Status of urologic laparoscopy in 2004: a survey of CUA members

Kenneth T. Pace, MD, Daniela Ghiculete, MD, Melanie Harju, MSc, R. John Honey, MD

Division of Urology, Department of Surgery, St. Michael's Hospital, University of Toronto, Toronto, Ontario, Canada

PACE KT, GHICULETE D, HARJU M, HONEY RJ. Status of urologic laparoscopy in 2004: a survey of CUA members. The Canadian Journal of Urology. 2006;13(3):3147-3152.

Introduction: *The optimal method of acquiring laparoscopic skills has not been determined. We sought to examine the current status of urologic laparoscopy and how practicing urologists acquired the skills needed to perform laparoscopic procedures.*

Methods: *A mail questionnaire regarding laparoscopic practices and training was sent to 480 members of the Canadian Urological Association (CUA) using standard Dillman survey methodology.*

Results: *Three hundred (62.5%) urologists responded to the questionnaire; 56.5% practiced in the community and 41.1% in an academic setting. There were 59.9% who had completed some form of fellowship training. Recent graduates (who finished residency after 1995) were more likely to perform all types of laparoscopic procedures compared to older graduates (65% versus 29.7%, $p < 0.001$). Advanced procedures were also performed more frequently by recent graduates (52.5% versus 23.4%, $p < 0.001$). Of those who do not currently perform laparoscopy, 38.2% plan to learn in the future. The most common method of acquiring laparoscopic skills was with animal laboratory experience (39.4%), but only 20.9% relied solely on this method. A trip to a centre of excellence (28.5%) and training from an urologist at the same institution (25.7 %) was also commonly reported as methods of acquiring skills. There were 48.8% who reported beginning laparoscopic procedures without a mentor.*

Conclusions: *A substantial portion of the Canadian urological community employs laparoscopy, although recent graduates are more likely to do so. Training methods in laparoscopy are variable, but a substantial portion of urologists begin practicing laparoscopic procedures without formal mentoring.*

Key Words: laparoscopy, education, training

Introduction

Laparoscopy has had a profound impact on the surgical practice of urology: it has revolutionized the surgical approaches to both ablative and reconstructive urologic procedures. Over the last decade, laparoscopic nephrectomy and adrenalectomy have become the standard of care in many centres,[1-3] while laparoscopic pyeloplasty, partial nephrectomy, and radical prostatectomy are becoming increasingly viable alternatives to open surgery.[4-6] While others have described the role that laparoscopy plays in urology in California, the United States at large, Germany and Switzerland,[7-9] very little is known about the extent to which minimally-invasive techniques are being employed in clinical practice in Canada, much less how practicing urologists have embarked on the process of acquiring the skills necessary for laparoscopic procedures. As a result we carried out this survey of Canadian urologists with two goals in mind: assessing the current status of urologic laparoscopy in Canada, and establishing how practicing urologists have acquired (or plan to acquire) laparoscopic skills.

Methods

A mail-based, confidential questionnaire was sent to 480 members of the Canadian Urological Association (CUA) using modified Dillman survey methodology.

Accepted for publication March 2006

Address correspondence to Dr. Kenneth Pace, 61 Queen St. East, Suite 9-106, Toronto, Ontario, Canada M5C 2T2 Canada

The survey consisted of 12 questions that covered demographics, training, practice environment, opinions about laparoscopy and details on laparoscopic procedures performed as well as laparoscopic training. Participants were asked to detail their operative experience in urologic laparoscopy and their plan to include laparoscopic procedures in the following 12 months. Their personal opinion about the future use of laparoscopy was scored from 1 (strongly disagree) to 7 (strongly agree). The survey was pre-tested and was translated and back translated into French for francophone urologists. Each mail package included a cover letter, a questionnaire and a stamped self-addressed envelope. In order to maximize response rates a post card reminder was sent 1 month after the first mailing, and the packages were resent after 2 months to participants who did not respond to the first mailing or reminder post card.

Descriptive and correlative information was derived from the response dataset. The data collected was analyzed using Chi-Square, analysis of variance (ANOVA) and Wilcoxon Rank Sum techniques where appropriate. Statistically significant differences were defined as those with a p-value of less than 0.05 using two-sided tests. All statistical analyses were performed using SPSS.

Results

Responses were received from 300 (62.5%) of the CUA members. The majority of the responders (84%) completed the questionnaire. The demographic characteristics of the participants are summarized in Table 1. There were 56.5% of the responders who practiced in the community, while 41.1% practiced in an academic setting and 59.9% of the responders reported completing a fellowship, with oncology and neuro-urology representing the most popular choices. Figure 1 demonstrates the timeframe when respondents completed residency training: 60.2% completed their residency between 1975 and 1995. Residency training was primarily completed in Canada (92.9%), followed by the United States (4.8%) and other countries (2.3%).

Overall, 36.5% of respondents reported performing laparoscopic procedures, Figure 2; however, recent graduates (who finished residency after 1995) were more likely to perform laparoscopy (65% versus 31.1%, $p < 0.001$). Urologists who completed any form of fellowship training were also more likely to perform laparoscopy (43.7% versus 25.7%, $p = 0.004$), while those who performed fellowships specifically in endourology and/or laparoscopy were most likely to perform laparoscopy in clinical practice (69.6% versus 26.2%, $p = 0.002$). Laparoscopic procedures were grouped into three

TABLE 1. **Demographic characteristics of respondents**

	n	%
Gender		
Male	231	91.7
Female	21	8.3
Type of practice		
Community	139	56.5
Academic	107	43.5
Age		
< 35	14	5.6
35 to 44	65	25.8
45 to 54	81	32.1
55 to 64	58	23.1
≥ 65	34	13.4

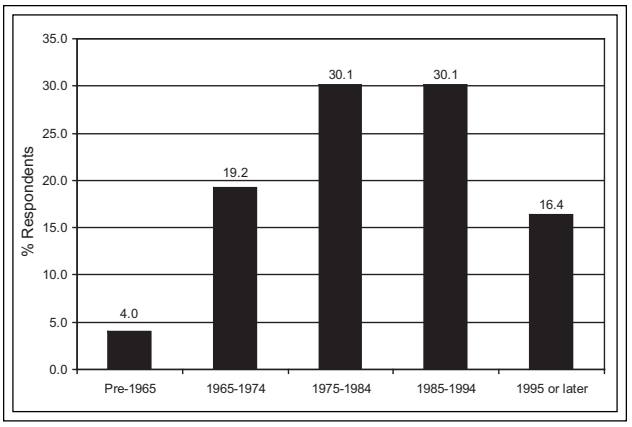

Figure 1. Distribution of participants based on year of completing residency.

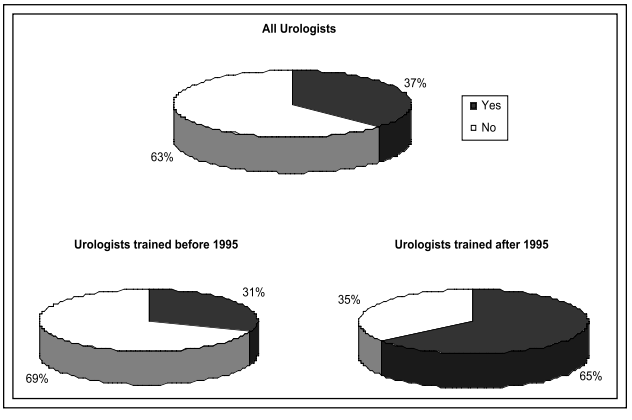

Figure 2. Proportion of respondents performing laparoscopy.

TABLE 2. **Proportion of urologists performing specific procedures**

Procedure	Overall		Trained pre-1995		Trained post-1995		p-value
	n	%	n	%	n	%	
«Basic» procedures	**37**	**14.9**	**28**	**13.4**	**9**	**22.5**	**NS**
Pelvic lymphadenectomy	29	11.6	20	9.6	9	22.5	0.02
Varicocelectomy	20	8.1	17	8.2	3	7.5	NS
«Standard» procedures	**88**	**35.3**	**62**	**29.7**	**26**	**65**	**< 0.001**
Radical nephrectomy	79	31.7	55	26.3	24	60	< 0.001
Simple nephrectomy	79	31.7	55	26.3	24	60	< 0.001
Adrenalectomy for adenoma	43	17.3	27	12.9	16	40	<0.001
«Advanced» procedures	**70**	**2801**	**49**	**23.4**	**21**	**52.5**	**< 0.001**
Partial nephrectomy	38	15.3	28	13.4	10	25	0.062
Donor nephrectomy	8	3.2	6	2.9	2	5	NS
Adrenalectomy for pheochromocytoma	37	14.9	24	11.5	13	32.5	< 0.001
Adrenalectomy for cancer	31	12.4	18	8.6	13	32.5	< 0.001
Pyeloplasty	35	14.1	24	11.5	11	27.5	0.008
Radical prostatectomy	27	10.8	19	9.1	8	20	0.042
Radical cystectomy	6	2.4	3	1.4	3	7.5	0.022

p values represent results from Chi-square comparison

categories for the purpose of analysis: basic procedures (pelvic lymphadenectomy and varicocelectomy), standard procedures (radical and simple nephrectomy, and adrenalectomy for benign lesions), and advanced procedures (donor and partial nephrectomy, adrenalectomy for cancer or pheochromocytoma, pyeloplasty, radical prostatectomy, and radical cystectomy). The proportion of respondents performing specific procedures based on the time interval they completed their residency training is shown in Table 2. Recent graduates were more likely to perform all types of laparoscopic procedures compared to older graduates. This included both "standard" laparoscopic procedures (65% versus 29.7%, $p < 0.001$) and "advanced" laparoscopic procedures (52.5% versus 23.4%, $p < 0.001$). Simple and radical nephrectomies were the most commonly performed procedures, followed by adrenalectomy for adenoma. Table 3 shows the number

TABLE 3. **Distribution of laparoscopic cases per year**

Procedure	Overall		Trained pre-1995		Trained post-1995		p-value
	Mean	Range	Mean	Range	Mean	Range	
«Basic» procedures	**8.2**	**0-25**	**9.4**	**0-25**	**6.3**	**0-10**	**NS**
Pelvic lymphadenectomy	5.6	0-20	6.1		4.4		NS
Varicocelectomy	6.8	0-15	7.4		5.0		NS
«Standard» procedures	**19.3**	**2-70**	**18.8**	**2-70**	**21.3**	**14-28**	**NS**
Nephrectomy	19.6	2-60	18.7		22.0		NS
Adrenalectomy	7.1	0-25	8.1		5.9		NS
«Advanced» procedures	**18.6**	**0-99**	**20.8**	**0-99**	**16.2**	**6-27**	**NS**
Partial nephrectomy	4.5	0-20	5.0		4.0		NS
Donor nephrectomy	13.4	0-20	14.0		10.0		NS
Pyeloplasty	5.6	0-20	5.5		4.8		NS
Radical prostatectomy	29.0	0-80	33.9		24.6		NS
Radical cystectomy	9.8	0-35	20.0		3.0		NS

p values represent results from ANOVA comparison

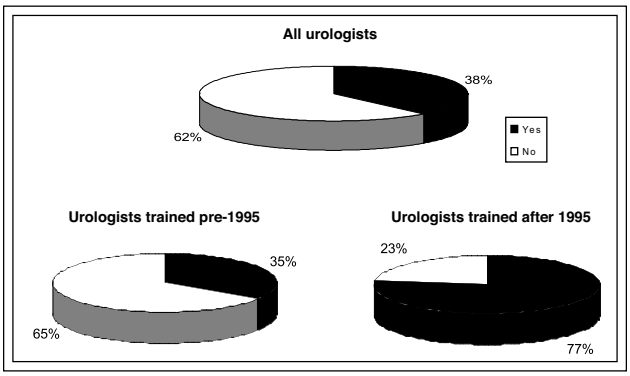

Figure 3. Proportion of urologists planning on learning laparoscopy.

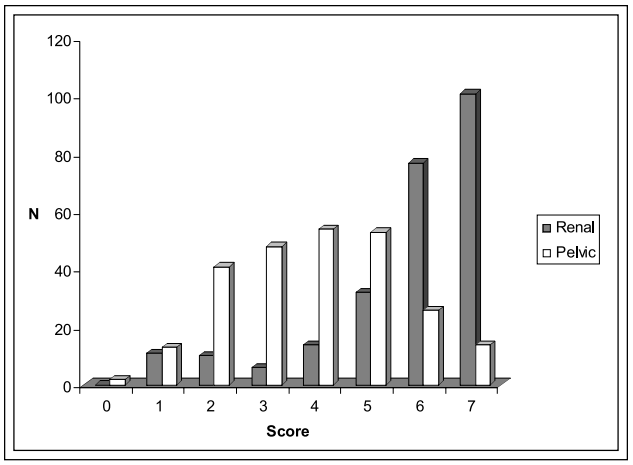

Figure 4. Respondents' opinion if in 5-10 years laparoscopy will be the standard approach for renal or pelvic urologic surgery (7=strongly agree).

of laparoscopic cases reported per year. Of the urologists who did not perform laparoscopy at the time of the survey, 38.2% planned to learn in the future. Recent graduates were more likely to consider learning laparoscopy (76.9% versus 34.5%, p = 0.003) when compared with older graduates, Figure 3. Respondents were more likely to believe that laparoscopy will become the standard of care for renal and adrenal surgery compared to pelvic surgery (median of 6 out of 7 versus 4, p < 0.001, Figure 4).

A wide range of training methods were employed by Canadian urologists prior to beginning to perform laparoscopic procedures, Table 4. The most commonly reported method of acquiring laparoscopic skills was with animal laboratory experience (39.4%), but only 20.9% of the responders relied solely on this method. A trip to a centre of excellence (28.5%) and training from an urologist at the same institution (25.7%) were also commonly reported as methods of acquiring skills. There were 48.8% who reported beginning laparoscopic procedures without a mentor. Training from an urologist at the respondent's centre was the most common training modality to be used alone, but 21% relied solely on a week-end course with animal lab, and 16% relied solely on a visit to a centre of excellence as the sole means of acquiring laparoscopic skills, Table 5.

TABLE 4. **Distribution of laparoscopic cases per year**

Choices	Total		Trained pre-1995		Trained post-1995		p-value
	n	%	n	%	n	%	
Residency	16	6.4	7	3.3	9	22.5	< 0.001
Fellowship	18	7.2	8	3.8	10	25.0	< 0.001
Week-end course (no animal lab)	12	4.8	10	4.8	2	5.0	NS
Week-end course with animal lab	100	39.4	78	37.3	20	50.0	NS
Trip to centre of excellence	71	28.5	60	28.7	11	27.5	NS
From another urologist at your centre	64	25.7	51	24.4	13	32.5	NS
Trained at another centre	37	14.9	28	13.4	9	22.5	NS
From a visiting urologist	33	13.3	25	12.0	8	20.0	NS
From a non-urologist at your centre	31	12.0	28	13.4	2	5.0	NS
From a visiting non-urologist	5	2.0	5	2.4	0	0	NS
Tele-surgery	4	1.6	4	1.9	0	0	NS

p values represent results from Chi-square comparison

TABLE 5. **Methods used as the ONLY form of training**

Training methods	n	%
Residency	1	2.3
Fellowship	4	3.7
Week-end course (no animal lab)	1	2.3
Week-end course with animal lab	9	20.9
Trip to centre of excellence	7	16.3
From another urologist at your centre	18	41.9
Trained at another centre	1	2.3
From a visiting urologist	1	2.3
From a non-urologist at your centre	1	2.3
From a visiting non-urologist	0	0.0
Tele-surgery	0	0.0

Discussion

There is a great deal of heterogeneity in the use of laparoscopy in surgical urological practice in Canada: many centers are still in the early phases of implementation of laparoscopic nephrectomy, while other centers carry out advanced laparoscopic procedures such as radical prostatectomy and partial nephrectomy routinely. While 36.5% of respondents in this survey reported performing at least some laparoscopic procedures, this also conceals a wide range of practice, with many urologists confining laparoscopy to pelvic lymphadenectomy alone. The safe and timely acquisition of laparoscopic skills for practicing urologists remains a significant barrier to entry to this field,[10] and is not unique to urology.[11] As would be expected, recent graduates (those trained after 1995) are more likely to perform laparoscopic procedures, likely because of greater exposure to laparoscopy in residency, and greater opportunities for fellowship training in laparoscopic techniques. Fellowship subspecialty training increases the likelihood of performing laparoscopy in clinical practice, and subspecialty training in laparoscopy and endourology is associated with the greatest likelihood of performing laparoscopic procedures. Urologists who completed training prior to 1995 grapple with the introduction of laparoscopy into their practice, since many had no exposure to laparoscopy during residency or fellowship training.

The wide variability in training methods used to learn laparoscopic techniques reflects the challenge urologists face when embarking on laparoscopic procedures. It has been shown that week-end courses in laparoscopy are not associated with long-term performance of laparoscopic procedures in clinical practice,[12] while structured, focused, high-intensity and high-volume mentored training can provide long-term acquisition of laparoscopic skills into clinical practice.[13] It is therefore of interest that 21% of respondents described using a week-end course (with an animal laboratory component) as the only training method they used to embark on urologic laparoscopy, and that 2% relied on a week-end course with no hands-on component. As more urologists enter practice with residency or fellowship training in laparoscopy, and as more urologists perform laparoscopic renal surgery routinely in their practice, these proportions would be expected to decrease. As the pool of fellowship and residency-trained urologists with laparoscopic expertise increases, the ability of practicing urologists to embark on urologic laparoscopy with the assistance of a mentor will increase. In addition, telementoring and remote telesurgery may provide another opportunity for urologists even in remote locations to begin laparoscopy in a supervised setting.[14] As with other type of surgery, mentoring should allow the introduction of laparoscopic urological procedures in a safe and controlled manner, and allow this surgical approach to benefit patients nationwide.

Canadian urologists are also mixed in their opinions about the role laparoscopy will play in future surgical practice. There seems to be remarkable consensus that laparoscopy will become the preferred approach for the majority of renal and adrenal pathology within the next 10 years. This consensus, however, does not exist for pelvic surgery: respondents were much more ambivalent about the role laparoscopy will play for prostatectomy and cystectomy (16% strongly agreed that laparoscopy would become the standard of care for pelvic surgery, compared with 71% for renal and adrenal surgery). This dichotomy is reflected in surgical practice: only 10.8% of Canadian urologists report performing laparoscopic radical prostatectomy or cystectomy, compared with 36.5% who perform renal and adrenal surgery laparoscopically. Whether Canadian urologists feel this way because of the smaller perceived benefit of laparoscopy for pelvic surgery, or because of concerns about the learning curve or of resource availability in an era where operating room time is precious and surgical waiting lists are lengthening is open to debate and was not explored in this questionnaire.

This study is limited by the questionnaire format: it relies on accurate self-reporting of behavior, case-mix

and case-volume. There was no external validation of urologist reporting on their behavior or surgical practice. The response rate of 63% is acceptable for a Dillman-method mail survey, but does leave open the possibility that non-responders might differ from responders. The survey also represents a snapshot of urological practice in time. As laparoscopy become more routine in residency programs, it is likely to become much more widespread in the near future. Repeating a similar survey after an appropriate interval will be informative.

Conclusions

There is a great deal of heterogeneity in the performance of and training in urological laparoscopy across Canada. Urologists trained after 1995 are more likely to perform laparoscopic procedures, but all urologists grapple with the best method for introducing laparoscopy into their clinical practice. Week-end courses represented the only method of training chose by nearly one quarter of urologists who currently perform laparoscopy. As the number of urologists with laparoscopy fellowship and residency training increases, one would expect that the opportunities for direct mentoring in laparoscopic skills will decrease this proportion and help diffuse laparoscopic techniques. Novel approaches to training such as focused "mini-fellowships" and telementoring may also play a greater role in the future. □

References

1. Smith CD, Weber CJ, Amerson JR. Laparoscopic adrenalectomy: new gold standard. *World J Surg* 1999;23(4):389-396.
2. Giessing M, Deger S, Schonberger B, Turk I., Loening SA. Laparoscopic living donor nephrectomy: from alternative to standard procedure. *Transplant Proc* 2003;35(6):2093-2095.
3. Makhoul B, De La Taille A, Vordos D, Salomon L, Sebe P, Audet JF et al. Laparoscopic radical nephrectomy for T1 renal cancer: the gold standard? A comparison of laparoscopic vs open nephrectomy. *BJU Int* 2004;93(1):67-70.
4. Klingler HC, Remzi M, Janetschek G, Kratzik C, Marberger MJ. Comparison of open versus laparoscopic pyeloplasty techniques in treatment of uretero-pelvic junction obstruction. *Eur Urol* 2003;44(3):340-345.
5. Gill IS, Desai MM., Kaouk JH, Meraney AM, Murphy DP, Sung GT et al. Laparoscopic partial nephrectomy for renal tumor: duplicating open surgical techniques. *J Urol* 2002;167(2Pt1):469-467;discussion 475-476.
6. Cathelineau X, Arroyo C, Rozet F, Baumert H, Vallancien G. Laparoscopic radical prostatectomy: the new gold standard? *Curr Urol Rep* 2004;5(2):108-114.
7. Kim HL, Hollowell CM, Patel RV, Bales GT, Clayman RV, Gerber GS. Use of new technology in endourology and laparoscopy by american urologists: internet and postal survey. *Urology* 2000;56(5):760-765.
8. Vogeli TA, Burchardt M, Fornara P, Rassweiler J, Sulser T. Current laparoscopic practice patterns in urology: results of a survey among urologists in Germany and Switzerland. *Eur Urol* 2002;42(5): 441-446.
9. Kaynan AM, Lee KL, Winfield HN. Survey of urological laparoscopic practices in the state of California. *J Urol* 2002;167(6):2380-2386.
10. Wang DS, Winfield HN. Survey of urological laparoscopic practice patterns in the midwest. *J Urol* 2004;172:2282-2286.
11. SAGES Board of Govenors. Framework for post-residency surgical education and training. The Society of American Gastrointestinal Endoscopic Surgeons. *Surg Endosc* 1994;8:1137.
12. Colegrove PM, Winfield HN, Donovan JF, See WA. Laparoscopic practice patterns among North American urologists 5 years after formal training. *J Urol* 1999;161(3):881-886.
13. Shalhav AL, Dabagia MD, Wagner TT, Koch MO, Lingeman JE. Training postgraduate urologists in laparoscopic surgery: the current challenge. *J Urol* 2002;167(5):2135-2137.
14. Marohn MR, Hanly EJ. Twenty-first century surgery using twenty-first century technology: surgical robotics. *Curr Surg* 2004;61(5):466-473.