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Laparoscopic surgery in gynecology : studies about implementaion and training

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Implementation of
advanced laparoscopy
into daily gynecologic practice:
difficulties and solutions

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Abstract

Background: The implementation of laparoscopy into Dutch gynecological practice is slow. This study was conducted to assess the current state of laparoscopy, to identify factors influencing the implementation and to find solutions towards a better implementation.

Methods: In 2003 a questionnaire was sent to all 151 gynecologists that finished residency between 1998 and 2002. The questionnaire addressed practice demographics, performance of laparoscopy, factors influencing use of laparoscopy in practice and means of obtaining laparoscopic skills after residency.

Results: Of 151 gynecologists 124 (82%) responded, 46 (37%) were male and 78 (63%) female. Mean age was 39 (range 32-47). Respondents (73%) felt to be adequately trained during residency for basic laparoscopic procedures, however not for the more advanced procedures (82%). Lack of caseload, lack of being primary surgeon and lack of simulator training caused the deficiency of laparoscopic skills at the end of residency. Causes of the slow implementation were long operating time, lack of attention for laparoscopy during residency and budgetary problems, however not the financial compensation for gynecologists. In current practice only 9% felt that they reached their preferred level of competence. Hiring an advanced laparoscopic gynecologist was felt to be the best opportunity to reach the preferred level of competence. Minority of respondents supported a referral system or fellowship program.

Conclusions: Basic laparoscopy is sufficiently mastered during residency training; however, advanced laparoscopy is not. More emphasis should be placed on laparoscopic training of advanced procedures during residency and for gynecologists in practice. Hiring a gynecologist with advanced laparoscopic skills is expected to be the solution for this problem. However, a referral system or fellowship program was not.

Introduction

Over the last two decades, the use of gynecological laparoscopy has expanded to prevent many procedures by laparotomy. The terms minimal invasive surgery (MIS) and minimal access surgery (MAS) have been applied to this revolutionary field of surgery, which has been associated with cosmetically superior results, reduced postoperative pain, shorter hospital stays, more rapid postoperative recovery and quicker return to normal activity. [Loh 2002, Park 2002, Darzi 2002]

However, the introduction of advanced laparoscopic procedures into general practice worldwide is slow. Also in the Netherlands concern is expressed about this; not only in gynecology, also in general surgery. [Brölmann 2001, Loh 2002]

While surgical treatment of an ectopic pregnancy was one of the earliest described and accepted application of operative laparoscopy in gynecology, at the end of last decade only 28% of ectopic pregnancies in The Netherlands were removed laparoscopically, compared to a rise from 29% to 72% in this period in other countries. [Brölmann 2001, Loh 2002] However, we should keep in mind that these data come from a university hospital. To our knowledge no nationwide study of laparoscopic procedures performed are published yet.

The purpose of this study is to assess the current state of laparoscopy in general gynecological practice, to identify factors causing the slow implementation and find solutions towards a better implementation of this promising type of surgery into daily gynecological practice.

Methods

A questionnaire was sent to all 151 gynecologists who finished residency within the last 5 years (1998-2002) and were registered at the Dutch Society of Obstetricians and Gynecologists (NVOG). Names and addresses were collected from the NVOG. Each envelope contained a letter of introduction, the questionnaire and a stamped return envelope. The questionnaire was assigned a number to track responses.

The questionnaire addressed basic personal and practice demographics, reached skills during residency, simulator training, interest and performance of laparoscopy, current laparoscopic skills, and factors influencing implementation of laparoscopy in current gynecological practice. All collected data were registered anonymously.

To maximize the response rate a second mailing was sent.

Dutch residents are trained as generalists. Postgraduates have the possibility to subspecialize (maternal-fetal medicine (MFM), gynecological oncology, infertil-

ity). However, generalists may have a special field of interest within their practice (gynecological endoscopy, uro-gynecology) or practice a combination of two fields of interest ('combination' group).

The respondents were grouped according to their type of current practice (MFM, gynecological oncology, infertility, general gynecology or combination) or type of current clinic (Academic Teaching Hospitals (ATH), non-Academic Teaching Hospitals (TH) and non-Teaching Hospitals (non-TH)).

Guidelines from the NVOG and Royal College of Obstetricians and Gynecologists 2001 (RCOG) were used to classify laparoscopic procedures (level 1-3). [RCOG 2001]

The Dutch gynecological residency has curriculum guidelines for resident training. These guidelines contain laparoscopic procedures that residents should master during residency and are essential for graduation (NVOG, 2003). These are: diagnostic laparoscopy, sterilization, ectopic pregnancy, simple adhesiolysis, adnexectomy, cystectomy and laparoscopic intracorporeal suturing.

A Likert-scale (LS) was used in the questionnaire to have the respondent express agreement or disagreement on a five-point scale: 1 (uncomfortable) - 5 (very comfortable), 1 (not interested) - 5 (very interested) or 1 (unimportant) - 5 (very important).

The received information was collected in the statistical SPSS-program (SPSS, version 12, SPSS Inc., Chicago, IL) and analyzed using T-test, Chi-square and logistic regression. Significance was reached at $p < .05$.

Results

Of 151 gynecologists 124 (82%) responded, 46 (37%) were male and 78 (63%) female. Mean age was 39 (range 32-47). Of the 101 clinics in The Netherlands 8 (8%) are ATH, 36 (35%) are TH, and 57 (59%) non-TH. Of the respondents 32 (26%) worked in an ATH (female 27%, male 18%), 51 (41%) in a TH (female 42%, male 43%), and 41 (33%) in a non-TH (female 31%, male 39%).

No significant difference ($p = 0.39$) was found between gender and type of clinic. Neither was a significant difference found in gender ($p = 0.72$) or type of current clinic ($p = 0.89$) between the respondents and non-respondent ($n = 27$) groups, nor for gender within the different subspecialties ($p = 0.72$).

Of the respondents 12 gynecologists (10%) were subspecialized in MFM and worked in an ATH. These gynecologists do not perform any gynecological laparoscopy in their current clinic and for this reason we excluded these 12 respondents (8

female, 4 male) from further analyses in our study. The remaining gynecologists interested in MFM in this study work as generalists in a non-academic TH. This means they perform gynecological laparoscopy in their practice, and additionally have MFM as a field of (special) interest. Since these respondents do perform laparoscopy, they were not excluded. From here on we will continue to analyze the returned inquiries of the remaining 112 respondents.

Because not all respondents answered all items of the questionnaire, subcalculations with different denominators are made.

Of the respondents 95% (106/112) were interested in performing laparoscopic procedures (LS: mean 4.20, median 4). When asked to score their interest in laparoscopy on a LS, men (n= 42, LS: mean 4.41, median 5) rank themselves significantly higher ($p=0.03$) than women (n= 70, LS: mean 4.07, median 4).

Respondents were asked if residency has adequately trained them to perform laparoscopic procedures in their current clinic. Of the respondents 73% (79/109) felt to be adequately trained during residency to perform basic laparoscopic procedures required for graduation (curriculum guidelines). However, 82% (82/100) felt not adequately trained during residency to perform the more advanced laparoscopic procedures in their current gynecological practice.

Factors that caused lack of laparoscopic skills at the end of residency are stated in table 1. The lack of case load during residency (LS: median 4), lack of having been first operating surgeon in ATH (LS: median 4) or TH (LS: median 3), lack of simulator to train laparoscopic skills (LS: median 3), lack of appropriate patients (LS: median 3) and lack of interest of the surgical educator (LS: median 3) were the most important factors.

Table 1 | Factors causing lack of laparoscopic skills during residency.

Factor	Likert scale	
	mean	median
Lack of being the first surgeon (academic TH)	3.77	4
Lack of caseload	3.23	4
Lack of simulator training	2.99	3
Lack of being the first surgeon (non-academic TH)	2.89	3
Lack of appropriate patients	2.87	3
Lack of correct equipment	2.43	2.5
Lack of being assisting surgeon	2.51	2

TH = teaching hospital, OR = operating room,
Likert-scale: 1 = not important, 5 = very important

Of the respondents 94% (102/108) felt laparoscopic training on a simulator outside the operating room is important (LS: mean 3.89, median 4) in relation to their performance in the operating room. Of the respondent 65% (70/107) was not in the opportunity of laparoscopic training on a simulator in their current clinic. Twenty-three respondents (23/35, 66%) had the possibility of training, but made no use of it (including one respondent that had access to a virtual reality simulator). Only one respondent trained once a month (3%), 4 trained each 6 months (11%) and 6 trained once a year (17%).

Respondents were asked to give an estimated number of laparoscopic procedures they individually performed per year in their current clinic. No significant difference ($p=0.47$) was found between the different types of hospitals. Of the respondents 16% (17/107) performed a mean of 1-20 laparoscopic procedures per year, 54% (58/107) 21-50 procedures, 26% (28/107) 51-100 procedures and 4% (4/107) more than 100 procedures.

Respondents were asked to scale their self-perceived competence per type of laparoscopic procedure by answering how comfortable they felt performing the procedure in their current clinic (table 2). Men showed significant higher mean self-perceived competence in laparoscopic procedures than women in level 2 for cystectomy ($p=0.04$), adnexectomy ($p=0.02$), salpingostomy ($p=0.03$), laparoscopic supravaginal hysterectomy ($p=0.02$) and in level 3 for major adhesiolysis ($p=0.005$) and myomectomy ($p=0.007$).

Respondents were asked to give their opinion on factors influencing the implementation of gynecological laparoscopy in The Netherlands (table 3). For this question multiple answers were allowed. The long operating time (65%), lack of attention for laparoscopy during residency (59%), lack of correct equipment (45%) and budgetary problems in clinics and the finance of the Dutch health care system (42%) were the main factors thought to influence current implementation. Respondents also felt that laparoscopy is a 'hobby' for a small group of gynecologists (28%), the financial compensation for laparoscopic procedures is too small (26%), there is no evidence to perform laparoscopic procedures (12%), interference of insurance is a limiting factor (11%) and there is no indication for the minimal invasive approach (4%).

Only 9% of respondents (8/92) felt they currently have reached their preferred level of competence in laparoscopic procedures. It was felt that the preferred level of laparoscopy after finishing residency in gynecological practice is best reached by hiring an advanced laparoscopic gynecologist to teach them in their own clinic (63%, 58/92, table 4). Others felt the preferred level can be reached by independently

Table 2 | Mean self perceived competence (Likert-scale) and interest in gynecological laparoscopy per level in current clinic.

	Mean self perceived competence				Interest in laparoscopy		
	Total mean	♂ mean	♀ mean	p*	would like to perform (%)	perform now (%)	no interest (%)
Level 1							
Diagnostic laparoscopy	4.62	4.65	4.60	NS	-	100	-
Sterilization	4.62	4.63	4.61	NS	1	98	1
Aspiration	4.53	4.64	4.47	NS	2	92	7
Fenestration	4.25	4.30	4.23	NS	6	85	9
Ovarian biopsy	4.23	4.25	4.22	NS	1	89	11
Level 2							
Minor adhesiolysis	4.02	4.13	3.96	NS	7	89	4
Ectopic pregnancy	4.22	4.35	4.14	NS	1	99	-
Endometriosis (I & II)	3.52	3.63	3.46	NS	14	76	10
Cystectomy	3.73	4.00	3.57	0.044	12	84	
Adnexectomy	3.95	4.25	3.79	0.023	11	86	3
LAVH	1.86	2.08	1.74	NS	39	21	39
Salpingostomy	1.51	1.78	1.35	0.032	28	9	63
Supravag. hysterectomy	1.40	1.65	1.26	0.024	46	11	43
Refertilisation	1.12	1.20	1.07	NS	24	1	75
Level 3							
Major adhesiolysis	2.01	2.38	1.79	0.005	40	21	39
Endometriosis (III & IV)	1.77	1.70	1.81	NS	52	9	40
Myomectomy	1.33	1.60	1.17	0.007	40	8	52
Sacropexy	1.10	1.15	1.07	NS	41	2	57

* = Student t-test, NS = not significant, LAVH = laparoscopic assisted vaginal hysterectomy, Likert-scale: 1 = not comfortable, 5 = very comfortable, levels according to RCOG, 2001.

performing new procedures and thus teaching themselves in the operating room (51%, 47/92), learning skills during courses and meetings (49%, 45/92) or practicing laparoscopic skills on a simulator (41%, 38/92). Others supported a referral system (12%, 11/92) or felt that a fellowship program (8%, 7/92) would improve implementation.

Table 2 shows the interest of respondents in the different types of laparoscopic procedures. The majority of respondents performed the basic laparoscopic procedures as taught during residency in their current clinic (between 84% and 100%).

Table 3 | Difficulties implementing advanced gynecological laparoscopy according to practicing gynecologists.

	Respondents (total n=112)	
	n	(%)
Operating time too long	71	(65)
Too little attention in residency	64	(59)
Correct equipment not available	49	(45)
Hospital budget is limited	46	(42)
Laparoscopy is a “hobby”	31	(28)
Financial compensation too small	28	(26)
No evidence	13	(12)
Health insurance is limiting factor	12	(11)
No indication	4	(4)

(Multiple answers allowed)

One of the goals of this study was to identify the gynecologists that are interested in performing advanced laparoscopic procedures, but are not doing so in their current clinic (table 2). Significantly more men ($p=0.03$) and more gynecologists subspecialized in infertility ($p<0.001$) were interested in performing advanced procedures. Logistic regression analyses were used to predict interest in -and performance of laparoscopic procedures on the basis of subspecialty and gender.

Table 4. Gynecologists’ perspective on how preferred level of competence of advanced laparoscopy is reached after residency.

	Respondents (total n=112)	
	n	(%)
Operating time too long	71	(65)
Hire laparoscopic gynecologist	58	(63)
Self-teaching in operating room	47	(51)
Course / congress	45	(49)
Simulator		
-Skills lab	38	(41)
-Bench model simulator	37	(40)
-Virtual reality simulator	38	(41)
Referral system	11	(12)
Fellowship	7	(8)

(Multiple answers allowed)

Gynecologists subspecialized in infertility were significantly more interested in laparoscopic salpingostomy ($p=0.06$) than the others. General gynecologists were more interested in performing laparoscopic sacropey than gynecologists subspecialized in infertility ($p=0.017$). Women were significantly less interested in performing laparoscopic supravaginal hysterectomy ($p=0.035$) and laparoscopic sacropey ($p=0.04$) than men. Significantly more gynecological oncologists performed LAVH compared to the other gynecologists ($p=0.01$).

Discussion

Implementation of laparoscopy in daily practice is a matter of concern. This problem is not only confined to gynecological practice in The Netherlands it also concerns other countries and other specialties. [Royston 1994, SAGES 1998, Navez 1999, Brölmann 2001, Loh 2002, Nussbaum 2002, Chiasson 2003] Since this is a worldwide problem the results of this study are of importance to all laparoscopists.

As a result of the high response rate this inquiry gives a representative insight in the opinion of young gynecologists on the implementation difficulties of laparoscopy in residency and their current practice and can therefore be translated to other countries in Europe and the United States.

Since laparoscopy is a relatively new surgical technique, the young generation of gynecologists was confronted with the difficulties of implementation of laparoscopy into their residency program and into their current gynecological practice. Since we inquired all gynecologists that recently finished residency no selection bias towards gynecologists that are more interested in laparoscopy than others is made.

We found that basic laparoscopic procedures are mastered during residency training, however advanced skills and procedures were not. Others also found that surgical residents perceive a need for additional training in advanced laparoscopic procedures after residency. [SAGES 1998, Rattner 2001, Chiasson 2003] The ability to learn and integrate advanced laparoscopic procedures successfully into daily practice is a major hurdle in the implementation of laparoscopy.

Many 'open' surgeons are not interested in incorporating advanced laparoscopic procedures into their practices. [Chiasson 2003] Of all surgeons 10% will not take up MIS skills and are thus better confining their activities to open surgery. [Royston 1994] Of surgeons who are interested, many are still dealing with their own learning curves, which take surgical procedures away from the resident's educational program. [Chiasson 2003] A debate could be performed discussing whether

advanced procedures should be incorporated into the curriculum guidelines for resident training. Considering the slow implementation of laparoscopy, this is not yet feasible.

On a Likert-scale men rank themselves significantly higher for mean self-perceived competence in certain level 2 and 3 procedures than women. Although this phenomenon has been described before [Einarsson 2002] it does not mean men are more proficient at laparoscopy than women. It shows that men rank themselves higher for some procedures than women do.

The cause of lack of laparoscopic skills as a final year resident is not due to residents' disinterest. The fact that certain laparoscopic procedures were not performed in teaching hospitals due to a lack of caseload leading to a perceived lack of laparoscopic skills of final year residents, shows that the implementation in The Netherlands is poor.

Additionally not having the opportunity to perform as a primary surgeon during residency is more pronounced in academic teaching hospitals than in non-academic teaching hospitals. Probably the higher level of difficulty of surgical cases in academic hospitals explains this phenomenon. However, for both types of teaching hospitals (TH and ATH) this is a serious factor causing lack of skills. Also the change in working hours, the decline in major surgical cases in gynecology and the increase in total number of gynecologists [Brölmann 2001] restricts this phenomenon.

Surprisingly, the lack of appropriate patients is found to be of major importance as a factor why laparoscopic skills are not mastered during residency. Although, indications and contraindications for gynecological laparoscopy are well established now and reasons why a patient is not appropriate for laparoscopy are limited, this factor may not be of any importance at present time and suggests more the lack of a skilled doctor.

The lack of operating time and the long operating time for laparoscopic procedures are considered the most important reasons of the slow implementation. Frumovitz et al recently described this as the major inhibiting factor of implementation of laparoscopy into daily practice. [Frumovitz 2004] Operating time and lack of attention for laparoscopic education during residency are linked, since a lack of laparoscopic skills training leads to increased operative time.

In the UK, lack of equipment as well as lack of training initially hindered the introduction of laparoscopy. [Royston 1994] There is now no lack of equipment, and general surgeons find themselves plagued by equipment manufacturers. In The Netherlands the lack of correct equipment is in part a budgetary problem. Investing in the equipment together with other laparoscopic specialties, i.e. Departments of Surgery or Urology, can partly solve this problem.

Surprisingly, the financial compensation for gynecologists performing laparoscopic procedures, which is not different from the conventional procedures, is not considered to be one of the main reasons for the slow implementation. In contrast to the United States, health insurance in The Netherlands has no interference with daily practice and therefore is not considered a limiting factor of implementation of laparoscopy.

Laparoscopy has created an ongoing continuing education need among practicing gynecologists for training in these new techniques. This need has been met with courses or congresses developed by advanced laparoscopic gynecologists, however concern is expressed about the adequacy of these courses. [Rogers 2001] As most gynecologists in The Netherlands are generalists (table 1), [Brölmann 2001] majority of respondents felt to be highly interested in performing laparoscopic procedures and felt they should master laparoscopic skills. However, a fellowship or referral system is not regarded a solution to optimize the implementation of laparoscopy.

Operating with or hiring a gynecologist with advanced laparoscopic skills was felt to be the best opportunity to reach the preferred level of competence. This solution has been shown in general surgery to increase the caseload and to have a positive effect on laparoscopic education and research. [Fowler 2000] One of the advantages of the presence of a gynecologist with advanced laparoscopic skills is that new procedures are taught and learned in your own operating room. This surgeon familiarizes the operating team with new techniques and equipment; it creates more awareness of laparoscopic procedures, indications, contraindications and possible complications.

In order to improve the implementation of laparoscopy in daily gynecological practice, effort has to be made to optimize training of residents and prepare them to perform the more advanced laparoscopic procedures. Also effort has to be made to continue to train in daily practice by hiring a gynecologist with advanced laparoscopic skills, to teach them the more advanced laparoscopic procedures in their own operating room. More importantly, nowadays most effort should be made to train the trainers, in order to be able to train the residents adequately.

