

# Sacrocolpopexy's Progression and the Creation of Innovative Methods Using Natural Orifice Transluminal Endoscopic Surgery

Tamisa Koythong\* and Xiao Ming

Department of Obstetrics and Gynecology, Baylor College of Medicine, Houston, Texas, US

## Description

Prolapse of one or more pelvic organs through the vagina, such as the uterus, bladder, or rectum, is an increasingly common occurrence in the aging female population, with rates approaching 60% of parous women [1]. Its associated symptoms of vaginal bulge or bladder, bowel, or sexual dysfunction can drastically affect a woman's quality of life. Multiple surgical options for the treatment pelvic organ prolapse exist and may involve autologous tissue repair or the use of biological or synthetic grafts. Abdominal sacrocolpopexy, first described in 1957 by Arthure and Savage, involves using the sacrum as a point of support for the vaginal apex [2]. The technique was further refined by Huguier and Scali by the incorporation of a graft to improve tissue strength and to improve postoperative anatomical cure rates [3]. Multiple approaches and techniques to abdominal sacrocolpopexy exist and involve either an open, laparoscopic, or robotic assisted laparoscopic approach, with reported cure rates similar between open and laparoscopic approaches. Over recent decades, a shift from open to minimally invasive surgery has been emphasized due to improved patient outcomes, and in general patients undergoing laparoscopy have decreased postoperative pain and opioid requirements, shorter hospital stay, improved cosmesis, and higher patient satisfaction. Further advancements to the field of laparoendoscopy include newer generation minimally invasive techniques such as single incision laparoscopy, robotic assisted single incision laparoscopy, and natural orifice transluminal endoscopic surgery, which seek to further improve cosmetic results through fewer abdominal incisions and patient satisfaction. The application and feasibility of both single incision laparoscopy and natural orifice transluminal endoscopic surgery in the field of gynecologic surgery have been demonstrated through successful hysterectomy, adnexal surgery, myomectomy, sacrocolpopexy, and lymphadenectomy in early stage endometrial cancer [4-8]. When feasible, transvaginal surgery is the preferred route of surgery for benign gynecologic disease – a position that is supported and upheld by the American College of Obstetrics and Gynecology [9]. vNOTES is particularly promising as it can overcome some of the barriers

associated with transvaginal surgery, such as limited visualization and inadequate transvaginal surgical training and experience, by incorporating the use the laparoendoscopic camera to improve visualization of adnexal or uterine masses while utilizing a laparoscopic approach that more gynecologists may be comfortable and familiar with. The first pilot study of vNOTES sacrocolpopexy was described in 2018 in 26 patients with stage II – IV pelvic organ prolapse as classified by the POP Quantification System (POP-Q) [10]. Of the 26 patients, 23 underwent successful vNOTES sacrocolpopexy, and the remaining 3 patients had conversion to single-incision abdominal laparoscopic sacrocolpopexy due to dense pelvic adhesions and stage IV endometriosis. Quality of life measurements as characterized through the PFIQ-7 questionnaire before and after surgery, surgical outcomes, and postoperative follow up for up to 14 months were gathered in all patients. Feasibility of this approach was demonstrated through improvement in anatomic prolapse and quality of life scores postoperatively, as well as no postoperative complications of mesh exposure, pain, infection, or new urinary incontinence in this small sample of patients. A more recent study in 2020 of 93 patients undergoing transvaginal vNOTES pelvic reconstruction with Y-shaped mesh, a technique with slight modifications from sacrocolpopexy, demonstrated similar findings without mesh erosion and improvement in postoperative POP-Q and quality of life scores however had 5 patients with *de novo* stress urinary incontinence with 3 patients requiring reoperation with transvaginal sling, 2 patients with dyspareunia classified as "mild," and 1 patient with persistent pelvic pain attributed to excessive tension with placement of the mesh [11]. Modifications to ensure tension-free placement during surgery was made by the authors and no other reports of persistent pain were appreciated in the study sample.

These findings are promising for consideration of vNOTES as an additional platform to successfully perform sacrocolpopexy while eliminating the need for abdominal incisions. However, some challenges to widespread adoption of this technique not only include its novelty but also the need for single incision laparoscopic skills and difficulty with intracorporeal sewing during mesh anchoring.

\*Address to Correspondence: Tamisa Koythong, Department of Obstetrics and Gynecology, Baylor College of Medicine, Houston, Texas, US, Tel: (832) 826-7464; E-mail: xiaoming@bcm.edu

Copyright: © 2021 Koythong T, et al. This is an open-access article distributed under the terms of the creative commons attribution license which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited.

Received: April 13, 2021; Accepted: April 27, 2021; Published: May 04, 2021

Integration of the robotic platform introduces a solution to this issue by improved dexterity through wristed articulating instruments and improved ergonomic handling.

The incorporation of the da Vinci Xi system in vNOTES sacrocolpopexy as demonstrated through this small case series details its feasibility and efficacy in treating pelvic organ prolapse [12,13]. Two patients with stage II prolapse underwent robotic assisted vNOTES hysterectomy and subsequent sacrocolpopexy for surgical correction of their symptomatic pelvic organ prolapse. They were both discharged home <24 hours after surgery with minimal need for opioid pain medications, and both patients had no notable postoperative complications in the 8 week postoperative period. Postoperative POP-Q staging was performed with both patients demonstrating a physical exam consistent with stage 0. Although the postoperative follow up period in this case series can only be used to determine short-term outcomes, use of the robotic platform to overcome some hurdles of traditional vNOTES sacrocolpopexy is obviously feasible and warrants attention as an alternative surgical approach.

The da Vinci Xi platform's availability is so widespread that it can allow a robotic surgeon to pursue this procedure without hassle. However, this platform can have some limitations due to limited reach of the robotic arms in upper abdominal or anterior abdominal wall pathology. Additionally, an extremely cephalad sacral promontory can pose challenges. In the meantime, emerging new pure single-site surgical platforms such as the da Vinci SP system can potentially overcome these hurdles to further promote vNOTES surgery and its adoptability [14].

## Conclusion

Clearly more comparative studies in evaluating postoperative outcomes of open, single or multiport laparoscopic, robotic assisted laparoscopic, or vNOTES sacrocolpopexy are necessary to completely evaluate the safety and feasibility of all these approaches in the surgical correction of pelvic organ prolapse. However, studies of vNOTES and robotic assisted vNOTES approaches are currently lacking despite their promising results. We believe these approaches are part of the next advancements in the field of minimally invasive surgery as they eliminate the need for abdominal incisions and therefore improve patient satisfaction.

## References

1. Maher, Christopher, Feiner Benjamin, Baessler Kaven and Adams Elisabeth J, et al. "Surgical Management of Pelvic Organ Prolapse in Women." *Cochrane Database Syst Rev* 30 (2013): CD004014.
2. Arthure HG and Savage D. "Uterine Prolapse and Prolapse of the Vaginal Vault Treated by Sacral Hysteropexy." *J Obstet Gynaecol* 64 (1957): 355-60.
3. Ameline A and Huguier J. "Posterior Suspension to the Lumbo-Sacral Disk; Abdominal Method of Replacement of the Utero-Sacral Ligaments." *Gynecol Obstet* 56(1957): 94-98.
4. Liu, Juan, Bardawil Elise, Zurawin Robert K and Wu Junwei, et al. "Robotic Single-Site Sacrocolpopexy with Retroperitoneal Tunneling." 22 (2018).
5. Sato, Hirokazu, Abe Hirokazu, Ikeda Atsushi and Miyagawa Tomoaki, et al. "Complications and Clinical Outcomes of Laparoscopic Sacrocolpopexy for Pelvic Organ Prolapse." *J Obstet Gynaecol* 41 (2021): 128-132.
6. Guan, Xiaoming, Ma Yingchun, Gisseman Jordan and Kleithermes Christopher, et al. "Robotic Single-Site Sacrocolpopexy Using Barbed Suture Anchoring and Peritoneal Tunneling Technique: Tips and Tricks." *J Minim Invasive Gynecol* 24 (2017): 12-13.
7. Liu, Juan, Kohn Jaden, Wu Chunhua and Guan Zhenkun, et al. "Short-Term Outcomes of Non-robotic Single-Incision Laparoscopic Sacrocolpopexy: A Surgical Technique." *J Minim Invasive Gynecol* 27 (2020): 721-727.
8. Lee Sa Ra. "Robotic Single-Site® Sacrocolpopexy: First Report and Technique Using the Single-Site® Wristed Needle Driver." *J Med* 57 (2016): 1029-1033.
9. "Choosing the route of hysterectomy for benign disease." Committee Opinion No. 701. American College of Obstetricians and Gynecologists. *Obstet Gynecol* 129 (2017): 155-159..
10. Liu, Juan, Kohn Jaden, Fu Huaying and Guan Zhenkun, et al. "Transvaginal Natural Orifice Transluminal Endoscopic Surgery for Sacrocolpopexy: A Pilot Study of 26 Cases." *J Minim Invasive Gynecol* 26 (2019): 748-753.
11. Li, Junwei, Changdong Hu, Wang Xiaojuan and Hua Keqin, et al. "Transvaginal Single-Port Laparoscopic Pelvic Reconstruction with Y-Shaped Mesh: Experiences of 93 cases." *J Int Urogynecol.* 32 (2021): 905-911.
12. Guan, Xiaoming, Guan Zhenkun, Koythong Tamisa and Liu Juan. "Robot-assisted Transvaginal Single-site Sacrocolpopexy for Pelvic Organ Prolapse." *J Gynecol* 28 (2021): 1141.
13. Guan, Xiaoming, Guan Zhenkun, Koythong Tamisa and Liu Juan, et al. "Integration of a Robotic Platform for Sacrocolpopexy in Transvaginal Natural Orifice Transluminal Endoscopic Surgery: A Novel Surgical Technique." *Urology* 25 (2021).
14. Lee, Sa Ra, Roh A-Mi, Jeong Kyungah and Kim Sung Hoon, et al. "First Report Comparing the Two Types of Single-Incision Robotic Sacrocolpopexy: Single site using the da Vinci Xi or Si system and Single Port Using the da Vinci SP system." *J Obstet Gynecol* 60 (2021): 60-65.

**How to cite this article:** Koythong, T and Xiao Ming. "Sacrocolpopexy's Progression and the Creation of Innovative Methods Using Natural Orifice Transluminal Endoscopic Surgery." *J Surgery* 17 (2021) : 005