Cystocele and rectocele repair: More success with mesh?

Graft materials have been used for years in other types of surgery. Can they reduce the high failure rate of prolapse repairs?

CASE Symptoms point to yet another prolapse recurrence

A 52-year-old woman presents with a bulge and pressure in her vagina. She has undergone 2 prior reconstructive surgeries. The first was a vaginal hysterectomy, anterior and posterior repair, and sling; the second was an abdominal procedure that included a sacrocolpopexy and paravaginal repair.

A physical examination reveals a recurrent 4th-degree cystocele that protrudes 2 cm beyond the hymenal ring. The vault and posterior compartment are well supported, and the patient reports no incontinence, a fact confirmed by urodynamics testing. She asks that you do everything in your power to prevent further recurrence.

How do you proceed?

This patient ultimately underwent anterior colporrhaphy and vaginal paravaginal repair using a decellularized dermal cadaveric implant. She was still doing well 1 year later, with no recurrence.

Despite success stories like this one, the use of graft materials to repair cystoceles and rectoceles is controversial. One reason is the difficulty of interpreting published data, since studies lack uniformity in technique, patient characteristics, graft shape, type of material, attachment sites, and duration of follow-up. Level I evidence that augmented repairs have a clear benefit over traditional repairs is sparse.

Advocates of graft materials argue that native tissue is already compromised—hence, the prolapse—making surgical failure likely. They claim graft materials help strengthen repairs, especially in the case of cystoceles. They also point out that adjuvant materials have been used in burns, plastic surgery, and orthopedics for more than 10 years and are generally well tolerated. Their success in hernia repairs prompted their consideration for the pelvic floor.

A pervasive problem, but only 10% to 20% seek help

Roughly 1 of 2 parous women lose pelvic support as they age, but only 10% to 20% seek medical care, with a lifetime risk of surgery for pelvic organ prolapse (POP) of 11% by age 80.

With women living longer than ever and remaining active later in life, this percentage is likely to rise. Unfortunately, few alternatives to surgical treatment exist, and the reoperation rate for recurrence is 29%, according to a 1995 review. If surgical management is the only hope of cure, how can we lower the 29% recurrence rate?

Graft materials may provide part or all of the solution.
Elements of prolapse

Anterior compartment

Central and/or lateral defects can occur in the anterior compartment.

Lateral (paravaginal) defects indicate that the endopelvic connective tissue has separated from the arcus tendineus fascia pelvis. Lateral defects can be repaired vaginally or abdominally.

One study found that 67% of women with anterior wall prolapse had paravaginal defects, but no randomized trials have evaluated the clinical benefit of repairing these defects, compared with traditional colporrhaphies.

Central defects involve site-specific defects and/or general attenuation of the endopelvic connective tissue. These are usually repaired vaginally.

Recurrence rates for lateral and central defects range from 3% to 70%.

Two large series of vaginal paravaginal repairs noted the following recurrence rates:

- Shull et al. found a recurrence rate of 7% to the hymenal ring or beyond.
- Young et al. observed a recurrence rate for lateral defects of 2%, with recurrence rates as high as 22% for central defects.

In a comparison of 3 techniques for vaginal repair of central defects, using strict criteria to assess anatomic outcomes, Weber et al. found recurrence rates of 54% to 70%. Other studies show symptomatic recurrence rates of 3% to 22% for cystoceles.

With grafts, both paravaginal and central defects can be repaired. Vaginal paravaginal repairs are not popular due to the technical difficulty involved. With the use of grafts, however, both paravaginal and central defects can be addressed simultaneously with relative ease.

Posterior compartment

Defects in the posterior compartment are less likely to recur. Reported success rates range from 80% to 90%.

Posterior compartment defects include general attenuation of Denonvillier’s fascia or a tear anywhere along the fascia or any of its attachments.

A complex web of support

In the normal pelvis, support of reproductive organs depends on a complex web of muscles, fascia, and connective tissue. To ensure success, prolapse repairs should correct any separation or attenuation of tissue and preserve or enhance tissue resilience.

Recurrence rates. Site-specific repairs are thought to minimize complications such as dyspareunia. However, few studies have compared the efficacy of site-specific repairs with that of traditional colporrhaphies. At our institution, women who underwent traditional colporrhaphy had fewer recurrences than controls (33% vs 14%), with no differences in postoperative symptoms such as dyspareunia, constipation, and fecal incontinence.
Risk factors for recurrent prolapse
- Poor tissue (assess tissue quality before and during surgery)
- Impaired healing
- Chronic increases in intraabdominal pressure due to obstructive pulmonary disease, asthma, or constipation
- High-grade cystocele
- Age 60 or above

Patients with these conditions may benefit from the use of adjuvant materials in the anterior compartment.

Note that women who have had recurrences after earlier repairs may experience repeat recurrence.

Advantages of grafts
Using graft materials, the surgeon can repair all vaginal defects faster and with less effort. In the anterior compartment, a graft can be placed and anchored bilaterally from arcus to arcus tendineus, and posteriorly to the level of the spine, recreating level I support. Graft materials also offer the potential to treat stress urinary incontinence concomitantly using different shaped materials. Two authors have already described their success performing this type of repair.  

Nevertheless, great care and consideration should be devoted to actual and theoretical short- and long-term risks, many of which have not been fully elucidated.

Once a successful material is identified or developed, it may decrease operating time and morbidity in vaginal surgeries. It may also reduce the higher hospital costs normally associated with abdominal procedures.

Types of graft materials
There are 2 types of materials: synthetic or biologic. Synthetic materials can be further classified into permanent or absorbable.

The most widely used biologic materials include allografts such as human freeze-dried or solvent-dehydrated fascia lata (Tutoplast), decellularized human cadaveric dermis (Alloderm, Repliform), porcine dermal xenografts such as Pelvicol or Intexene, and bovine pericardial implants (Veritas).

Soft polypropylene meshes such as Gynemesh and Atrium are commonly used permanent materials, and polyglactin 910 is an absorbable material (TABLE).

Classification of synthetic materials
- Type 1 grafts are totally macroporous (>75 µm), which allows fibroblast, macrophage, and collagen penetration with angiogenesis. Examples include Prolene and Marlex meshes.
- Type 2 mesh is microporous (<10 µm in 1 dimension). This prevents penetration of fibroblasts, macrophages, or collagen. Gore-Tex is an example of a Type 2 mesh.
- Type 3 mesh is macroporous (>75 µm) with multifilamentous or microporous components. Examples include Mersilene (braided Dacron mesh), Teflon (polytetrafluoroethylene [PTFE]), Surgipro (braided polypropylene mesh), and MycroMesh (perforated PTFE patch).
- Type 4 mesh has a submicron pore size that prevents penetration. Examples include Silastic, Cellgard (polypropylene sheeting), and Preclude pericardial membrane/Preclude dura-substitute.

2 other important properties are composition of fibers (multifilamentous materials commonly have interstices less than 10 microns) and flexibility (which has a bearing on erosion of the material).

Bacteria can penetrate pores smaller than 1 µm, whereas polymorphonuclear white blood cells and macrophages need a pore size larger than 10 µm, and capillary ingrowth requires a size larger than 75 microns. Thus, Type 1 offers the advantages of larger pore size and monofilamentous interstices to allow for capillary ingrowth.

Which material is best?
Although the literature is difficult to interpret because of the diversity of studies and other factors, some findings are worth noting:
- Tutoplast and AlloDerm appear to have the best tensile strength, maximum load to capacity, and microscopic architec-
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### Table: How successful are adjuvant materials in cystocele and rectocele repairs?

<table>
<thead>
<tr>
<th>MATERIAL (SIZE IN CM)</th>
<th>AUTHOR</th>
<th>NO. IN STUDY</th>
<th>RECURRENCE RATE (%)</th>
<th>SITE OF ATTACHMENT</th>
<th>FOLLOW-UP (MONTHS)</th>
<th>COMPLICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BIOLOGIC MATERIALS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alloderm 3x7 patch with concomitant sling</td>
<td>Chung1998 &amp; Chung2005</td>
<td>19</td>
<td>16</td>
<td>Pubocervical fascia</td>
<td>28</td>
<td>None</td>
</tr>
<tr>
<td>Intexene 6x8 with sling</td>
<td>Gomelsky et al 2004</td>
<td>70</td>
<td>9 stage II</td>
<td>Arcus tendineus fascia pelvis</td>
<td>24</td>
<td>1 wound separation</td>
</tr>
<tr>
<td>Solvent-dehydrated cadaveric fascia lata patch with sling</td>
<td>Gandhi et al 2005</td>
<td>76 patch vs 72 no patch</td>
<td>21 vs 29, respectively (P=.23)</td>
<td>Overlay</td>
<td>13</td>
<td>None</td>
</tr>
<tr>
<td>Alloderm 3x7 trapezoid</td>
<td>Clemons et al 2003</td>
<td>33</td>
<td>41 stage II 3 symptomatic</td>
<td>Arcus tendineus fascia pelvis</td>
<td>18</td>
<td>None</td>
</tr>
<tr>
<td><strong>SYNTHETIC MATERIALS WITH CONCOMITANT SLINGS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marlex 10x3x5</td>
<td>Nicita 1998</td>
<td>44</td>
<td>0</td>
<td>Arcus tendineus fascia pelvis</td>
<td>13</td>
<td>1 vaginal erosion</td>
</tr>
<tr>
<td>Polyglactin 910 absorbable mesh</td>
<td>Sand et al 2004</td>
<td>80 mesh vs 80 no mesh</td>
<td>25 vs 43 stage II cystoceles, respectively (P=.02)</td>
<td>Insert in the anterior and posterior colporrhaphy suture line</td>
<td>12</td>
<td>None</td>
</tr>
<tr>
<td>Polyglactin 910 absorbable mesh</td>
<td>Weber et al 2004</td>
<td>26 with mesh + standard repair; 24 with ulterior repair; 33 with standard repair</td>
<td>58 vs 54 vs 70 stage II, respectively (P=.58)</td>
<td>Overlay</td>
<td>23</td>
<td>None</td>
</tr>
<tr>
<td><strong>SYNTHETIC PERMANENT GRAFTS WITHOUT CONCOMITANT SLINGS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marlex trapezoid</td>
<td>Julian 1996</td>
<td>12 with 12 without</td>
<td>0 vs 33, respectively</td>
<td>Arcus tendineus fascia pelvis</td>
<td>24</td>
<td>3 vaginal erosions</td>
</tr>
<tr>
<td>Mixed-fiber mesh (polyglactin 910 and polyester 5x5)</td>
<td>Migliari and Usai 1999</td>
<td>12</td>
<td>25</td>
<td>Pubourethral and cardinal ligaments</td>
<td>20</td>
<td>None</td>
</tr>
<tr>
<td>Prolene (Atrium)</td>
<td>Dwyer and O’Reilly</td>
<td>64 anterior 50 posterior</td>
<td>6 grade II</td>
<td>Tension-free</td>
<td>29</td>
<td>8% vaginal erosion 1 rectovaginal fistula</td>
</tr>
<tr>
<td>Gynemesh 6x15</td>
<td>de Tayrac et al 2005</td>
<td>87</td>
<td>7 stage II 2 stage III</td>
<td>Tension-free</td>
<td>24</td>
<td>8% vaginal erosion</td>
</tr>
<tr>
<td>Prolene mesh patch</td>
<td>Milani et al 2005</td>
<td>32 anterior 31 posterior</td>
<td>6 stage II</td>
<td>Fixed to endopelvic connective tissue</td>
<td>17</td>
<td>20% anterior, 63% posterior dyspareunia; 13% vaginal erosion (anterior); 1 pelvic abscess (posterior)</td>
</tr>
<tr>
<td>Prolene mesh (double-wing shape)</td>
<td>Natale et al 2000</td>
<td>138</td>
<td>3</td>
<td>Tension-free</td>
<td>18</td>
<td>9% vaginal erosion 7% dyspareunia 1 hematoma</td>
</tr>
</tbody>
</table>

*Absorbable and permanent.
ture similar to the original tissue.15–17 However, these qualities were documented prior to implantation in vivo.

- **Slings** appear to help prevent cystocele recurrences, according to a study by Goldberg et al.18
- **A fascial patch** had no benefit when placed as an overlay in the anterior compartment in a randomized, controlled trial (involving 162 women) by Sand et al.12
- **Marlex.** One group of women with recurrent prolapse underwent synthetic graft (Marlex) augmentation with bilateral ATPF attachment, while the other group had anterior colporrhaphy only.19 None of the women who received grafts had further recurrence, while 33% of the control group did. However, 25% of the women with the graft had vaginal erosions.
- **Polyglactin 910** had a protective effect when embedded in the plication, according to Sand et al.12 However, it had no benefit when used as an overlay to a traditional repair in a study by Weber et al.4 The discrepancy may be related to small sample size; the study by Weber et al was powered to detect only a 30% difference. However, these studies suggest that it is not only the type of graft that is important, but how it is used or tolerated.

**In general,** synthetic grafts may have slightly higher success rates, whereas biologic materials appear to be better tolerated.

Prospective, comparative trials of these materials are desperately needed.

**REFERENCES**


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