GYNECOLOGY

A prospective comparison of postoperative pain and quality of life in robotic assisted vs conventional laparoscopic gynecologic surgery

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OBJECTIVE: We sought to compare robotic vs laparoscopic surgery in regards to patient reported postoperative pain and quality of life.

STUDY DESIGN: This was a prospective study of patients who presented for treatment of a new gynecologic disease requiring minimally invasive surgical intervention. All subjects were asked to take the validated Brief Pain Inventory-Short Form at 3 time points to assess pain and its effect on quality of life. Statistical analyses were performed using Pearson x^2 and Student's t test.

RESULTS: One hundred eleven were included in the analysis of which 56 patients underwent robotic assisted surgery and 55 patients underwent laparoscopic surgery. There was no difference in postoperative pain between conventional laparoscopy and robotic assisted surgery for gynecologic procedures. There was a statistically significant difference found at the delayed postoperative period when evaluating interference of sleep, favoring laparoscopy (ROB 2.0 vs LSC 1.0; $P = .03$). There were no differences found between the robotic and laparoscopic groups of patients receiving narcotics (56 vs 53, $P = .24$, respectively), route of administration of narcotics (47 vs 45, $P > .99$, respectively), or administration of nonsteroidal antiinflammatory medications (27 vs 21, $P = .33$, respectively).

CONCLUSION: Our results demonstrate no difference in postoperative pain between conventional laparoscopy and robotic assisted surgery for gynecologic procedures. Furthermore, pain did not appear to interfere consistently with any daily activity of living. Interference of sleep needs to be further evaluated after controlling for bilateral salpingo-oophorectomy.

Key words: laparoscopic surgery, postoperative pain, quality of life, robotic surgery

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Technological advances continue to revolutionize the surgical management of gynecologic conditions. Several approaches for the surgical treatment of both benign and malignant gynecologic conditions remain available, namely traditional laparotomy, vaginal or laparoscopic approaches. Over the last 3 decades, the minimally invasive approach has evolved into a total laparoscopic technique culminating with the introduction of robotic assisted minimally invasive surgery in the mid-2000s.

Benefits of the robotic approach are limited and warrant further research. Several studies have shown decreased blood loss when comparing robotic to a conventional laparoscopic approach.[1,2] However, many studies have failed to show a difference in hospital length of stay, patient perceived pain, analgesic use, rates of conversion to laparotomy, and rates of complications.[3-5] Robotic surgery has some technical advantages over laparoscopic surgery, including a 3 dimensional visual system, improved dexterity with wristed instrumentation and better ergonomic surgeon positioning.[6]

In addition to the known advantages of the daVinci Intuitive Surgical System, we hypothesized that the localization of the patient's surgical center with daVinci would minimize torque, thereby minimizing manipulation of tissue and ultimately postoperative pain. Our objective was to compare robotic vs laparoscopic surgery in regard to patient reported postoperative pain and quality of life.

Materials and Methods

This study was submitted to the New York University School of Medicine

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TABLE 1
Demographic and clinical data

Patient characteristics	Robotic assisted group (n = 56)	Laparoscopic group (n = 55)	*P* value
Age	54.6 ± 10.2	53.4 ± 14.4	.53
BMI, kg/m^2	24.2 ± 11.6	23.8 ± 9.6	.85
Total operating time, min	235.4 ± 92.7	155.2 ± 70.2	< .001
Length of hospital stay, d	0.8 ± 0.6	0.8 ± 2.5	.98
Estimated blood loss, mL	161.6 ± 158.8	117.6 ± 112.9	.09

BMI, body mass index.

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Institutional Review Board and was granted approval from 2009 to 2012. For this prospective study, 116 patients from a Gynecologic Oncology practice with both benign and oncologic conditions underwent minimally invasive procedures as part of their standard care. The decision to perform conventional laparoscopy vs robotic assisted surgery was based on the preference of the attending surgeon performing the procedure.

Women were enrolled over a 32-month period from September 2009 to April 2012. The patients presented to New York Langone Medical Center for treatment of a new gynecologic disease requiring minimally invasive surgical intervention. Each patient was required to sign an informed consent before surgery explaining the purpose of the study. Patients either underwent either robotic or laparoscopic surgery at the discretion of the physician and patient. Women were excluded if they were judged by the primary surgeon as unfit for minimally invasive surgery, had evidence of metastatic disease, had a diagnosis of chronic pain, were dependent on pain medication, or were converted intraoperatively to laparotomy.

Demographic and clinical data such as patient age, body mass index, and medical comorbidities were collected before surgery. Type of operation, total surgical time, estimated blood loss, conversion to laparotomy along with the reason for conversion to laparotomy and intraoperative complications were all recorded in the operating room. Total surgical time was defined as the time from skin incision to the time of last closure suture of the skin. Postoperative complications, total postoperative hospital length of stay (measured in days), and postoperative analgesics were recorded. Postoperative pain medications were recorded by both a "yes/no" answer and the classification of medication used. In addition, the Brief Pain Inventory survey asked an open-ended question regarding pain treatments/medications at the time of the survey.

The primary objective of this study was to study the difference in pain experienced by patients undergoing robotic assisted vs conventional laparoscopic gynecologic surgery. Secondary objectives were postoperative analgesic use and interference of quality of life by pain. Enrolled subjects were asked to take the Brief Pain Inventory-Short Form (BPI-SF, Appendix), a 14-question assessment of the patient's perception of pain. The BPI-SF measures intensity of pain (5-item sensory dimension, each scored as 0-10) plus 2 questions regarding current medications and medication relief, and interference caused by pain in the patient's life (7-item reactive dimension, each scored as 0-10). This survey has been found to be a reliable and validated tool for assessment of pain[7] and was chosen as it had been previously validated to assess pain over multiple time points. This survey was distributed preoperatively as baseline, within 24 to 48 hours (immediate postoperative) of the completion of surgery and 1-2 weeks (delayed postoperative) after surgery. Written permission to use this validated pain instrument was obtained from MD Anderson Cancer Center, Department of Symptom Research.

The primary comparison between robotic and laparoscopic arms is the change in Brief Pain Inventory score between preoperative scores and scores at both endpoints after surgery. To derive our sample size, we assume that the baseline preoperative scores are equal between groups and focus on the comparison of mean scores postoperatively. Assuming a detectable mean difference of a score of 2.4 points between study arms (used in other studies using the BPI-SF), a power of at least 80% was estimated for this comparison before initiation of the study requiring a target sample size of 52 patients total or 26 in each arm of the study.

Statistical analyses were performed using Pearson x^2 and Student *t* test. SPSS software was used to calculate a difference in mean pain scores preoperatively,

TABLE 2
Comparative pain analysis at preoperative baseline questionnaire

Intensity of pain	Robotic group (n = 56)	Laparoscopic group (n = 55)	*P* value
Worst	1.2	1	.7
Least	0.4	0.5	.9
Average	0.9	0.9	.8
Pain "right now"	0.4	0.8	.2
Mean score	0.7	0.8	.8

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