The autologous rectus fascia sheath sacrocolpopexy and sacrohysteropexy, a mesh free alternative in patients with recurrent uterine and vault prolapse: A contemporary series and literature review

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INTRODUCTION

Epidemiological study suggests that up to 40% of all women develop a degree of pelvic organ prolapse (POP) during their lifetime,[1] and the life risk of requiring surgical repair is 11%.3] Surgical management of vault prolapse...
by abdominal sacrocolpopexy or sacrohysteropexy is considered the gold standard, based on high success rates for functional and anatomical outcomes.[3]

In the last two decades, transabdominal POP repairs have been performed using polypropylene mesh to reduce risk of medium- and long-term recurrence.[3] However, with the popularization of mesh usage, the numbers of complications with its use are increasingly reported. Complications include mesh erosion, quoted at up to 19.6%, and chronic pelvic pain in up to 12%, which may render the patient in a worse state of health in such cases.[3-7]

Patients and clinicians are now requesting non-mesh alternatives. The use of autologous rectus fascia sheath (RFS) is increasingly being preferred in patients with stress urinary incontinence, as an alternative to the tension-free transvaginal tape (TVT) and TVT obturator tape.[8] The success rates for autologous fascia seem to be broadly similar to those using polypropylene mesh in these cohorts.[9,10] As such, it seems sensible to offer patients autologous sacrocolpopexy and sacrohysteropexy as a meshfree alternative for uterine and vault prolapse. We report the use of RFS as a free graft for recurrent abdominal prolapse in a series of patients with complex pelvic floor dysfunction.

PATIENTS AND METHODS

Patients with complex pelvic floor dysfunction who were referred to a tertiary center were all discussed at multidisciplinary meeting. All patients had (multiple) previous gynecological or urological surgeries and had significant symptomatic POP. Patients who were felt to be a risk of (de novo or further) mesh complication were offered autologous sacrocolpopexy or sacrohysteropexy using RFS to perform the repair. Patient details were kept in a prospective database. All cases were performed by two specialists with expertise in pelvic floor dysfunction.

All patients were assessed by (repeat) videourodynamics and magnetic resonance imaging (MRI) defecating proctography to assess the nature of their incontinence and degree of POP. Incontinence was described by the Blaivas classification system and POP was measured by the extent of the vault descent below the pubococcygeal line.

The procedures were performed through Pfannenstiel access to harvest a strip of RFS 10–18 cm by 2.5 cm in length. Sacrocolpopexy and sacrohysteropexy were performed in similar fashion to their mesh alternatives. For sacrocolpopexy, the RFS was reconstructed in Y configuration and secured to anterior vault and posterior wall with polydioxanone (PDS) sutures. For sacrohysteropexy, the RFS was wrapped around the cervix through windows in the broad ligament. The apex of the slings was attached to the ligament over the sacral promontory with PDS.

RESULTS

Seven patients with the mean age of 52 (33–64) years underwent autologous RFS POP repair (sacrocolpopexy n = 4 and sacrohysteropexy n = 3). Mean follow-up is 16 (range 2–33) months.

Previous surgical interventions, videourodynamic evaluation, defecating MRI proctography findings, and the details of interventions are shown in Table 1. Patients had between one and six previous pelvic surgeries. One patient had POP repair alone, four had concomitant colposuspension, one patient takedown of previous failed Boari flap, one patient excision of ureterocoele, and one patient had cystectomy with neobladder and Mitrofanoff formation. The mean inpatient stay was 5.1 days (range 3–10). One patient required extended antibiotic cover for a post-operative chest infection. There were no other complications reported.

DISCUSSION

This is the first report of autologous RFS suspensions for POP in patients with complex (recurrent) pelvic floor dysfunction. All patients had successful resolution of their
prolapse (and incontinence) symptoms at last follow-up.

To the best of our knowledge, autologous fascia POP repair has been reported in only five series [Table 2]. The largest series of 150 patients was performed using lateral pedicled rectus fascia strips and concomitant reconstruction of the uterosacral ligaments. The authors’ reported high patient satisfaction rates with no prolapse recurrence at 1 year. Some patients went on to have subsequent cesarean sections, and it was noted that there were some adhesions between

Table 1: Previous surgery, assessment, and interventions

| Patient | Previous interventions | VCMG and MRI findings | Procedure | Outcomes |
|---------|------------------------|-----------------------|-----------|----------|
| 1       | Colposuspension        | Type IIB SUI          | Autologous RFS sacrocolpopexy and redo colposuspension | No prolapse recurrence |
|         | Posterior compartment repair | Detrusor overactivity | Abdominoplasty | SUI cured |
|         | Second posterior repair and anterior compartment repair | 5.3 cm vault descent from pubococcygeal line | | |
|         | TAH and BSO            |                       | | |
|         | Mesh sacrocolpopexy    |                       | | |
|         | Colposuspension        | No SUI                | Autologous RFS sacrocolpopexy | Sensory urgency persists |
|         |                       | Stable bladder        | | |
|         |                       | 5.0 cm vault descent from pubococcygeal line | | |
| 2       | Laparoscopic sterilization | Type IIB SUI          | Autologous RFS sacrocolpopexy and colposuspension | No prolapse recurrence |
|         | TVT                    | Detrusor overactivity | Abdominoplasty | 1 security pad/day |
|         | TVT excised to restore normal voiding Botox | 3.0 cm vault descent from pubococcygeal line | | |
| 3       | TAH and BSO (with the right ureteric injury) | Type IIB SUI          | Autologous RFS sacrocolpopexy | No prolapse recurrence |
|         | Right Boari flap       | Hypocontractile        | Abdominoplasty | Urgency resolved |
|         | Redo right ureteric reimplantation | 5.0 cm vault descent from pubococcygeal line | | |
| 4       | Bilateral duplex kidneys | Type IIA SUI          | Autologous RFS sacrocolpopexy and colposuspension | No prolapse recurrence |
|         | Left nephrectomy       | Stable bladder        | Excision of recurrent urethrocele | SUI cured |
|         | Left ureterocele, incised and subsequently resected | 2.5 cm vault descent from pubococcygeal line | | |
|         | Sacrospinous fixation  | Vaginal vault pulled laterally from previous surgery | | |
|         | Repeat vaginal prolapse surgery | | | |
| 5       | Lower segment cesarean section | Type IIA SUI          | Autologous RFS sacrocolpopexy and colposuspension | No prolapse recurrence |
|         | CVA                    | Stable bladder        | Excision of recurrent urethrocele | SUI cured |
|         | Decreasing benefits of intravesical Botox | 4.2 cm vault descent from pubococcygeal line | | |
|         | End colostomy for bowel dysfunction (fecal incontinence) | | | |
| 6       | Spina bifida           | Type III SUI (no control) | Autologous RFS sacrocolpopexy and colposuspension | No prolapse recurrence |
|         | TVT                    | >5.0 cm vault descent from pubococcygeal line at rest | Excision of TVT | Continent Mitrofanoff |
|         | Complete erosion of urethra (urethral loss) | | | |

RFS: Rectus fascia sheath, TVT: Transvaginal tape, MRI: Magnetic resonance imaging, SUI: Stress urinary incontinence, VCMG: Videocystometryrogram, BSO: Bilateral salpingo-oophorectomy, TAH: Total abdominal hysterectomy, CVA: Cerebrovascular accident, CISC: Clean intermittent self-catheterisation

Table 2: Published series of autologous fascia sacrocolpopexy

| Series                  | No patients | Patient type | Technique | FU (months) | Outcome |
|-------------------------|-------------|--------------|-----------|-------------|---------|
| Jenkins and McCoubrie 1992[15] | 20          | Primary 55% Recurrent 45% | Pedicled rectus sheath tendon flap | 43 | No recurrence of prolapse |
| Quiraz et al., 2008[15]   | 15          | Primary 91% Recurrent 9% | Free RFS graft abdominal sacral colpopereiopexy | 13 | 3 patients (15%) developed small cystoceles |
| Mahendru et al., 2010[15] | 51          | Primary 96% Recurrent 4% | Lateral pedicled rectus fascia strips | 14-63 | Recurrence of prolapse in 1 case (7%) |
| Yaqub and Shahzad 2013[15] | 150         | Unspecified (mostly primary) | Lateral pedicled rectus fascia strips and concomitant reconstruction of the uterosacral ligaments | 12 | No recurrence |
| Oliver et al., 2017[15]   | 19          | Mesh complications (erosion or pain) | L-shaped rectus sheath graft | 9.9 | No recurrence apical prolapse. 2 patients (11%) required surgery for anterior vaginal wall prolapse |

RFS: Rectus fascia sheath, FU: Follow up

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the uterus and the abdominal wall. There were no reported problems with the graft itself and no reports of erosion.\textsuperscript{[4]}

Jenkins and McCoubrie also reported the use of a pedicled RFS tendon flap as a mode of treating vault prolapse in 20 patients.\textsuperscript{[11]} A central strip of rectus was mobilized, 3 cm in width, and flapped from the distal attachment to the pubic symphysis. The proximal end of the graft was then sutured to the vaginal vault, thus suspending it from the pubis. After a mean follow-up of 43 months, no patients reported a prolapse recurrence, although three patients developed a small distal anterior wall (cystocele) prolapse.

Mahendru, in 2010, reported on 51 patients with post hysterectomy vault prolapse using bilateral pedicled flaps of rectus fascia, the medial aspects of which were sutured to the vaginal vault. The repair was durable at 14 months.\textsuperscript{[13]}

Quiroz \textit{et al}. retrospectively compared outcomes between mesh (\textit{n} = 105), Pelvicol xenograft (\textit{n} = 93), and autologous fascia (\textit{n} = 15) for abdominal sacrocolpopexy. POP repair was performed by an abdominal sacral colpoproctoepy in which the free RFS graft was secured to either the perineal body or the rectovaginal fascia. At 1.1 years recurrence occurred in 11\% of the Pelvicol group, but only one patient in the synthetic group, and one patient autologous RFS group. All seven reoperations for apical prolapse were in the Pelvicol group. The authors concluded that recurrence is most likely with a Pelvicol graft but equivalent for mesh and autologous tissue.\textsuperscript{[12]}

Abraham \textit{et al}. presented a single video case of a free RFS graft sacrocolpopexy, in a 76-year-old patient with previous sigmoid colectomy and ureteric injury, with no recurrence at 4 months.\textsuperscript{[16]}

Oliver \textit{et al}. reported 19 patients with excision of sacrocolpopexy mesh for either refractory pelvic pain or mesh erosion. An L-shaped free graft RFS sacrocolpopexy was used to replace the mesh (compared with a Y-shaped configuration in our series). Concomitant midurethral sling was performed 47\%, hysterectomy 58\%, and rectopexy in 21\%. At a median follow-up of 9.9 months, no recurrence of apical prolapse had occurred although two patients required surgery for anterior vaginal wall prolapse.\textsuperscript{[13]}

The use of mesh for POP can be associated with significant morbidity,\textsuperscript{[4]} most importantly visceral erosion and chronic pain. In 2008, the US Food and Drug Administration (FDA) issued a public health warning regarding complications of mesh implantation. In 2014, the FDA classified transvaginal usage of mesh as a high-risk device\textsuperscript{[17]} and their use in vaginal prolapse repair has been severely curtailed.

Mesh is still commonly used for sacrocolpopexy and sacrohysteropexy as it has been shown that compared to suture alone techniques, there is a 2-fold reduction in the risk of anatomical recurrence.\textsuperscript{[3]} The rate of complications with mesh colposacropexy is lower than that reported for transvaginal mesh but is now becoming a recognized issue in its own right. In the colpopexy and urinary reduction effort study, the estimated rate of vaginal erosion rate was 10\% at 7 years, and the rate of pain without exposure even higher.\textsuperscript{[18]} One-third of patients presenting with mesh complications were related to sacrocolpopexy, mesh rather than vaginal mesh.\textsuperscript{[19]}

As far as we are aware, the only reports of autologous fascia use as a POP graft are those reported in the series above. In only two of these series (Oliver \textit{et al}.\textsuperscript{[19]} and our own series) were a free RFS graft employed, and only in our series was the technique of Y-shaped sacrocolpopexy and sacrohysteropexy described. In all these series, the outcomes seem equivalent to those of mesh repairs and significantly better than (Pelvicol) xenograft, although the follow-up is relatively short. A further study using Pelvicol for sacrocolpopexy also showed a recurrence rate of 8.3\% at 21 months.\textsuperscript{[20]}

The success of autologous RFS sacrocolpopexy and sacrohysteropexy is reflective of the experience of RFS durability with stress incontinence\textsuperscript{[9,10]} and seems durable at least over the short-to-medium term (9.9–63 months). However, prospective patients should be counseled about the lack of long-term and randomized, controlled trial data. It is vital until such data become available that autologous sacrocolpopexy/sacrohysteropexy should be performed within the realms of accurate audit and the outcomes monitored. Long-term data are still necessary to support the employment of autologous RFS sacrocolpopexy and sacrohysteropexy techniques in the wider, primary POP population.

CONCLUSIONS

This is the first report of patients with complex pelvic floor dysfunction and apical POP being managed with autologous RFS sacrocolpopexy and sacrohysteropexy, and only the second report of a free RFS graft being utilized with success. These two series demonstrate proof of concept for abdominal repair for POP, with safe and promising early functional results.

The technique offers a mesh-free approach, which could be considered for patients who are at potentially higher
risk of synthetic mesh extrusion. Further study is required to identify patient suitability, durability of treatment, and benefit over the more practiced standard treatment of polypropylene mesh repair.

Declaration of patient consent
The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest
There are no conflicts of interest.

REFERENCES

1. Swift S, Woodman P, O’Boyle A, Kahn M, Valley M, Bland D, et al. Pelvic organ support study (POSST): The distribution, clinical definition, and epidemiologic condition of pelvic organ support defects. Am J Obstet Gynecol 2005;192:795-806.

2. Olsen AL, Smith VJ, Bergstrom JO, Colling JC, Clark AL. Epidemiology of surgically managed pelvic organ prolapse and urinary incontinence. Obstet Gynecol 1997;89:501-6.

3. Maher C, Feiner B, Christmann-Schmid C, Haya N, Brown J, et al. Surgery for women with apical vaginal prolapse. Cochrane Database Syst Rev 2016;10:CD012376.

4. MacDonald S, Terlecki R, Baessler K, Christmann-Schmid C, Haya N, Brown J, et al. Complications of transvaginal mesh for pelvic organ prolapse and stress urinary incontinence: Tips for prevention, recognition, and management. Eur Urol Focus 2016;2:260-7.

5. Zhang L, Zhu L, Chen J, Xu T, Lang JH. Tension-free polypropylene mesh-related surgical repair for pelvic organ prolapse has a good anatomic success rate but a high risk of complications. Chin Med J (Engl) 2015;128:295-300.

6. Rogowski A, Bienkowski P, Tarwacki D, Szafarowska M, Samochowiec J, Sienkiewicz-Jarosz H, et al. Retrospective comparison between the prolift and elevate anterior vaginal mesh procedures: 18-month clinical outcome. Int Urogynecol J 2015;26:1815-20.

7. Mahon J, Cikalo M, Varley D, Glanville J. Medicines and Healthcare Products Regulatory Agency: Summaries of the Safety/Adverse Effects of Vaginal Tapes/Slings/Meshes for Stress Urinary Incontinence and Prolapse. Final Report 2012.

8. Shah K, Nikolavsky D, Gilsdorf D, Flynn BJ. Surgical management of lower urinary mesh perforation after mid-urethral polypropylene mesh sling: Mesh excision, urinary tract reconstruction and concomitant pubovaginal sling with autologous rectus fascia. Int Urogynecol J 2013;24:2111-7.

9. Wadie BS, Edwan A, Naheef AM. Autologous fascial sling vs. polypropylene tape at short-term followup: A prospective randomized study. J Urol 2005;174:990-3.

10. Sharifiaghdas F, Mortazavi N. Tension-free vaginal tape and autologous rectus fascia pubovaginal sling for the treatment of urinary stress incontinence: A medium-term follow-up. Med Princ Pract 2008;17:209-14.

11. Jenkins DT, McCoutrie SJ. Vault prolapse: A new approach. Aust N Z Surg 1992;62:805-8.

12. Quiroz LH, Gutman RE, Shippey S, Cundiff GW, Sanes T, Blomquist J, et al. Abdominal sacrocolpopexy: Anatomic outcomes and complications with pelvicol, autologous and synthetic graft materials. Am J Obstet Gynecol 2008;198:557.e1-5.

13. Mahendru R. An effective and safe innovation for the management of vault prolapse. Ann Surg Innov Res 2010;4:6.

14. Yaqub U, Shahzad N. Uterine Suspension by Rectus Sheath Flap, in Selected Cases of UV Prolapse, PJMHS 2013;7:322-33.

15. Oliver JL, Chaudhry ZQ, Medendorp AR, Wood LN, Baxter ZG, Kim JH, et al. Complete excision of sacrocolpopexy mesh with autologous fascia sacrocolpopexy. Urology 2017;106:65-9.

16. Abraham N, Quiroket A, Goldman HB. Transabdominal sacrocolpopexy with autologous rectus fascia graft. Int Urogynecol J 2016;27:1273-5.

17. FDA Strengthens Requirements for Surgical Mesh for the Transvaginal Repair of Pelvic Organ Prolapse to Address Safety Risks. FDA News Release; 2016. Available from: https://www.fda.gov/newsevents/newsroom/pressannouncements/ucm479732.htm. [Last accessed on 10 Apr 2018].

18. Naheef AM, Quiroket A, Goldman HB. Transabdominal sacrocolpopexy with autologous rectus fascia graft. Int Urogynecol J 2016;27:1273-5.

19. Warenbourg S, Labaki M, de Tayrac R, Costa P, Fattah T. Reoperations for mesh-related complications after pelvic organ prolapse repair: 8-year experience at a tertiary referral center. Int Urogynecol J 2017;28:1139-51.

20. Hijazi S, Echtle D, Abou-marzouk OM, Heinrich E. Abdominal sacrocolpopexy with pelvicol xenograph and concomitant burch colposuspension. Int J Womens Health 2017;9:625-30.