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Laparoscopic surgery in gynecology : studies about implementaion and training

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Gynecological laparoscopy
in residency training program:
Dutch perspectives

Abstract

Background: Implementation of laparoscopy into residency training is difficult. This study was conducted to assess the current state of implementation of laparoscopic surgery into gynecological residency program, to identify factors influencing laparoscopic skills training and to find solutions towards better training and implementation.

Methods: In 2003 a questionnaire was sent to all 68 postgraduate year 5 and year 6 residents obstetrics and gynecology in The Netherlands. The questionnaire addressed demographics, performance of laparoscopy, self-perceived competence, simulator training, and factors influencing laparoscopic training in residency.

Results: Of the 68 residents 60 (88%) responded, 46 (37%) were male and 78 (63%) female. Men showed significant higher mean self-perceived competence in some laparoscopic procedures than women. Of the respondents 20% had no advanced laparoscopic gynecologist present in their teaching hospital. Residents felt that simulator training is important in relation to their performance in the operating room. Of all gynecological teaching hospitals in the Netherlands 55% did not have the opportunity of simulator training. Of the respondents that had the possibility of simulator training voluntarily 33% did not use the simulator. Residents who trained on a simulator felt this training was significantly more important ($p=0.02$) than residents who never practiced on a simulator. Respondents' laparoscopic skills were subjectively evaluated in the operating room (92%) or were evaluated based on the number of laparoscopic procedures performed as primary surgeon (49%). Of the respondents 47% were satisfied with their current laparoscopic skills and 27% felt also to be prepared for the more advanced procedures. Lack of having been primary surgeon in non-academic teaching hospitals and even more so in academic teaching hospitals ($p<0.05$) were limiting factors in acquiring laparoscopic skills.

Conclusions: Incorporation of basic laparoscopic procedures into residency training has been successful, however advanced procedures are not. Simulator training is still in its infancy in The Netherlands, is not frequently used when voluntarily and should be mandatory during residency. Acquired laparoscopic skills on a simulator and in the operating room should be objectively assessed and above all training of trainers is imperative.

Introduction

Laparoscopic skills are not an innate behavior; neither can they be easily mimicked due to their difficult and non-intuitive nature. [Gallagher 1998] Besides the difficulties of acquiring laparoscopic skills, the implementation of laparoscopic procedures into daily practice and laparoscopic training into residency program is troublesome. [Navez 1999, Loh 2002, Nussbaum 2002] The decrease in residents working hours [Haluck 2000] combined with the shown reduction in major gynecological procedures [Brölmann 2001] leads to less exposure in the operating room and relatively smaller case volumes for residents in training. [Blanchard 2004] Therefore residents are not optimally exposed to laparoscopic surgery during residency and this may ultimately restrict the implementation of laparoscopy even further. [Shay 2002]

Simulator training is developed to acquire laparoscopic skills outside the operating room and has many advantages. It is shown to improve residents in vivo laparoscopic skills. [Feldman 2004] Besides a training modality, a simulator can be used to objectively assess the trainee's laparoscopic skills. [Feldman 2004] Successful integration of a simulator into residency training is subject to development worldwide.

The purpose of this study is to assess the current state of implementation of laparoscopic surgery into gynecological residency program, to identify factors influencing the laparoscopic skills training and to find solutions towards better training and implementation of this promising type of surgery into gynecological residency in The Netherlands.

Methods

A questionnaire was sent to all 66 postgraduate year 5 (PGY5) and 6 (PGY6) residents Obstetrics and Gynecology registered at the Dutch Society of Obstetricians and Gynecologists (NVOG) in The Netherlands in 2003. 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, laparoscopic education during residency, simulator training, interest and performance of laparoscopy, current laparoscopic skills, and factors influencing implementation of laparoscopy in current gynecological residency. All collected data were registered anonymous.

To maximize the response rate a second mailing was sent.

Also an inventory was made of the simulator training possibilities in the Departments of Obstetrics and Gynecology of all teaching hospitals (TH's, n=34) and academic hospitals (AH's, n=8).

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

In 2000 the Dutch gynecological residency program has established curriculum guidelines. These guidelines contain requirements that are essential for graduation: a minimum number of laparoscopic procedures that need to be performed by residents as a primary surgeon, mandatory laparoscopy courses and a yearly written progress examination. The mandatory laparoscopic procedures that residents should master during residency procedures are: diagnostic laparoscopy, sterilization, ectopic pregnancy, simple adhesiolysis, adnexectomy, cystectomy and performance of a laparoscopic intracorporeal suture.

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 means of the LS were calculated and stated in the results.

Not all respondents answered all items of the questionnaire, therefore subcalculations with different denominators were made. Also for some questions multiple answers were allowed.

The received information was collected in the statistical SPSS-program (SPSS, version 12, SPSS Inc., Chicago, IL) and analyzed using Student t-test, Chi-square and logistic regression. Significance was reached at $p < 0.05$.

Results

Of the 68 residents 60 (88%) responded, of which 42 were female and 18 male. With regard to the response, no significant difference was found for gender.

All respondents were interested in performing laparoscopic procedures (LS: 4.43). Men were more interested in performing laparoscopic surgery than women (LS: men 4.61, women 4.34), although this difference was not significant.

Table 1 shows the percentage of residents interested in each specific laparoscopic procedure, stratified by level of difficulty. All residents were interested in performing the mandatory procedures for graduation. Majority of residents (77%-100%) already performed these procedures, and the residents who did not, were all interested in performing them in the near future. Table 1 also shows that the more advanced the procedure was, the lesser residents currently perform these procedures. Procedures residents would like to perform as a gynecologist are laparoscopic myomectomy (51%), laparoscopic-assisted vaginal hysterectomy (52%), endometriosis III & IV (54%) and major adhesiolysis (67%). Procedures residents were less

Table 1 | Residents' self perceived competence (Likert-scale) and interest in gynecological laparoscopy per level.

	Mean self perceived competence				Interest in laparoscopy		
	Total mean	♂ mean	♀ mean	p*	would like to perform (%)	perform now (%)	no interest (%)
Level 1							
Diagnostic laparoscopy**	4.33	4.33	4.33	NS	0	100	0
Sterilization**	4.38	4.44	4.36	NS	0	100	0
Level 2							
Simple adhesiolysis**	3.54	3.94	3.37	0.018	15	85	0
Ectopic pregnancy**	3.27	3.65	3.12	0.037	13	87	0
Endometriosis (I & II)	3.15	3.56	2.98	0.033	32	67	2
Cystectomy**	3.35	3.83	3.14	0.013	23	77	0
Adnexectomy**	3.30	3.83	3.07	0.005	18	82	0
LAVH	1.55	1.67	1.50	NS	52	10	38
Salpingostomy	1.33	1.56	1.24	NS	33	5	62
Supravag. hysterectomy	1.38	1.50	1.33	NS	42	7	51
Refertilisation	1.08	1.17	1.05	NS	21	0	79
Level 3							
Major adhesiolysis	1.67	2.00	1.52	0.023	67	13	20
Endometriosis (III & IV)	1.48	1.78	1.36	0.011	54	4	43
Myomectomy	1.25	1.39	1.19	NS	51	2	47
Sacropexy	1.07	1.06	1.07	NS	27	0	73

* = t-test, ** = Mandatory procedures for graduation, NS = not significant, LAVH = laparoscopic assisted vaginal hysterectomy, Likert-scale: 1 = not comfortable, 5 = very comfortable, levels according to RCOG. [RCOG 2001]

interested to perform as a gynecologist were laparoscopic supravaginal hysterectomy (51%), laparoscopic salpingostomy (62%), laparoscopic sacropexy (73%) and laparoscopic refertilisation (79%).

Respondents were asked to scale their self-perceived competence per type of laparoscopic procedure by answering how comfortable they felt performing the procedures. Table 1 shows that men had a significant higher mean self-perceived competence than women in level 2 for minor adhesiolysis ($p=0.02$), ectopic pregnancy ($p=0.04$), endometriosis stage I & II ($p=0.03$), cystectomy ($p=0.01$) and adnexectomy ($p=0.005$). Procedures in level 3 where men had a higher mean self-perceived competence were major adhesiolysis ($p=0.02$) and endometriosis stage III & IV ($p=0.01$).

Respondents were asked to give an estimated number of laparoscopic procedures they individually performed per year in their current clinic. No significant difference was found between TH's and AH's. Of the respondents 15 performed a mean of 1-20 laparoscopic procedures yearly, 32 respondents performed 21-50 procedures and 12 performed 51-100 procedures. Of the respondents 12 (20%) had no advanced laparoscopic gynecologist present in their current teaching hospital to teach them the advanced procedures.

Residents felt that simulator training is important in relation to their performance in the operating room (LS: 3.9).

Table 2 details the possibility of simulator training in gynecological residency training in The Netherlands. Of all 43 teaching hospitals in the Netherlands 23 had no simulator. Of the AH's ($n=8$), 2 had a skills laboratory, 4 had a box trainer and 2 had no simulator to train on. Of the TH's ($n=34$), 1 had a skills laboratory, 12 had a box trainer and 21 had no simulator.

Table 2 | Possibility of simulator training during gynecological residency program.

	TH ($n=34$) n (%)	AH ($n=8$) n (%)
Skills laboratory	1 (3)	2 (25)
Box trainer	12 (35)	4 (50)
Virtual reality	0	0
No simulator	21 (62)	2 (25)

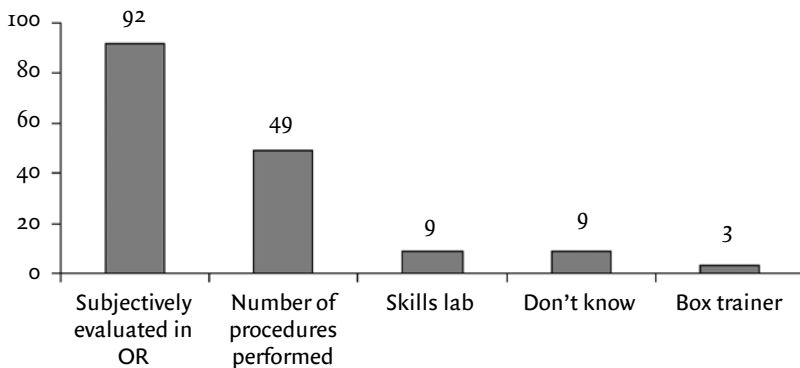
TH = Teaching hospital, AH = Academic teaching hospital

Of the respondents that had the possibility of simulator training 11 (33%) did not use the simulator. Those who did use the simulator, 7 trained once a year, 9 trained twice a year and 6 trained once a month.

Residents who trained on a simulator felt this training was significantly more important (LS: 4.23, $p=0.02$) than residents who never practiced on a simulator (LS: 3.71).

The questionnaire addressed how residents' laparoscopic skills were evaluated during residency. For this question multiple answers were allowed. Figure 1 shows 54 (92%) respondents were subjectively evaluated in the operating room, whereas 29 (49%) were evaluated based on the number of laparoscopic procedures performed as primary surgeon. Another 5 were evaluated in a skills lab, 5 did not know how laparoscopic skills were evaluated and only 2 residents were evaluated on a box trainer.

Figure 1 | Evaluation of residents' laparoscopic skill.



Multiple answers allowed, OR = operating room

Of the respondents 28 (47%) were satisfied with their current laparoscopic skills at this stage of residency, whereas 32 were not. Of the latter, 23 were postgraduate year 5 and 9 were postgraduate year 6. Of the respondents 15 (27%) felt that residency also prepared them for the more advanced procedures, in addition to the mandatory laparoscopic procedures in residency program.

Factors limiting laparoscopic skills at the end of residency are stated in table 3. The lack of having been primary surgeon in AH (LS: 4.06), or in TH (LS: 2.98) and lack of having been assisting surgeon (LS: 3.20) were considered important factors.

Table 3 | Causes of lack of laparoscopic skills during residency.

Factor	mean LS
Lack of opportunity to be primary surgeon in AH *	4.06
Lack of opportunity to be assisting surgeon	3.20
Lack of appropriate patients	3.12
Lack of box trainer	3.08
Lack of opportunity to be primary surgeon in TH *	2.98
Procedures are not performed in (academic) TH	2.94
Lack of interest surgical educator	2.50
Lack of correct equipment	2.17
Lack of trained OR-staff	2.02
Lack of interest resident	1.51

LS = Likert Scale, AH = academic teaching hospital, TH = teaching hospital
OR = operating room, * $p < 0.05$

Residents felt the “lack of having been first operating surgeon in AH’s” was significantly more important ($p < 0.05$) than “lack of having been first operating surgeon in TH’s.”

Lack of appropriate patients (LS: 3.12) and limited simulator training (LS: 3.08) were also found important. The limited caseload (LS: 2.94) and the lack of interest of the surgical educator (LS: 2.50) were less important factors.

Discussion

The high response rate (88%) shows that the results of this inquiry give a representative insight in the opinion of residents on the implementation of gynecological laparoscopy into residency training program.

Dutch residents are interested in performing gynecological laparoscopy and the incorporation of basic laparoscopic procedures into residency training seems to be successful. Residents feel that current residency training program prepares them to perform the basic procedures as stated in the curriculum guidelines and the requirements for graduation are obtained. In this study residents indicate that they are also interested in performing advanced procedures during residency and 27% actually do so.

In this context we have to consider that the ability to successfully integrate advanced laparoscopic procedures into daily practice, and especially into residency program, is difficult. Recent studies have shown that other surgical training programs also encounter this problem. [SAGES 1998, Rattner 2001, Nussbaum

2002, Hunter 2002, Chiasson 2003, Schijven 2004, Chiasson 2004] Residents in training are not performing enough advanced procedures to feel comfortable with these procedures when they enter daily practice. Ultimately this is in itself a limiting factor of the implementation of advanced laparoscopy. [Rattner 2001] Debated can be on whether advanced laparoscopic procedures should be included in the curriculum guidelines for resident training at this point of time, especially since advanced laparoscopic gynecologists are not present in all teaching hospitals.

Particularly the presence of an advanced gynecological endoscopist during residency is considered a very important factor for residents' laparoscopic education. A Canadian survey among surgical residents described that 99% thought there was an important role for such an advanced laparoscopic surgeon within the academic setting. [Chiasson 2004] In addition, hiring an advanced laparoscopic surgeon has been shown to increase the caseload, to improve residents' exposure and to have a positive effect on laparoscopic education and research in general surgery. [Fowler 2000, Einarsson 2002]

Residents consider simulator training as very important in relation to their performance in the operating room. We found that residents who had the opportunity of simulator training feel significantly more positive about the effect of training on their in vivo skills than the residents who do not have the possibility of simulator training.

Unfortunately in 2003 the majority of Dutch gynecological residents did not have the opportunity to train on a simulator. However, the residents that did have the opportunity trained between once and twice a year, and one third did not use the simulator at all. Surprisingly, these findings are contradictory to the residents' opinion that simulator training is an important addition to their residency program. Simulator training in current Dutch gynecological residency program is voluntary. Assuming a simulator is present, it is residents' responsibility to train in his / her free time, after work or during a break. However, this study shows that residents do not make the effort of practicing voluntarily. Considering the importance of simulator training [Feldman 2004] and the fact that residents do not train on a voluntary basis, it is recommendable to incorporate simulator training into residency training in a mandatory fashion. Dutch residents prefer to be trained as a general obstetrician-gynecologist. [Schutte 2004] This leads to an already crowded curriculum, and successfully incorporating simulator training to it is a major hurdle. However, its necessity is obvious.

The frequency of simulator training to reach optimal result still needs further research, [Brunner 2004] however, the optimal frequency will surely be higher than once or twice a year.

At present, the number of cases performed by a resident is the most important and widely accepted measure of competence. [Park 2002] Case volumes are easily quantifiable; unfortunately they do not represent the competence of a resident. Additionally, the number of cases required for competency is not known yet and presumably differs between individuals. [Feldman 2004] Besides the number of procedures performed, evaluation of residents' laparoscopic skills is usually based on subjective assessment by surgical educators in the operating room, influenced by personal traits and relationships. Emphasis should be placed on objective evaluation of laparoscopic skills. [Martin 1997, Reznick 1997, Goff 2000]

Surprisingly, the lack of appropriate patients is found to be one of the most important factors why laparoscopic skills are not mastered during residency. Although, indications and contraindications for gynecological laparoscopy are well established nowadays and reasons why a patient is not suitable for a laparoscopic procedure are limited, the lack of appropriate patients suggests the lack of a skilled doctor, rather than the opposite.

A recent survey from the United States concluded that those who had received formal laparoscopic training during residency were much more likely to incorporate laparoscopic techniques into their daily practices as a gynecologist. [Shay 2002] In addition to their findings it is our opinion that the implementation of laparoscopy will improve, provided residency training is optimized.

It is our opinion basic skills should be learned on a simulator and this should be incorporated into the curriculum. In addition, the acquired skills on a simulator and in the operating room should be objectively assessed. Emphasis should be placed on individual skills. It is not the quantity of training, but the quality of training and evaluation that leads to sufficient laparoscopic skills. For this, advanced laparoscopic trainers are urgently needed. There is work to be done.