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Collagen scaffold: a treatment for large mesh exposure following vaginal prolapse repair

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Abstract

Transvaginal repair with mesh of pelvic organ prolapse (POP) provides women with the durability of a synthetic graft using the less-invasive route of vaginal surgery. However, morbidities such as mesh exposures are common and challenging to manage. Small intestinal submucosa (SIS) is a naturally occurring collagen matrix derived from porcine intestine. It contains growth factors and cytokines that promote healing of damaged tissue. This case report describes a large vaginal mesh exposure due to necrosis of the full thickness of the anterior vaginal wall. A remarkable and rapid regeneration of vaginal tissue over the exposed mesh was achieved with SIS placement after failure of treatment with vaginal estrogen for >6 months. Collagen scaffold is an effective, rapid, and minimally invasive treatment for large vaginal mesh exposures.

Keywords

Mesh; Collagen scaffold; Pelvic organ prolapse

Introduction

Failures of native tissue prolapse repair with 30 % reoperation rate led surgeons to turn to graft-augmented procedures. However, use of synthetic materials is not devoid of complications. In 2011, the US Food and Drug Administration (FDA) issued a notification that adverse outcomes of transvaginally placed mesh for POP repair are not rare. Despite this warning, transvaginal mesh is still used by 61 % of American Urogynecology Society members who responded to a recent survey [1]. Vaginal mesh exposure is the most common complication, occurring in >10 % of patients [2]. Conservative management with estrogen cream, antibiotics, or silver nitrate fails to treat the majority of symptomatic exposures, necessitating surgical excision [2]. Surgical excision can result in vaginal shortening and recurrence of mesh exposure at rates as high as 40 %. Recurrent POP occurs in 29 % of cases after complete and 5 % after partial mesh resection [3]. Also, in cases of a large mesh exposure, there is insufficient tissue to close vaginal defects.

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Conflict of interest None

Small intestinal submucosa (SIS) is an acellular collagen matrix containing vascular endothelial, fibroblast, and transforming growth factor- β (TGF- β) factors that induce angiogenesis and recruit bone-marrow-derived cells into the wound site, promoting healing of damaged tissue toward a regenerative pathway [4]. Surgisis® (Cook Surgical, Bloomington, IN, USA), a commercially available SIS graft, has been successfully used to aid in the repair of vascular, urogenital, and musculoskeletal tissues. This case report describes the use of Surgisis® to treat a large mesh exposure after necrosis of the full thickness of the anterior vagina with minimal mesh resection.

Case report

The patient, a 58-year-old menopausal woman not on hormone replacement therapy, who underwent vaginal hysterectomy, reconstruction with Total Prolift® (Gynecare/Ethicon, Somerville, NJ, USA), and a midurethral sling (Monarc, American Medical Systems, Minnetonka, MN, USA) for symptomatic stage III uterovaginal prolapse and stress urinary incontinence (SUI). Her medical comorbidities were limited to asthma and acid reflux. The index surgery was performed without complications and an estimated blood loss of 200 ml. Cefazolin and metronidazole were given perioperatively. Hysterectomy and full-thickness dissections into the vesicovaginal and rectovaginal spaces were performed through a single paracervical incision. A quarter percent solution of marcaine with 1:200,000 epinephrine diluted 1:1 with normal saline was used for hydrosection. A separate incision was made for sling placement. Total operative time was 215 min. The vagina was packed for 24 h postoperatively, and the patient was discharged on postoperative day 1 after passing a voiding trial. Two weeks later, she presented complaining of “something coming out of the vagina.” Pelvic exam revealed necrosis of ~70 % of the anterior vagina which was attached by a 4-mm distal stalk. Vaginal tissue at the site of the midurethral sling and posteriorly was intact, with no mesh exposure. There was no discharge or bleeding. The necrosed portion of the vagina was separated from its stalk without causing any pain. The patient subsequently underwent exam under sedation, cystourethroscopy, and rectal examination. There was no mesh erosion into urethra, bladder, or rectum. The minimal remaining necrotic tissue was removed sharply; there were no signs of infection. Mesh was not removed, as it was providing support for the anterior compartment. The patient was instructed to use vaginal estrogen daily. Two weeks later there was no further necrosis. Subsequently, the patient was out of the country for 6 months, during which time she continued using vaginal estrogen. Upon her return, pelvic exam revealed minimal tissue regrowth laterally with a persistent, large area of mesh exposure (Fig. 1). The patient was taken to the operating room, where the exposed mesh measured 4 × 6 cm, and closure with native tissue was not possible. Mesh fibers that were not flush with the underlying bladder muscularis were trimmed, with the majority of mesh left in place, as it continued to provide paravaginal attachments for the anterior vagina and bladder support. A 4×7-cm piece of four-layer Surgisis® was placed over the exposed mesh and secured with interrupted 3–0 polyglactin sutures. The patient was seen 2 and 4 weeks after placement of the SIS graft. Exposed mesh was completely covered with vaginal epithelium (Fig. 2). Twenty-four months later, the patient had no recurrent mesh exposure and no recurrent prolapse.

Informed consent was obtained from the patient for publication of this case report and accompanying images.

Discussion

Mesh exposures complicate 3—19% of mesh-augmented vaginal POP repairs, leading to additional surgery, expense, and other untoward patient sequelae. The etiology of this undesired outcome is not fully known. Patient characteristics, which influence the route of surgery; devitalizing incisions; and material properties of mesh have been implicated in mesh exposures. A case series in which the exposed mesh was excised and the defect covered with Surgisis® SIS reported a 55 % rate of complete re-epithelization [5]. However, mesh removal compromises the repair, resulting in a high rate of recurrent POP [3], as SIS is a degradable graft and by itself does not improve outcomes of POP reconstructive surgeries. In cases of large mesh exposures, mobilization of native tissue to cover the defect often cannot be achieved. To my knowledge, there is only one report of short-term outcomes of three cases of vaginal mesh exposure successfully treated with Martius flap without excision of exposed mesh [6]. This case report describes a remarkable and rapid regeneration of vaginal tissue, with minimal removal of synthetic graft in response to SIS placement and without recurrence of mesh exposure or POP 2 years later. Longer follow-up, histologic analysis of regenerated tissue, and additional cases are necessary to further investigate this treatment modality; however, this report establishes the foundation for the role of collagen scaffolds in managing mesh exposures without compromising prolapse repair.

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Fig. 1.
Large area of mesh exposure due to necrosis of the full thickness of the anterior vaginal wall, with minimal tissue ingrowth after treatment with vaginal estrogen cream for 6 months

Fig. 2.
a Regenerated anterior vaginal wall tissue completely covering exposed mesh 2 weeks after treatment with a small intestinal submucosal (SIS) graft. **b** Four weeks after treatment with SIS graft