Surgical approach to hysterectomy and barriers to using minimally-invasive methods

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Article type : Short Communication

Surgical approach to hysterectomy and barriers to using minimally-invasive methods

Short title: Factors influencing hysterectomy choice

Word count: 1,530 (abstract 100w)

Keywords: hysterectomy, laparoscopy, surgical techniques, education, training,

Tables: 2

Figures: Nil

Abstract

Minimally-invasive approaches to hysterectomy have been shown to be safe, effective, and have recovery advantages over open hysterectomy, yet in Australia 36% of hysterectomies are still conducted by open surgery. In 2006, a survey of Australian gynaecological specialists found the main impediment to increasing laparoscopic hysterectomy to be a lack of surgical skills training opportunities. We resurveyed specialists to explore contemporary factors influencing surgeons' approach to hysterectomy; 258 (estimated ~19%) provided analysable responses. Despite >50% of surveyed specialists wishing to practise laparoscopic hysterectomy in future, lack of surgical skills, arising from the lack of training opportunities, remains the main impediment.

Introduction

Hysterectomy is the most common major gynaecological procedure (~30,000 conducted annually in Australia).[1] Benign conditions such as uterine fibroids, abnormal uterine

bleeding, and endometriosis account for 85%-90% of hysterectomies, with the remainder performed to prevent, or treat cancer.[2] Hysterectomy may be conducted by open surgery (total abdominal hysterectomy, TAH), vaginally (VH), by total laparoscopic hysterectomy (TLH), laparoscopic-assisted vaginal hysterectomy (LAVH), or Robotic Hysterectomy (RH).

In 2006, when <14% of hysterectomies in Australia were conducted laparoscopically, Englund and Robson surveyed the attitudes of obstetricians and gynaecologists (O&G) towards the use of laparoscopic hysterectomy; they found lack of experience and training, lack of hospital equipment, and lack of support from colleagues to be the main impediments to increased use of TLH.[3] Meanwhile, evidence of safety and effectiveness, patient-reported outcomes, and the economic benefits of laparoscopic hysterectomy has grown;[4-9] and the proportion of hysterectomies conducted in Australia laparoscopically has increased (~14% to ~38% for TLH/LAVH combined). The proportions of hysterectomies conducted by TAH has steadily decreased from over 50% in 2007, but still remains at 36%.[1, 10] By contrast, in the same period, minimally-invasive hysterectomy techniques have decreased TAH to 10-15% of hysterectomies in countries such as Finland, Slovakia and Poland.[11]

By re-surveying Australian O&G specialists, we aimed to explore whether changes had occurred in surgeons' procedural preferences, their self-rated surgical skills, or their perceptions of the facilitators and barriers to the use of TLH over the last ten years.

Materials and Methods

We conducted an online, anonymous survey of Australian and New Zealand O&G specialists.

Questionnaire development

We developed and iteratively refined the questionnaire using the literature, and interviews with ten Royal Australian and New Zealand College of Obstetrics and Gynaecology (RANZCOG) fellows. The questionnaire covered: (i) age, place of primary practice, health system (public, private, or both); (ii) usual (most often conducted), and preferred surgical approach for hysterectomy; (iii) surgical skills, training and mentoring; (iv) enablers and barriers that influence surgical approach; and (v) other comments.

Participants and recruitment

Participants were RANZCOG Fellows; workforce planning studies suggest that ~78% of the 1,700 fellows conduct operative gynaecology. Information about the survey was distributed

by email by RANZCOG to its fellows in July 2015; a reminder email was sent three weeks later. The survey, hosted on REDCap (Research Electronic Data Capture, Vanderbilt University) was open between July and November 2015.

Analysis

Factors influencing the preferred surgical approach to hysterectomy were analysed using Kruskall-Wallis (age), one-way ANOVA (surgical volume) or Fishers Exact tests (surgical skills, personal experience, surgical training, surgical trainee training, hospital support, anaesthetic support, nursing support, medical-legal issues, research evidence, best patient outcomes, and remuneration).

Self-rated skill (very high, high, moderate, minimal, do not perform) was summarised for each surgical technique. To provide a view of procedural skills across the entire cohort, responses were summarised irrespective which specific procedures the surgeons actually performed (i.e. including 'do not perform' responses in the denominator). Subsequently, responses were summarised for surgeons who actually performed each specific procedure, (i.e. excluding 'do not perform' responses in the denominator).

For factors associated with uptake of laparoscopic techniques, responses were dichotomised (barrier/no barrier) and summarised. Chi-squared statistics were used to compare barriers between the public and private health care systems. Median scores were calculated for the strengths of barriers on a scale of 1-3 (1 low, 2 moderate, and 3 substantial), and factors were grouped and tabulated by (i) hospital level, (ii) supporting staff; (iii) training and mentoring, and (iv) other.

Data were prepared and analysed using Stata 14/IC (Statacorp, College Station, TX). The study was approved by the University of Queensland Human Research Ethics Committee (approval number 2014001451) on 26 March 2014.

Results

Two hundred and eighty-seven doctors responded; 29 responses were excluded (27 did not perform hysterectomies, 2 provided insufficient data); 258 participants remained for analysis (an estimated 19% analysable response rate amongst operative gynaecologists), of whom 2 had missing preferred surgical approach data. Participants' median age was 52 years (range 31-81). Consistent with national workforce data, half of the participants worked in both public and private settings. The median number of hysterectomies completed by respondents

was 5 (IQR 3-8) per month and almost all (250/258, 96.9%) used laparoscopic surgical techniques for a range of gynaecological problems.

Factors influencing the choice of surgical approach

Table 1 summarises surgeons' preferred surgical approach to hysterectomy, with VH being the most commonly preferred among the respondents (109/256, 43%), followed by TLH (30%), TAH (14%), LAVH (12%) and RH (2%).

Surgeons who preferred TAH, VH or LAVH chose their surgical approach because it matches their surgical skills, personal experience or their personal surgical training. Additionally, surgeons with TAH as their most preferred surgical approach were also concerned about the surgical training of trainees and medico-legal pressures, but less concerned than other surgeons about research evidence or best patient outcomes. By contrast, achieving best patient outcomes was the main factor that influenced 94.8% of TLH surgeons in their choice of preferred surgical approach. Compared to surgeons with other preferred approaches, 45.5% of surgeons who preferred TLH, and 40.0% of surgeons who preferred RH reported that research evidence supported their preference (Table 1).

Self-rated procedural skills

Across the entire cohort, most respondents rated their own skill level as high or very high for TAH (215/258, 83.3%) and VH (188/258, 72.9%), with few surgeons (1.6% TAH and 6.2% VH) not performing these two approaches. In comparison, <40% of surgeons rated their own skills as high/very high with TLH or LAVH. When self-rated skills were examined among surgeons who actually perform each procedure, the proportion rating their own skills as high/very high was >60% across all procedures, except for RH 9/23 (39.1%) (Table 1).

Facilitators and Barriers to practising TLH

Facilitators and barriers were grouped by 'hospital level', 'supporting staff' and 'training and mentoring' (Table 2). In both the public and private systems, lack of own surgical skills was the dominant impediment to practising TLH, with most participants (public system 102/172, 59.3%; private system 97/171, 56.7%) rating it as a moderate-to-substantial impediment, followed by lack of surgical training for trainees, time pressure to finish cases, and poor surgical assistance, especially in public hospitals.

Barriers identified from free-text responses (categorised as 'other') related to lack of training and mentoring, and patient-related factors such as the challenges presented by women with very high BMI, large size of uterus, or complex pathology.

Discussion

We show that most Australian O&G specialists rate themselves as highly-skilled at conducting TAH and VH, and similar to countries, many prefer VH.[12] Only 40% reported they were highly-skilled at conducting hysterectomy laparoscopically, and over half of respondents wished to practise TLH in future but impediments included lack of surgical training opportunities, and systemic barriers such as time pressures; thus for some surgeons, in cases where VH may be unfeasible or unsafe, there may be no alternative but to conduct a TAH. These data suggest that surgeons who answered the survey were interested in additional training opportunities.

We acknowledge that only approximately one fifth of potentially eligible doctors opted to complete the survey. This level of response is not unusual for electronic surveys,[13] and for surveys of doctors, where lack of time and survey burden are well documented impediments to participation.[14] However, we acknowledge the potential for bias: TAH is more commonly performed than TLH or LAVH in Australia (rates of 17.9, 7.7, and 8.2 per 10,000 women respectively),[10] but in this survey the proportion of respondents who preferred TAH was lower (14%) than those who preferred LAVH or TLH (42%). The survey was likely completed by those with an interest in the topic. For these reasons, we do not claim that the sample is representative of the entire RANZCOG cohort, or draw conclusions beyond those surveyed; rather, in the context of the persisting high rates of TAH,[1] we offer the results as an indication that impediments to change previously identified by Englund and Robson may still remain.

Elsewhere, systematic training has been shown to translate into changes in surgical practice: In Finland by 2006, only 24% of all hysterectomies were performed by TAH (from 58% in 1996). In parallel, the rate of surgical complications decreased significantly.[17, 18] At The Ottawa Hospital, Canada, the proportion of minimally-invasive hysterectomies for benign disease rose from 40.1% in 2005 to 72.2% in 2012.[19] At Newton-Wellesley Hospital, USA, in 2004 minimally-invasive techniques were used for only 8% of hysterectomies for benign conditions; through training and mentoring, the proportion increased to 93% by 2012.[20] In our cohort, most respondents reported that they conduct procedures laparoscopically, suggesting they have general skills which could be extended to TLH with

further training. While RANZCOG trainees may receive adequate training in TAH and VH, exposure to TLH may be more limited.[15, 16] Other barriers reported by the survey participants were systems–based such as time pressure, operating theatre session availability, costs of consumables, and long waiting lists.

Conclusions

Internationally, systematic training and mentoring programs have successfully increased the use of minimally-invasive surgical approaches, and reduced the use of open surgery. While our results may not be generalizable, it may be the case that the limited opportunity for surgeons to gain new procedural skills remains the primary impediment to achieving similar changes in Australia.

Funding

The study received (competitive, externally peer reviewed) funding from the Australian Centre for Health Services Innovation (AusHSI, grant SG0015-000486). The funder played no part in the conduct of the research, or in writing of the paper.

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Table 1. Influences on preferred surgical technique and self-rated skills level

	Preferred surgical technique (n=256)				
Influences	TAH (n=35; 14%)	VH (n=109; 42%)	LAVH (n=30; 12%)	TLH (n=77; 30%)	RH (n=5; 2%)
Age in years (median, IQR)*	57 (45–67)	54 (48-59)	60 44-64)	48 (41-55)	44 (44-49)
Surgical volume/month (mean, SD)*	1.7 (1.47)	2.5 (2.61)	2.2 (1.53)	2.9 (3.43)	6.5 (7.16)
Reasons for preferring[†]					
Surgical skills	31 (88.6%)	87 (79.8%)	26 (86.7%)	52 (67.5%)	4 (80.0%)
Wealth of personal experience**	21 (60.0%)	70 (64.2%)	17 (56.7%)	32 (41.6%)	2 (40.0%)
Personal surgical training	25 (71.4%)	80 (73.4%)	19 (63.3%)	45 (58.4%)	4 (80.0%)
Surgical trainee training	9 (25.7%)	20 (18.4%)	1 (3.3%)	17 (22.1%)	1 (20.0%)
Hospital admin support	1 (2.9%)	6 (5.5%)	3 (10.0%)	3 (3.9%)	1 (20.0%)
Anaesthetic support	3 (8.6%)	9 (8.3%)	3 (10.0%)	7 (9.1%)	1 (20.0%)
Nursing support	0 (0%)	5 (4.6%)	3 (10.0%)	6 (7.8%)	1 (20.0%)
Medico-legal pressures**, [#]	5 (14.3%)	2 (1.8%)	2 (6.7%)	0 (0%)	0 (0%)
Research evidence*	1 (2.9%)	39 (35.8%)	8 (26.7%)	35 (45.5%)	2 (40.0%)
Best patient outcomes*	6 (17.1%)	76 (69.7%)	18 (60.0%)	73 (94.8%)	2 (40.0%)
Remuneration	0 (0%)	0 (0%)	0 (0%)	4 (5.2%)	0 (0%)
Other	2 (5.7%)	2 (1.8%)	4 (13.3%)	2 (2.6%)	1 (20.0%)

Self-rated skill level	**Surgical technique**				
Among Entire cohort	TAH	VH	LAVH	TLH	RH
Very high	90 (34.9%)	96 (37.2%)	35 (13.6%)	42 (16.3%)	3 (1.2%)
High	125 (48.4%)	92 (35.7%)	66 (25.6%)	43 (16.7%)	6 (2.3%)
Moderate	39 (15.1%)	49 (19.0%)	50 (19.4%)	35 (13.6%)	3 (1.2%)
Minimal	0 (0%)	4 (1.6%)	17 (6.6%)	21 (8.1%)	11 (4.3%)
Do not perform	4 (1.6%)	16 (6.2%)	88 (34.1%)	115 (44.6%)	232 (89.9%)

Not answered	0 (0%)	1 (0.4%)	2 (0.8%)	2 (0.8%)	3 (1.2%)
Among those who perform	TAH (n=154)	VH (n=241)	LAVH (n=168)	TLH (n=141)	RH (n=23)
Very high	90 (58.4%)	96 (39.8%)	35 (20.8%)	42 (29.8%)	3 (13.0%)
High	25 (16.2%)	92 (38.2%)	66 (39.3%)	43 (30.5%)	6 (26.1%)
Moderate	39 (23.3%)	49 (20.3%)	50 (29.8%)	35 (24.9%)	3 (13.0%)
Minimal	0 (0%)	4 (1.7%)	17 (10.1%)	21 (14.9%)	11 (47.8%)

*p<0.001; **p<0.05; #missing data for n=2; †considering their most preferred approach, surgeons were asked to select all reasons for their preference

Table 2. Perceived barriers to practising TLH in the public and private systems

	Public system				**Private system**			
	Barrier				Barrier			
Hospital level	Respondents	yes	no	Strength†	Respondents	yes	no	Strength†
Hospital surgical outcome monitoring	153 (80.1%)	33 (21.5%)	120 (78.4%)	2	157 (82.2%)	22 (14.0%)	135 (86.0%)	2
Insufficient OT sessions*	158 (82.7%)	72 (45.6%)	86 (54.4%)	2	162 (84.8%)	27 (16.7%)	135 (83.3%)	1
Time pressures to finish on time**	160 (83.8%)	89 (55.6%)	71 (44.4%)	2	165 (86.4%)	54 (32.7%)	111 (67.3)	1
Long surgical waiting lists*	160 (83.8%)	64 (40.0%)	96 (60.0%)	2	163 (85.3%)	15 (9.2%)	148 (90.8%)	1
Lack of appropriate equipment**	160 (83.8%)	72 (45.0%)	88 (55.0%)	2	166 (86.9%)	37 (22.3%)	129 (77.8%)	1
Cost of surgical consumables**	160 (83.8%)	65 (40.6%)	95 (59.4%)	1	165 (86.4%)	33 (20.0%)	132 (80.0%)	1
Supporting staff								
Lack of anaesthetic support**	157 (82.2%)	33 (21.0%)	124 (79.0%)	1	163 (85.3%)	10 (6.1%)	153 (93.9%)	2
Poor surgical assistants**	160 (83.8%)	93 (58.1%)	67 (41.9%)	2	165 (86.4%)	62 (37.6%)	103 (62.4%)	1
Lack of theatre nursing support**	160 (83.8%)	69 (43.1%)	91 (56.9%)	1	166 (86.9%)	42 (25.3%)	124 (74.7%)	1
Training and mentoring								
Lack of own surgical skills	172 (90.1%)	102 (59.3%)	70 (40.7%)	2.5	171 (89.5%)	97 (56.7%)	74 (43.3%)	3

Burden to others while learning	156 (81.7%)	63 (40.4%)	93 (59.6%)	2	157 (82.2%)	63 (40.1%)	94 (59.9%)	2
Lack of surgical training for trainees**	157 (82.2%)	84 (53.5%)	73 (46.5)	2	125 (65.5%)	39 (31.2%)	86 (68.8%)	2
Lack of surgical mentoring	157 (82.2%)	79 (50.3%)	78 (49.7%)	2	153 (80.1%)	66 (43.1%)	87 (56.9%)	2
Other	78 (40.8%)	22 (28.2%)	56 (71.8%)	3	81 (42.4%)	15 (18.5%)	66 (81.5%)	2

p-values represent differences in proportions between public and private systems; *p<0.001; **p<0.05; †Median on scale 1=low, 2=moderate; 3=substantial;