI- body mass index

prolapse (cystocele or rectocele) greater than grade 1 and 3 of them were symptomatic. The mean time to recurrent prolapse sensation was 6.2±1.9 months (range 4-9). Analysis of patients with postoperative prolapse greater than grade 1 is shown in Table 5. There was no difference in patient's characteristics between this group and the "success" group (Table 6). The mean total vaginal length was shorter postoperatively (7.2±0.8 cm versus 8.6±1.0 cm preoperatively, p<0.001), although there was no significant difference in vaginal hiatus width or perineal body lengths. Only one patient had a significantly short vagina of 4 cm. She was not sexually active and had had a previous vaginal hysterectomy combined with cystocele and rectocele repair.

DISCUSSION

Surgery for vaginal vault prolapse has several goals: restore the normal anatomy, relieve symptoms, restore normal bowel and bladder function, and preserve satisfactory sexual function. Vaginal vault prolapse and enterocele may be a source of frustration to the surgeon because of the difficulty in satisfactory correcting of the defects for the long term, especially when preservation of a functional vaginal length is necessary. Benson et al⁵ noted that 33% of patients who had previous vaginal surgery for prolapse required reoperation for recurrence. A variety of abdominal and vaginal surgical techniques have been suggested to correct the pelvic floor. The choice of procedure depends on the abdominal and pelvic anatomy, the patient's general health, previous pelvic surgery, the quality of the pelvic support tissues and the surgeon's skills. The more commonly used vaginal approaches for vault prolapse repair are sacrospinous fixation (SSF) and uterosacral suspension. However, the intraoperative complications of SSF are not infrequent and include damage to the neurovascular bundle that runs in the ligament. Moreover, the typical unilateral SSF results in vaginal deviation laterally and exposes the anterior vaginal wall to persistent or subsequent cystocele in up to 37% of the patients.^{6,7} The main problematic complication of uterosacral suspension is ureteral obstruction reported in up to 11% of the patients⁸. Other disadvantages of both procedures are the need for a certain vaginal length and mobility in order to bring the vaginal vault to the sacrospinous or uterosacral ligaments without tension, and the need for a wide dissection to visualize the sacrospinous ligaments. Such dissection may increase the risk of bleeding and pelvic floor denervation.⁹ By contrast, the iliococcygeus fascia does not have critical structures such as the pudendal vessels and nerve or the ureter immediately adjacent to it. Therefore, it is theoretically associated with a lower rate of pelvic pain from nerve entrapment, bleeding, and ureteral damage. Furthermore, because of the lateral position of the iliococcygeus fascia in relation to the other anchoring pelvic structures (sacrospinous ligament, uterosacral ligaments and the sacrum), surgery is technically easier to perform and the final surgical result is more closely mimics the normal anatomic position of the upper vagina. Another advantage of ICF is its feasibility in women with restricted vaginal mobility or a short vagina that cannot be attached to the sacrospinous or the uterosacral ligaments without tension. Our study group included 17 patients (53.1%) who had had previous surgery for prolapse. Yet, in none of them did we find significant difficulty in exposing the iliococcygeus fascia or accomplished the sutures placement. Patients weight, vaginal length, and previous pelvic surgery had no effect on the feasibility of the procedure. There were no intraoperative complications and the postoperative complications were left leg pain in one patient, which we attributed to surgical positioning resolved spontaneously

6 weeks later with no neurological deficiency. Another patient needed a blood transfusion for preoperative anemia that become symptomatic postoperatively. Shull et al¹⁰ and Meeks et al¹¹ reported a success rate of more than 90% with ICF after a follow-up of 3-5 years. A recent study of Maher et al¹² compared sacrospinous fixation to ICF and found no significant difference in success or complication rates. Our results with ICF showed a good success rate of 89.7% for correcting apical prolapse (26/29 patients). However, critical analysis revealed that 6 out of the remaining 26 patients (23.0%) had rectocele or cystocele greater than grade 1 which was symptomatic in 3 of them. Five patients had no surgery for the failed compartment (preoperatively 2 had rectocele grade 2, 1 rectocele grade 1, and 2 cystourethrocele grade 0 and 1). In the 2 patients with rectocele grade 2, intraoperative re-assessment precluded surgery for these sites. Two other patients had deterioration of an existing prolapse, and only one patient had a denovo prolapse. The patient characteristics of the failed group were similar to those of the successful group.

We presume that the reasons for failure were as follows:

1. We did not perform a routine rectocele or cystocele repair in patients with multiple-site prolapse who had rectocele or cystocele grade 1 or less.
2. We did not use a routine mesh interposition in patients with previous surgery for prolapse.
3. We used polydgalactin 0 suture (absorbable material). Non-absorbable sutures or polydioxanone suture may be a better choice.
4. We altered the grade of prolapse during surgery.

A potential disadvantage of ICF is the position of ischial spines inferior to the normal position of the vaginal apex. This may result in shortening of the vagina, as shown in our study. We believe that in a not potentially sexually active patient, it is reasonable to judiciously shorten the vagina in order to decrease the risk of recurrence. However, in a potentially sexually active woman, attention should be directed leaving a functional vaginal length.

CONCLUSIONS

The iliococcygeus fixation is a relatively safe and effective vaginal surgery for the treatment of vaginal vault prolapse and enterocele. Efforts should be made to correct all additional site of prolapse and to maintain an adequate vaginal length in sexually active women. The grade of prolapse should not be altered during surgery. In cases of secondary repair, a mesh interposition should be considered. Long-term follow-up is needed for further evaluation of this technique.

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