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MINIMALLY-INVASIVE SACRAL COLPOPEXY: COMPARISON OF OPERATIVE CHARACTERISTICS OF LAPAROSCOPIC AND ROBOTIC APPROACHES.

<u>Hypothesis / aims of study</u>

Sacral colpopexy is considered one of the more effective surgical techniques for reconstruction of advance apical (uterine and vaginal vault) prolapse. With a growing interest in minimally-invasive surgery laparoscopic sacral colpopexy was introduced. Disadvantages of laparoscopy include steep learning curve, cumbersome instruments and compromised surgeons ergonomics during procedures. Introduction of robotic surgery has opened a possibility of eliminating some of laparoscopic disadvantages while providing still a similarly minimally-invasive option. In addition, robotic surgery offers a minimally-invasive option in practices where advanced laparoscopy is not performed. We hypothesized that robot-assisted and laparoscopic approaches would have similar operating room experience, including complications, estimated blood loss (EBL), operating room time (OR time) and need to convert to laparotomy. The aim of this study was to compare operative characteristics of the two minimally-invasive approaches to sacral colpopexy: laparoscopic and robotic, as well as assess robotic learning curve with a newly-developed robotic program.

<u>Study design, materials and methods</u>

Retrospective case series study of minimally-invasive apical sacropexy (MI-APSC) techniques was done a single academic centre. MI-APSC included laparoscopic and robotic-assisted sacrocolpopexy, sacral hysteropexy, sacrocervicoopexy. All women who planned MI-APSC surgery were included in the analysis. Women for whom an abdominal sacral colpopexy (via laparotomy) was planned were excluded from the study. For all sacrocolpo- and cervicopexies a Y-shape piece of mesh was sutured to the vagina (approximately 12 sutures for anterior and posterior portions) and 2 sutures were used for anchoring into anterior longitudinal ligament at sacral promontory. For sacral hysteropexy a rectangular piece of mesh was used to attach to the posterior cervix and vaginal wall. The primary outcome is operative time in minutes from start to finish of surgical procedure as abstracted from operating room records. The secondary outcomes included estimated blood loss (EBL), rate of conversion to laparotomy, intra-operative complications, major immediate postoperative complications, and length of hospital stay. Demographic characteristics of each group were analysed, including patient age, prior surgeries and body-mass index. As the study started at the initiation of robotic program we analysed robotic learning curve. Statistical analysis included ANOVA and Kruskal-Wallis test.

<u>Results</u>

Table I: Summary of minimally-invasive sacral colpopexy operating room experience.

	Laparoscopic ASC N=46	**Robotic ASC N=33**	**p-value**
OR time (min)*	236 (±60)	248 (±48)	0.3†
EBL (cc)*	91 (±72)	83 (±78)	0.6†
MIS (minimally-invasive sling)	15/46	11/33	0.9‡
Hysterectomy ∫	8/46	2/33	0.1‡
Other procedures¶	22/46	15/33	0.6‡
LOA	12/46	8/33	0.8‡
Conversion	1/46	1/33	0.8‡
Hospital stay (days)	2 (2-6)	2(2-5)	0.3‡
Age (years)	61 (36-79)	60 (37-77)	0.8†
BMI (kg/m2)*	28 (±5)	27 (±4)	0.2†
Prior surgeries	35/46	29/33	0.2‡

* Mean (SD)
† ANOVA
‡ Kruskal-Wallis Test
∫ Hysterectomy done included total laparoscopic, supracervical or vaginal hysterectomy
¶ Other procedures included bilaterally salpingoophorectomy (BSO), mesh revision, posterior colporrhaphy, perineorrhaphy, excision of pelvic mass, rectopexy, hemorroidectomy,
‖ Two cases converted to open: one patient with severe adhesive disease, second patient with a large venous structure at the promontory – cases was completed with vaginal mesh kit.

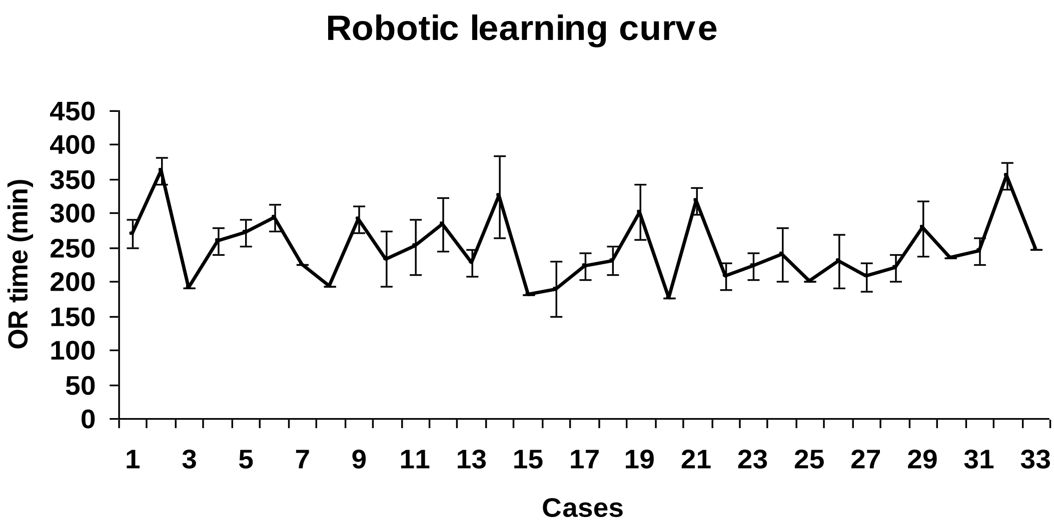

Figure 1: Robotic learning curve where cases are shown against the recorded operating room time (in minutes). The error bars signify the additional procedures performed with the robotic-assisted sacral colpopexy portion. The longer error bar represents multiple (2 or 3) additional procedures p. The additional cases included MIS, perineorrhaphy, posterior colporrhaphy, BSO. The robotic learning curve was relatively short: after completion of first 10 cases robotic time decreased by about average of 60 minutes to an overall average of 248 (±48) minutes.

Interpretation of results

Our data suggests that introduction of robotic program for pelvic reconstructive surgery, performing MI-APSC offers comparable operating room experience as the laparoscopic approach. Robotic surgery offers a more ergonomic option for operating surgeon [1]. We demonstrate a short robotic learning curve, which is consistent with prior published data [2]. The robotic learning curve represents learning by of new technology by surgeons, anaesthesiologists and the operating room staff. Our institution has an established minimally-invasive sacral colpopexy practice and thus the learning curve where transition to robotic-assisted technology may be smoother than in other institutions. As an academic surgical practice our patient population and operating room experience may be different from a community-based practice. More studies are needed to compare surgical outcomes. Ideal candidate for either approach to MI-APSC is not clear and more studies are needed in this area.

Concluding message

Operating room experiences with laparoscopic and robotic-assisted approaches to abdominal sacral colpopexy are similar. Robotic learning curve is short in surgeon with experience in laparoscopic MI-APSC.

References

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Was this study approved by an ethics committee?	**Yes**
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Was the Declaration of Helsinki followed?	**Yes**
Was informed consent obtained from the patients?	**No**