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Original Article

Outcomes of Robotic Sacrocolpopexy Using Barbed Delayed Absorbable Sutures

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ABSTRACT **Study Objective:** To evaluate 1-year outcomes of robotic sacrocolpopexy (RSC) for pelvic organ prolapse using barbed delayed absorbable sutures.

Design: Retrospective cohort study (Class II-3).

Settings: University-based hospital in Southeast Texas.

Patients: Patients with symptomatic apical pelvic organ prolapse who underwent RSC using barbed delayed absorbable sutures between January 2011 and August 2012. Patients were examined postoperatively at least twice (after 6 weeks and 1 year).

Interventions: RSC procedure.

Measurements and Main Results: The study included a total of 20 patients, of them 15 had grades 3 or 4 whereas 5 had grade 2 apical defects according to the Baden-Walker classification system. Fourteen patients (70%) underwent concomitant hysterectomy while 9 (45%) underwent concomitant anti-incontinence surgery. Mesh suturing times were 46.9 ± 12.6 and 20.5 ± 9.3 minutes in the first 10 versus the last 10 cases, respectively ($p < .001$). The mean follow-up duration was 17.3 months (range, 12–24 months). There were no recurrences of apical defects or mesh/suture exposure/erosion. However, 1 patient developed a grade 2 cystocele, and another developed new-onset urinary incontinence, both after 1 year. A third patient's urine leakage did not improve postoperatively. Lastly, a fourth patient developed port site incisional hernia and underwent repair 5 months later.

Conclusion: Our study suggests that barbed delayed absorbable sutures are safe and effective in RCS procedures over 1 year. Larger, comparative, and randomized trials are recommended for definitive conclusions. Journal of Minimally Invasive Gynecology (2014) 21, 412–416 © 2014 AAGL. All rights reserved.

Keywords: Barbed suture; Robotic; Sacrocolpopexy

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The number of women suffering from pelvic organ prolapse (POP) is increasing and projected to continue to increase as the population grows older. In fact, according to the United States Census Bureau, in 2030, it is expected that nearly 1 in 5 US residents will be aged 65 and older and nearly 40 million will be female [1]. The lifetime risk of POP or urinary incontinence is 11%, and at least 200,000 women undergo POP surgery per year [2]. Importantly, apical prolapse plays a significant role in POP pathophysiology [3]. Although several vaginal and abdominal procedures are used for the restoration of the apical support, abdominal sacrocolpopexy (ASC) is currently considered the gold standard because of its superior outcomes and lower recurrence rates [4]. Recurrence with ASC varies between 2% and 10%, whereas vaginal procedures have higher recurrence reaching 25% [5]. As minimally invasive approaches

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gains popularity [6–8], both laparoscopic sacrocolpopexy (LSC) and robotic sacrocolpopexy (RSC) are becoming common alternatives to classic ASC [6,9].

The use of barbed sutures is gaining traction in gynecologic surgery since their relatively recent introduction [10]. By eliminating the need for knot tying, it is conceivable that barbed sutures can be associated with a shorter operating time. In addition, it is intriguing to think that using absorbable sutures may be associated with lower rates of mesh/suture erosion/exposure than permanent sutures. One of these novel sutures, the V-Loc 180 Wound Closure Device (Covidien, Mansfield, MA) is made up of delayed absorbable copolymers of glycolic acid and trimethylene carbonate with unidirectional barbs to prevent the suture from moving backwards. Certain studies evaluated the use of barbed sutures in some gynecologic procedures (e.g., myomectomy and vaginal cuff closure during hysterectomy) [11–15]. However, limited data are available about the long-term outcomes of V-Loc 180 use in the RCS procedure. Herein, we present our findings after a 1-year follow-up to evaluate prolapse recurrence, mesh exposure, and suture-related complications after RSC using V-Loc 180 sutures.

Materials and Methods

Study Patients

This retrospective study included all patients with symptomatic grade 2 or more apical POP who underwent RSC between January 2011 and August 2012 and completed at least a 1-year follow-up. POP symptoms experienced by patients were defined as pelvic pressure and bulging vaginal mass. The diagnosis of POP was based on an office pelvic examination using the Baden-Walker classification system [16]. All procedures were performed by the same surgeon (GSK).

Demographic characteristics recorded included age, race, parity, body mass index, and surgical history including hysterectomy and any prior POP surgery. Written informed consents were obtained when risks, benefits, alternatives, complications, and recurrence rates were thoroughly discussed. Continent patients were counseled and offered prophylactic anti-incontinence surgery based on the Colpopexy and Urinary Reduction Efforts (CARE) trial results and long-term outcomes [17,18]. Institutional review board approval was obtained before data collection.

Procedure

During the RSC procedure, the peritoneum was vertically incised to the right of the sigmoid starting 2 cm above the sacral promontory and extending downward toward the cul-de-sac. The right ureter was visualized, and care was exercised to avoid its injury. Thereafter, the peritoneum overlying vaginal cuff was incised and dissected off, extending both anteriorly (between vagina and bladder) and posteriorly (between vagina and rectum). It is critical to secure hemostasis at all these steps. The extent of anterior and dissection was tailored to each patient's defect. However, dissection was limited to the upper half of the vagina in all cases.

We used Y-shaped soft macroporous polypropylene mesh (Prolene; Ethicon, Somerville, NJ). We started by suturing the mesh to the vaginal cuff using 3-0 V-Loc 180 sutures on a CV-23 taper needle. With the vaginal sizer in place, running sutures are placed transversely starting from one side to the other followed by another row after making a U-turn. We place 3 to 5 transverse rows with the last one more than 1 cm from vaginal cuff line. The same is done both anteriorly and posteriorly to attach both short arms of the Y-shaped mesh. It is important to avoid tightly synching the suture so that mesh stays flat. In addition, it is better to avoid puncturing vaginal epithelium while placing cuff sutures.

Thereafter, the long arm of the mesh is laid flat into the previously created retroperitoneal track. Next, it is important to adjust the mesh for the appropriate level of the vaginal cuff and the degree of mesh tension. The mesh is then attached to the sacral promontory using 2 interrupted permanent sutures. We used the nonabsorbable monofilament expanded polytetrafluoroethylene CV-2 (Gore-Tex, W. L. Gore & Associates, Inc., Newark, DE). Excess mesh is cut and removed. Finally, the peritoneum overlying the mesh is closed using a running 3-0 V-Loc suture.

In cases in which concomitant total hysterectomy was performed, the vaginal cuff was closed using running 3-0 V-Loc sutures before sacrocolpopexy. Alternatively, in patients opting to keep their uteri, sacrohysteropexy was performed. In these cases, peritoneal incision was carried out similar to sacrocolpopexy, and we used the same Prolene polypropylene mesh, V-Loc, and Gore-Tex CV-2 sutures. The mesh was anchored to the posterior aspect of the cervix using V-Loc sutures and the sacral promontory using Gore-Tex CV-2 sutures in the same fashion as in sacrocolpopexy cases. The entire length of the mesh was then covered with peritoneum using running 3-0 V-Loc sutures. A detailed description of the procedural techniques of robotic sacrocolpopexy and sacrohysteropexy can be found elsewhere [19].

Surgical parameters including concomitant hysterectomy, anti-incontinence surgery, suturing time, hospital stay, and intraoperative and postoperative complications were recorded. All patients were seen in the office at least twice (6 weeks and 1 year after the operation) and were thoroughly evaluated for symptoms and signs indicating prolapse recurrence or surgical complications.

Statistical Analysis

Data were initially reviewed and thoroughly checked for any missing variables. Descriptive statistics were calculated and data presented as mean ± standard deviation. The Student's *t* test was used to compare the surgical variables of the first 10 cases to the last 10 cases. A p value $<.05$ was