Laparoscopic surgery in gynecology : studies about implementaion and training

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Operative laparoscopy in The Netherlands: diffusion and acceptance

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Abstract

Objective: To evaluate and update the current status of the implementation of operative laparoscopy in gynecology in The Netherlands by assessing diffusion and acceptance of each specific procedure per hospital.

Methods: In 2003 a questionnaire was sent to all hospitals (n=102), which addressed the total number and type of laparoscopic procedures performed in 2002 stratified by level of difficulty (level 1: diagnostic laparoscopy, sterilization, tubal patency tests; level 2: adhesiolysis, ectopic pregnancy (EP), laparoscopic treatment of endometriosis, cystectomy, oophorectomy, laparoscopic-assisted vaginal hysterectomy (LAVH), tubal surgery for infertility; level 3: myomectomy, total laparoscopic hysterectomy (TLH) and sacropexy). Data were compared to previously published data of 1994.

Results: Response rate was 79% (81/102). Diffusion and acceptance of level 2 procedures increased significantly, except endometriosis and tubal surgery for infertility. Diffusion of LAVH was only 58%. 4.0% of hysterectomies were LAVH. TLH and sacropexy were not performed. The diffusion of myomectomy increased significantly (p=0.01), whereas its acceptance remained low.

Conclusions: Although the diffusion of operative procedures has increased over the last decade, acceptance is still limited, especially for laparoscopic hysterectomy. The implementation of operative gynecological laparoscopy in The Netherlands seems to develop at a slow pace.

Introduction

Initially, gynecological laparoscopy was performed for diagnostic purposes and sterilization, later also for operative procedures. Nowadays, laparoscopy has developed into an important component of the operative gynecological palette, since it is accepted as an alternative to conventional gynecological surgery for many indications. However, the introduction of this new surgical technique has shown to bring along difficulties incorporating into daily practice, especially advanced operative procedures. Therefore it is important to assess the degree of diffusion and acceptance [Banta 1993, Vondeling 1993, SAGES 1998, Loh 2002] and use this information to guide further implementation at regional and (inter)national levels.

Implementation of laparoscopy is objectified in two ways. First, the diffusion of every specific procedure can be examined, defined by the percentage of hospitals where the different types of laparoscopic procedures are performed. And second, the extent of acceptance of each specific procedure per hospital can be examined, defined by the number of different laparoscopic procedures performed per hospital. Considering the diffusion and acceptance of every type of laparoscopic procedure, conclusions can be made on the implementation of gynecological laparoscopy. [Menon 1994]

The objective of this study was to elucidate the implementation of laparoscopy in operative gynecology in The Netherlands as a follow up of previous studies. [Jansen[a] 1996, Jansen[b] 1996]

Methods

In 2003 a questionnaire was sent to all hospitals (n=102) in The Netherlands. The questionnaire addressed the total number and type of all gynecological laparoscopic procedures (LS) that were performed in each hospital in 2002. Also the numbers of abdominal and vaginal hysterectomies (oncology excluded), as well as the numbers of conventional procedures per laparotomy for cystectomy, oophorectomy and ectopic pregnancy (EP) were collected.

For this questionnaire each envelope contained a letter of introduction, the questionnaire and a stamped return envelope. To maximize the response rate a reminder was sent after 6 weeks.

All laparoscopic procedures were stratified by level of difficulty according to the guidelines of the Royal College of Obstetricians and Gynaecologists (RCOG). [RCOG 2001] Level 1 procedures were diagnostic laparoscopy, sterilization and tubal patency tests; level 2 procedures were adhesiolysis, EP, laparoscopic treatment of endometriosis, cystectomy, oophorectomy, LAVH and tubal surgery for infertility;

level 3 procedures were myomectomy, total laparoscopic hysterectomy (TLH) and sacropexy.

Data from this study were compared to previously published data. [Jansen[a] 1996, Jansen[b] 1996]

Received information was collected in the statistical SPSS program (SPSS, version 12, SPSS Inc., Chicago, IL) and was analyzed using Chi-square, and Mann-Whitney test. Significance was reached at $p<0.05$.

Results

Of all 102 hospitals, 81 (79%) returned the questionnaire.

Not all questionnaires were returned with all items completed. Therefore the denominators in the analyses did not always add up to the total number of questionnaires returned.

In 2002 the majority of cystectomies (69%) and EP's (71%) were performed laparoscopically, whereas the minority of oophorectomies (40%) was performed by laparoscopy (oncology excluded), as shown in table 1.

Table 1 | Laparoscopic approach versus conventional procedures by laparotomy in 2002 (oncology excluded)

	Laparoscopy		**Conventional**	
	n	%	n	%
Cystectomy	327	69	149	31
Oophorectomy	750	40	1.146	60
Ectopic pregnancy	750	71	306	29
Hysterectomy	240	4	5.981	96

Data based on 61 hospitals that completed these items of the questionnaire

The different approaches to hysterectomy are detailed in table 2. Of the reported hysterectomies performed, 52% was abdominal, 44% vaginal and 4.0% LAVH.

Not all hospitals performed LAVH. Of the hospitals where LAVH was performed (25/43), 7% of all hysterectomies were LAVH's (range 0.6%-36%). Highest absolute number of LAVH's performed per hospital were 10 procedures in 1992, 32 procedures in 1994 and 46 procedures in 2002.

In hospitals where LAVH was not performed (18/43), significantly more hysterectomies were performed abdominally compared to hospitals where LAVH was performed ($p<0.001$).

Acceptance of a procedure, defined as the median number of each specific laparoscopic procedure performed per hospital was compared to data from 1994 and is detailed in table 3. The number of diagnostic LS performed per hospital decreased

Table 2 | Approach to hysterectomy in The Netherlands in 2002

	Number of procedures in hospitals where LAVH is not performed		performed			Total	
Approach to hysterectomy	n	%	n	%	p*	n	%
Abdominal	1.394	55	1.730	50	<0.001	3.124	52
Vaginal	1.138	45	1.479	43	NS	2.617	44
LAVH	0	0	240	7	-	240	4
Total	2.532	100	3.449	100		5.981	100

Data based on 43 hospitals that completed all 3 items, LAVH = laparoscopic-assisted vaginal hysterectomy, NS = not significant,
* = Chi-square

significantly (p=0.007), whereas the number of cystectomies (p<0.001), oophorectomies (p<0.001), EP's (p<0.001), adhesiolyses (p = 0.02), LAVH's (p=0.001) and myomectomies (p=0.03) increased significantly.

Table 3 | Acceptance per procedure: median number of laparoscopic procedures performed per hospital in The Netherlands stratified by level of difficulty [RCOG 2001]

	1994[Jansen (b) 1996]		2002			
	median	(range)	median	(range)	Δ	p*
Level 1						
Diagnostic laparoscopy	93.5	(5 – 723)	63	(4 – 315)	-30.5	0.002
Sterilization	109.5	(2 – 340)	107.5	(30 – 381)	-2	NS
Tubal patency test	40	(0 – 400)	46	(8 – 184)	+6	NS
Level 2						
Cystectomy	2	(0 – 40)	10.5	(0 – 51)	+8.5	<0.001
Oophorectomy	1.5	(0 – 44)	15	(0 – 76)	+13.5	<0.001
EP	4	(0 – 50)	12	(0 – 31)	+8	<0.001
Endometriosis	4	(0 – 64)	4	(0 – 76)	=	NS
Adhesiolysis	5	(0 – 120)	7	(0 – 48)	+2	0.02
Tubal surgery for infertility	0	(0 – 30)	1	(0 – 22)	+1	NS
LAVH	0	(0 – 32)	1	(0 – 46)	+1	<0.001
Level 3						
Myomectomy	0	(0 – 8)	0	(0 – 4)	=	NS
TLH	–		–		–	
Sacropexy	–		–		–	

Δ = difference, * = Mann-Whitney, NS = not significant, EP = ectopic pregnancy,
LAVH = laparoscopic-assisted vaginal hysterectomy, TLH = total laparoscopic hysterectomy

Diffusion of a procedure, defined as the percentage of hospitals performing each specific laparoscopic procedure is shown in table 4. The diffusion of cystectomy (p<0.001), oophorectomy (p<0.001), EP (p=0.03), adhesiolysis (p<0.001) and laparoscopic treatment of endometriosis (p=0.004) increased significantly to respectively 95%, 98%, 94%, 96% and 90%, whereas the diffusion of LAVH (p<0.001) and myomectomy (p=0.01) increased significantly to 58% and 36% respectively. The diffusion of tubal surgery for infertility increased from 14% to 20%, however not significantly.

No hospital performed TLH or laparoscopic sacropexy in 2002.

The diffusion of diagnostic laparoscopic procedures, sterilization and tubal patency test was already widespread in 1994 and was complete (100%) in 2002.

A significant increase in diffusion of all level 2 procedures, except for tubal surgery for infertility was seen between 1994 and 2002. Except for LAVH (58%) and tubal surgery for infertility (20%), level 2 procedures were performed in nearly all hospitals in 2002 (between 90% and 98%). With the exception of laparoscopic

Table 4 | Diffusion: percentage of hospitals where procedures were performed

	1994[Jansen 1996]		2002			
	%	(n/n)	%	(n/n)	Δ	p*
Level 1						
Diagnostic laparoscopy	100	(118/118)	100	(75/75)	=	NS
Sterilization	100	(118/118)	100	(74/74)		=
NS						
Tubal patency test	98	(116/118)	100	(68/68)	+2	N
Level 2						
Cystectomy	62	(71/115)	95	(42/44)	+33	0.001
Oophorectomy	60	(68/114)	98	(49/50)	+38	<0.001
EP	83	(96/116)	94	(63/67)	+11	0.03
Endometriosis	64	(72/113)	90	(28/31)	+26	0.004
Adhesiolysis	71	(81/114)	96	(49/51)	+25	<0.001
Tubal surgery infertility	14	(16/114)	20	(16/82)	+4	NS
LAVH	16	(18/115)	58	(25/43)	+42	<0.001
Level 3						
Myomectomy	17	(19/114)	36	(13/36)	+19	0.01
TLH	–	–	–			
Sacropexy	–	–	–			

Δ = difference, * = Chi-square, NS = not significant, EP = ectopic pregnancy,
LAVH = laparoscopic-assisted vaginal hysterectomy, TLH = total laparoscopic hysterectomy

treatment of endometriosis and tubal surgery for infertility, the acceptance of level 2 procedures was significantly increased in 2002.

Of the level 3 procedures, TLH and laparoscopic sacropexy were not performed in 2002 in the responding hospitals. The diffusion of laparoscopic myomectomy increased significantly to 36% (p=0.01), whereas its acceptance per hospital remained very low (median: 0, range 0 – 4, table 3).

Discussion

Although the diffusion of these procedures has increased over the last decade, the acceptance is still limited, especially for LAVH and the more advanced laparoscopic procedures (level 3). The implementation of operative gynecological laparoscopy in The Netherlands seems to develop at a slow pace.

In 1998, 12% of all ovarian surgery (cystectomy and oophorectomy) and 28% of all surgery for EP's was performed laparoscopically in The Netherlands. [Brölmann 2001] In 2002 these numbers have rapidly expanded to respectively 69% and 40% for ovarian surgery (cystectomy and oophorectomy) and 71% for EP. The results of laparoscopic treatment of EP in our study can be compared to results of other studies, [Xiang 1999] although it has been described that over 90% of EP's can be treated laparoscopically. [Loh 2002] However, it can be debated whether 71% laparoscopic treatment of EP is acceptable or whether should be aimed for at least 90%.

Although LAVH is considered a level 2 procedure, its implementation is more difficult than the other level 2 procedures. In 1998, only 0.8% of all hysterectomies were performed laparoscopically [Brölmann 2001] and this percentage has significantly expanded to 4% in 2002 (p<0.001). As anticipated this increase was mainly at the expense of abdominal hysterectomies, whereas the percentage of vaginal hysterectomies remained practically unchanged. [Claerhout 2005] In some studies from laparoscopic centers an increase of LAVH up to 24% or 39% is shown. [Kives 2003, Garry 2005]

The performance of LAVH had spread since 1994, however this procedure is not performed in all hospitals in The Netherlands and the acceptance seems to be low. Since hysterectomy is the most frequent major surgical procedure performed by gynecologists, [Brölmann 2001] it is our opinion that every hospital should have the ability to offer their patients an L(AV)H. However, in this context it is debatable whether all gynecologists should be able to perform L(AV)H. It is our opinion that at least one gynecologist per hospital should be qualified to perform this procedure in order to create the situation of 'internal referral'. Like others, [Brölmann 2001,

Garry 2005] we found that of all hysterectomies performed in The Netherlands nearly half were performed vaginally. From this we conclude that lack of experience in vaginal hysterectomy is not the reason for the lack of uptake in LAVH.

Laparoscopy has developed into an important component of operative gynecology, however the implementation of advanced procedures into daily practice is shown to be difficult. [Banta 1993, Vondeling 1993, SAGES 1998, Loh 2002] Matters of concern are the more difficult procedures, such as laparoscopic myomectomy, tubal surgery for infertility and sacropexy. These procedures are performed only in tertiary centers or in specialized centers. Although tubal surgery for infertility is not considered a level 3 procedure according to the RCOG, [RCOG 2001] it can be compared to laparoscopic myomectomy and sacropexy, since it requires a much higher level of competence in laparoscopy in order to be completed successfully and has a high conversion rate in inexperienced hands. [Marret 2004] Considering the difficulty of these procedures, a referral system seems to be a better solution for these cases in order to ensure good outcomes and keep the complication rate low.

Despite the successful diffusion of the majority of operative laparoscopic procedures over the last decade, the limited acceptance nowadays shows that the implementation of operative gynecological laparoscopy, especially of the LAVH and the more advanced procedures is slow. Over the last decade non-surgical methods of managing benign gynecological disease were developed as an alternative for the operative approach, such as intra-uterine devices. The effects of these alternatives on the surgical approach, and therefore on the uptake of minimal invasive surgery is controversial. [Brölmann 2001, Garry 2005] Moreover, this subject is beyond the scope of this article and needs further study.

Previous study on the causes of the slow implementation of laparoscopy based on a questionnaire among gynecologists has shown that more emphasis should be placed on laparoscopic training for residents and gynecologists in practice. [Kolkman 2005] This present study highlights the importance of continuous analysis of the implementation of gynecological laparoscopy to assess the need for further stimulation of diffusion and acceptance at regional and (inter)national levels.