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Trends in laparoscopic and robotic surgery among gynecologic oncologists: A survey update

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Abstract

Objectives—To assess the use of traditional and robotic assisted laparoscopy by Society of Gynecologic Oncology (SGO) members and to compare the results with those of our published survey in 2004.

Methods—Surveys were mailed to SGO members, and anonymous responses were collected by mail or through a web site. Data were analyzed and compared with those of our previous survey. In addition, we gathered information on the effect of robotic assisted surgery on the management of gynecologic malignancies.

Results—Three hundred eighty-eight (46%) of 850 SGO members responded to the survey. Three hundred fifty-two (91%) indicated that they performed laparoscopic surgery in their practice (compared with 84% in the 2004 survey). The three most common laparoscopic procedures were laparoscopic hysterectomy and staging for uterine cancer (43%), diagnostic laparoscopy for adnexal masses (39%), and prophylactic bilateral oophorectomy for high-risk women (11%). Although 76% of respondents had received either *limited or no* laparoscopic training during their fellowship, 78% now believe that *maximum or much emphasis* should be placed on laparoscopic training (55% in the 2004 survey). Twenty-four percent of respondents indicated that they performed robotic assisted surgery, with 66% indicating that they planned to increase their use of the procedure in the next year.

Conclusions—We found an overall increase in the use of and perceived indications for minimally invasive surgery in gynecologic oncology among SGO members. Endometrial cancer

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staging has become an accepted indication for laparoscopy. In addition, most respondents were planning on increasing their use of robotic assisted surgery in the next year.

Keywords

gynecologic oncology; laparoscopy; evaluation

Introduction

Over the last decade, gynecologic oncologists have increasingly used minimally invasive techniques to resect and stage gynecologic cancers. Multiple studies have described the feasibility, efficacy, safety, and adequacy of this surgical approach in the management of gynecologic malignancies [1–5]. More recently, robot-assisted management of gynecologic malignancies has been described as a promising new technique that may overcome the surgical limitations seen with conventional laparoscopy [6, 7].

In 2004, we reported the results of a survey of the members of the Society of Gynecologic Oncology (SGO) on the use of laparoscopic surgery in gynecologic malignancies. At that time, we reported that laparoscopy was being used with increasing frequency and was gaining acceptance among gynecologic oncology practitioners. However, our survey demonstrated that most SGO respondents were using laparoscopy for limited indications [8].

In the 4 years since that report, we have hypothesized that there has been an overall increase in the use of minimally invasive surgery by gynecologic oncologists. The goal of this study was to conduct a follow-up survey of SGO members to evaluate the current use of traditional laparoscopic and robotic assisted techniques and compare the results with those of our survey published in 2004 [8].

Materials and Methods

After obtaining approval from the institutional review boards of The University of Texas M. D. Anderson Cancer Center (Houston, TX) and the SGO, we mailed the survey to all 850 full and candidate members of the Society. The questions were based on those in our previous survey, with some modifications to obtain updated information. The survey was estimated to take 5 minutes to complete. It is available at <http://www2.mdanderson.org/app/ir/LQ2007/LPQ2007A.cfm>. (Control number 9999)

The survey was mailed in May 2007, with a follow-up reminder postcard sent 1 week after the initial mailing. The survey was mailed again in June and July 2007. Respondents were given the option of replying via the internet; the cover letter included a link to an online survey instrument whereby responses could be submitted electronically. The paper surveys had control numbers for mailing purposes to ensure that no SGO member received a second survey if they had completed it in the first mailing. All responses were anonymous as neither the online nor the paper copies of the surveys had names associated with the responses.

The collected data were analyzed using frequency distributions tests. Responses were compared with those to similar questions in the 2004 survey [8]. Because of differences in

the question format between the two surveys, testing for statistical significance was not performed. All unknown or missing responses were removed from the analyses. The responses from the paper surveys were entered into an internet survey database (where the electronic surveys were automatically stored) by the Department of Institutional Research at M. D. Anderson Cancer Center. The data were then analyzed using SPSS software for Windows, release 14.0, standard version (Chicago, IL). We considered a change in responses of 10% or greater between the two questionnaires to be clinically significant.

Results

Three hundred eighty-eight (46%) of 850 SGO members responded to the surveys. Of the respondents who performed laparoscopy in their practice, 44% had academic practices, 24% had community practices, and 27% practiced in both settings. Over half the respondents had completed their fellowships 11 or more years previously (57%); most were men (71%) and aged 41–60 years (64%). Most women had completed their fellowships 5 or more years previously (76%) and were 50 years or younger (76%).

Three hundred fifty-two (91%) respondents indicated that they performed laparoscopic surgeries in their practice (compared with 84% in the 2004 survey). In 2004, respondents who had been out of fellowship were much more likely to be performing laparoscopy than those members who had completed training more than 15 years previously (Table 1). By 2007, however, this difference had largely disappeared with members of all ages performing minimally invasive surgery. Respondents indicated that they performed procedures laparoscopically because of decreased length of hospital stay (85%), improved quality of life (74%), patient preference (60%), improved cosmesis (59%), and better visualization (41%) (Table 1). Approximately 9% of respondents indicated that they performed procedures laparoscopically for reasons other than those listed in the survey, such as decreased morbidity and less blood loss. Of the respondents who did not use laparoscopic procedures, the most common reasons given were lack of training (50%), increased operating time (47%), lack of technical skills (27%), and lack of proper equipment (13%). Approximately 37% of respondents who did not perform laparoscopic surgery stated reasons other than those listed in the survey, such as unproven survival equivalency and not enough cases to maintain skill.

When asked to identify the single most commonly performed laparoscopic procedure in their practice, SGO respondents stated they most commonly perform hysterectomy and staging for uterine cancer (43%), diagnostic laparoscopy to assess adnexal masses (39%), and prophylactic bilateral salpingo-oophorectomy in patients at high risk for ovarian cancer (11%). By contrast, in 2004, the most common procedures were diagnosis of adnexal masses (69%), prophylactic bilateral salpingo-oophorectomy (11%), and laparoscopically assisted vaginal hysterectomy and lymph node staging for uterine cancer (10%) (Table 2). We asked which procedures respondents felt would be most appropriate for a laparoscopic approach. The overwhelming majority felt that the three most commonly indicated procedures for a laparoscopic approach were diagnosis of adnexal masses (96%), prophylactic bilateral salpingo-oophorectomy for women with high-risk factors (96%), and staging of endometrial cancer (87%) (Table 1).

We evaluated how SGO members viewed the importance of laparoscopic training during fellowship training. Although 76% of respondents had received either *limited (less than five procedures per month)* or *no* laparoscopic training during their fellowship, 78% believed that *maximum or much emphasis* should be placed on this training (compared with 55% in the 2004 survey [8]). Ninety-three percent of respondents believed that at least six laparoscopic procedures per month were necessary for adequate training compared with 80% in the 2004 survey.

When managing a case in which both laparoscopy and laparotomy offer equal benefits and the patient is willing to undergo either, 88% of the respondents would use laparoscopy (76% in the 2004 survey), whereas 8% (18% in the 2004 survey) would use laparotomy. We inquired as to the percentage of cases performed using laparoscopy each month. Thirty-two percent of participants indicated that they performed *less than five procedures a month* compared with 62% in 2004, 44% performed *between six and 10 cases a month* compared with 27% in 2004, 17% performed *between 11 and 20 cases a month* compared with 6% in 2004, and 7% performed *over 20 laparoscopic procedures a month* compared with only 3% in 2004. Approximately 63% of respondents indicated that they still performed laparotomy in *50% or more cases*.

We also evaluated the conversion rate from laparoscopy to laparotomy. Over 90% of respondents indicated that *25% or less* of their cases were conversions. Approximately 94% of respondents indicated that during the past year, they *rarely or never* converted from laparoscopy to laparotomy, whereas 3% indicated that they *sometimes* converted.

Twenty-seven percent of respondents indicated that they performed robotic assisted surgery. Similar to the early adopters of traditional laparoscopy, respondents who had been out of fellowship for less time were more likely to be utilizing robotics than those who had completed training more distantly (Table 3). Of the respondents who used the robot for gynecologic procedures, 41% had academic practices, 30% had academic and community practices, and 29% had predominantly community practices. The only two procedures that over 30% of respondents indicated were most appropriate for the robotic assisted approach were total laparoscopic hysterectomy and staging for uterine cancer (36%) and laparoscopic radical hysterectomy and node dissection for cervical cancer (32%). Of the respondents who performed robotic assisted surgery, 34% indicated that they used the technology in *more than 50%* of their minimally invasive surgeries. The reasons respondents did not use the robot were unavailability of a robotic system (32%), ability to perform all appropriate gynecologic procedures with traditional laparoscopy (23%), use of the robot limits the amount of laparoscopy exposure for trainees (9%), and do not perform laparoscopy (6%) (Table 4).

Sixty-one percent of SGO respondents who used robotic assisted surgery indicated that they did not train fellows. Of those who did train fellows, 29% allowed fellows to sit at the console during robotic assisted surgery. However, among those who permitted fellows to sit at the console, trainee exposure was limited: only 13% indicated that fellows were allowed to complete over 50% of the case. When respondents were asked about their plans for the use of robotic assisted surgery during 2007, 66% indicated that it would increase, 16% that it

would remain the same, and 2% that it would decrease. An additional 16% of respondents indicated that although they did not use the robot, they were planning to begin use within the year.

We also determined respondents' willingness to participate in continuing education programs. Most respondents (77%) were willing to participate in an SGO co-sponsored hands-on surgical and didactic course on minimally invasive surgery in gynecologic oncology. Approximately 61% of practitioners indicated that they would attend this course if there was a registration fee, and 24% indicated that they would attend only if it was free of charge.

Discussion

Our results confirm the anecdotal perception that the role of laparoscopy continues to expand in the treatment of patients with gynecologic malignancies. Compared with our previous report, there was a 12% increase in the number of SGO members who preferred to use laparoscopy in oncologic cases in which both laparoscopy and laparotomy offered equal results and the patient agreed to undergo either. There was also a considerable increase in the number of laparoscopic procedures and decrease in the number of laparotomies performed monthly by SGO members. This increase was most evident among academic and dual academic/community practitioners. A change was also noted in the indications for laparoscopy in gynecologic oncology, with an increased percentage of SGO members performing laparoscopy for the management of endometrial and cervical cancers. A higher percentage of respondents emphasized the importance of laparoscopic training during fellowship and believed that a higher number of procedures were required for adequate training. Among respondents, there was an increased willingness to undergo training and to train fellows in the use of laparoscopy in the management of gynecologic malignancies.

In our previous report, the overwhelming majority of SGO members advocated the use of laparoscopy for procedures such as the diagnosis of adnexal masses and prophylactic bilateral salpingo-oophorectomy. However, in the present report, surgical staging of uterine cancer was the most common indication for laparoscopy. This expanded use of laparoscopy for the management of endometrial cancer may be the result of studies confirming the feasibility, effectiveness, and outcomes of laparoscopy in the management of this malignancy [9–11]. Zullo et al. [12] performed a randomized trial comparing laparoscopy and laparotomy in patients with early-stage uterine cancer, with an emphasis on evaluating quality of life. They found that the laparoscopic approach to early-stage endometrial cancer was as feasible and safe as the classic open approach. In addition, the laparoscopic approach was significantly beneficial over laparotomy in terms of quality of life for at least 6 months after surgery.

Preliminary data obtained from a phase III trial of the Gynecologic Oncology Group [1] confirmed that laparoscopic surgical staging of patients with endometrial cancer was associated with a shorter length of stay and longer operative times. Although the authors concluded that laparoscopy was feasible in most patients with clinical stage I or IIA uterine cancer, approximately 23% of patients randomly assigned to undergo laparoscopy required

laparotomy to complete staging [1]. However, this study was performed in the early adoption period of laparoscopy in gynecologic practice, when surgeons were in the early part of the learning curve and minimally invasive technology was less advanced.

Tozzi et al. [13] were the first to report survival outcomes from a randomized clinical trial of laparoscopic versus laparotomic approaches in the management of endometrial cancer. At a median follow-up of 44 months, patients with International Federation of Gynecology and Obstetrics stage I endometrial cancer had disease-free survival rates of 91% (in the laparoscopy group) and 94% (in the laparotomy group). The overall survival rates were 86% and 90%, respectively.

Malur et al. [14] evaluated laparoscopy in patients with stage I–III endometrial cancer. They compared 37 patients treated by laparoscopy-assisted simple or radical vaginal hysterectomy with 33 patients treated by simple or radical abdominal hysterectomy, with or without lymph node dissection. There was no difference between the two groups with regard to the mean Quetelet index, number of lymph nodes, or mean operating time. The mean follow-up in the laparoscopy group was 16.5 months compared with 21.6 months in the laparotomy group. The recurrence-free survival rates were not significantly different between the laparoscopy (97%) and laparotomy (93%) groups. Similarly, the overall survival rates were 84% in the laparoscopic group and 91% in the laparotomy group.

In the present study, 26% of SGO members reported that laparoscopy is an appropriate approach to the management of cervical carcinoma. This increase from 2004 may be a result of multiple publications that describe laparoscopy as a safe and adequate technique for radical hysterectomy [5, 15–20].

Limited data are available on the use of laparoscopy in patients with ovarian cancer. Early reports confirmed the feasibility of laparoscopic staging and demonstrated that all components of the procedure could be performed laparoscopically [21, 22]. However, no long-term results were provided. Leblanc et al. [23] reported their 10-year experience with laparoscopic restaging of early-stage invasive adnexal tumors. They concluded that complete laparoscopic management is feasible in selected cases of apparently early-stage ovarian cancer, and re-staging procedures remain an ideal indication for laparoscopy in these cases. However, the authors recommended reserving this procedure for teams trained in advanced laparoscopy [23]. The indications for laparoscopy that were considered appropriate by respondents were also those most commonly performed. For adnexal disease, these indications remained limited to diagnostic laparoscopy of adnexal masses, bilateral prophylactic oophorectomy in high-risk women, staging disease in patients with incidental findings of ovarian cancer, second-look surgery, and placement of intraperitoneal catheters. Most respondents believed that laparotomy was the most prudent surgical approach to known or suspected ovarian cancer.

Approximately 90% of respondents (compared with 84% in the 2004 survey) indicated that during the past year, they had had a low incidence of conversion from laparoscopy to laparotomy. This finding may indicate proper patient selection and practitioner training.

Adhesions, extensive disease, and intra-operative blood loss remained the leading causes for conversion among respondents.

There is increasing evidence to support the use of robotic assisted surgery in gynecologic oncology. The advantages of the robotic assisted system include three-dimensional vision, tremor reduction, 7° of intra-abdominal articulation, and motion scaling. The disadvantages of robotic assisted surgery include loss of tactile feedback, large bulky robotic arms, limited variety of instrumentation, and high cost [6, 24]. In our study, 27% of respondents indicated that they currently used the robot for gynecologic procedures. However, most respondents who did not use it reported that they had not adapted the technology because of limited access to robotic systems. There seemed to be substantial interest in its use among most respondents.

Robotic assisted surgery could potentially be an ideal tool for teaching as it allows expert surgeons to instruct novice surgeons from distant sites. In addition, when compared to traditional laparoscopy, the learning curve for obtaining proficiency in robotic assisted surgery is seemingly much quicker due to the advantages outlined above. However, of those surgeons who train fellows, only 29% allow trainees to sit at the console and, even in those cases, fellows get limited exposure with only 13% completing more than half the case. This is likely due to the fact that attending gynecologic oncologists are still in the early part of their learning with this new technology and still trying to maximize their exposure to these techniques in order to achieve mastery of the technology. We would expect that once they are comfortable and proficient with utilization of the robot, they would increase the “hands-on” exposure of trainees to robotic assisted surgery.”

We recognize the limitations of our study. The response rate of 46% may or may not represent the views of all SGO practitioners. Most researchers believe that a response rate of over 60% indicates that the survey is representative of the study population [25]. Other limitations include the “social desirability” inherent to data collected by survey, in which respondents give self-enhancing responses. However, the anonymous nature of our mail survey should have limited this bias. In addition, there may have been recall bias. The questionnaire itself may have been a source of measurement error because it was developed by us and not subjected to tests of validity and reliability. To develop the 2007 questionnaire, we updated that of 2004. Unfortunately, this made it impossible to directly compare answers or perform statistical analyses.

In conclusion, the results of our study give insight into the use of laparoscopic procedures in the management of gynecologic malignancies. The favorable results of this report confirm the expansion of its use in this setting. Indications for laparoscopy, such as endometrial cancer staging, are becoming universally accepted; these procedures are widely performed by practitioners. More emphasis should be placed on hands-on surgical and didactic courses on traditional laparoscopic and robotic assisted techniques in gynecologic oncology.

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Table 1

Percentage of respondents performing laparoscopic surgery based on time since completing fellowship

Years since completing fellowship	Year (%)	
	2004	2007
5 years	96%	95%
6–10 years	88%	95%
11–15 years	84%	98%
> 15 years	77%	93%

Table 2

Findings of the 2004 and 2007 surveys

Finding	Year (%)	
	2004	2007
Reasons for laparoscopy		
Decreased length of stay	74	85
Improved quality of life	57	74
Patient preference	48	60
Improved cosmesis	46	59
Improved visualization	18	41
Most common laparoscopic procedures performed		
Diagnosis of adnexal masses	69	39
Prophylactic BSO for high-risk women	11	11
LAVH/TLH with staging for uterine cancer	10	43
Procedures considered appropriate for laparoscopy		
Diagnosis of adnexal masses	81	96
Prophylactic BSO for high-risk women	81	96
Laparoscopic hysterectomy/staging for endometrial cancer	56	87
Laparoscopic radical hysterectomy for cervical cancer	11	38
Re-staging of “early” ovarian cancer	N/A	62

BSO, bilateral salpingo-oophorectomy; LAVH, laparoscopy-assisted vaginal hysterectomy; TLH, total laparoscopic hysterectomy.

Table 3

Percentage of respondents performing robotic assisted surgery based on time since completing fellowship

Years since completing fellowship	Year (%)
	2007
5 years	33%
6–10 years	29%
11–15 years	25%
> 15 years	25%

Table 4

Reasons for not using robotic assisted surgery by respondents' practice

Reason	Total (n)	Academic (%)	Community (%)	Both (%)
Able to perform all gynecologic procedures by traditional laparoscopy	87	40	25	33
Unavailability of the system	125	48	23	27
Using robot limits the amount of laparoscopic exposure of trainees	31	23	19	45
Do not perform laparoscopy	20	50	25	25
Other reasons	72	50	21	29