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Original Article

Trends in the Implementation of Advanced Minimally Invasive Gynecologic Surgical Procedures in The Netherlands

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ABSTRACT **Study Objectives:** To assess the implementation of advanced laparoscopic gynecologic surgical procedures, assess the number of gynecologists performing these procedures, and highlight the distribution of surgical approaches to hysterectomy.
Design: Observational multicenter study.
Design Classification: Canadian Task Force classification II-2.
Setting: All hospitals in The Netherlands.
Sample: Minimally invasive surgical procedures performed in all 90 hospitals in the year 2012, and the number of gynecologists performing these procedures. Data were compared with national surveys conducted in 2002 and 2007.
Interventions: The number of advanced laparoscopic gynecologic procedures, the number of gynecologists performing these procedures, and the distribution of approaches to hysterectomy were collected through a Web-based questionnaire.
Measurements and Main Results: The response rate was 96% (86 of 90 hospitals). A total of 4979 advanced laparoscopic gynecologic procedures were performed in 2012 (mean per hospital, 58; median, 50.5; SD, 44.4), which is a significant increase over 2007 (95% CI, 30.3–46.5; $p < .001$). The proportion of laparoscopic hysterectomy increased from 3% in 2002 to 10% in 2007 and to 36% in 2012. The proportions of abdominal hysterectomy (68% in 2002, 54% in 2007, and 39% in 2012) and vaginal hysterectomy (29% in 2002, 36% in 2007, and 25% in 2012) decreased significantly. However, approximately 37% of gynecologists ($n = 76$) and 12% of hospitals ($n = 9$) performed fewer than 20 advanced laparoscopic procedures (level 3 and level 4) annually.
Conclusions: Implementation of advanced laparoscopic gynecologic procedures has accelerated tremendously in the last decade, owing mainly to the increased number of laparoscopic hysterectomies. A significant shift has occurred from abdominal and vaginal hysterectomies toward a laparoscopic approach. The vaginal hysterectomy should be brought back in focus, to prevent the deterioration of skills needed to perform this least invasive approach. Furthermore, the introduction of case volume as quality assessment is sure to have consequences for daily gynecologic surgical practice in The Netherlands. Journal of Minimally Invasive Gynecology (2015) 22, 642–647 © 2015 AAGL. All rights reserved.

Keywords: Gynecology; Hysterectomy; Implementation; Laparoscopy; Surgical volume

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Transparency and improvement of quality and safety in healthcare have generated considerable worldwide attention in recent years. To gain insight into doctors' performance, a growing social demand has been observed from insurance companies and governmental associations, as well as from the patient's perspective.

Given that laparoscopy is being increasingly applied to a broader palette of gynecologic surgical procedures and thus is indispensable to the current daily practice of the gynecologic surgeon, growing emphasis is being placed on the quality assessment of these minimal invasive techniques. In highly complex surgery, for example, patient safety issues and outcome measurements are directly connected to case volume and hospital volume. Furthermore, surgeon case

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volume has served as a quality measurement tool for several years now [1,2]. The assumption that higher case volume is associated with better patient outcomes in a variety of complex surgical procedures is frequently supported in the literature [1,3,4]. In addition, the Dutch Health Care Inspectorate expressed concerns about low volume and highly complex procedures and urgently demanded case volume as quality assessment for these procedures [5].

As the laparoscopic approach gains popularity and gynecologic surgeons' laparoscopic skills improve, there is an ongoing shift in surgical indications in the minimally invasive approach. Therefore, the demand for volume has also entered the field of advanced laparoscopic gynecologic surgery. In this context, a minimum annual volume of 20 procedures is mentioned; however, there remain no conclusive data on the association between higher case volume and improved surgical outcomes in the field of advanced laparoscopic gynecologic surgery, and thus the optimal case volume is only speculative [6]. Furthermore, there is ongoing debate regarding centralization and the maximum possible number of gynecologists performing these advanced laparoscopic procedures to maintain their surgical skills with an adequate case volume.

To make valid decisions regarding this subject, reliable data are needed to provide insight into the current case volume and, no less importantly, the number of gynecologists performing these procedures. At the same time, there is growing international concern about an undesired shift in the approach of vaginal hysterectomy (VH) to laparoscopic hysterectomy (LH), because VH remains the first-choice method for benign indications [7,8]. Currently, conclusions regarding the national exposure of advanced laparoscopy and the distribution of approaches to hysterectomy in The Netherlands are based on data from 2007 [9].

On these grounds, the aim of the present study was to assess the current state of advanced laparoscopic gynecologic surgery, the number of gynecologists and hospitals performing these laparoscopic procedures, and the distribution of the surgical approaches to hysterectomy, to analyze the possible practical consequences of an increasing demand for high-volume surgeons.

Materials and Methods

In 2013, a Web-based questionnaire was sent to all hospitals in The Netherlands containing questions about the number of advanced laparoscopic procedures performed in 2012 and the number of gynecologists performing these procedures. The data were extracted from the local electronic database or from the theatre lists. In addition, the annual report of each hospital was obtained to double-check the provided data. The laparoscopic procedures were classified by 4 levels of difficulty according to the internationally introduced classification [10]. Levels 3 and 4 are considered advanced laparoscopic procedures (level 3: hysterectomy, myomectomy, extensive adhesiolysis, and severe endometriosis; level 4: sacrocolpopexy, lymphadenectomy, and rectovaginal endometriosis). The questionnaire also included questions about the number of procedures performed using robotic surgery. Furthermore, the numbers of abdominal hysterectomies (AHs) and VHs for benign indications and endometrial cancer were collected to detect a possible shift in approach. VHs involving pelvic organ prolapse were excluded. In addition, the number of abdominal sacrocolpopexy procedures was requested as well.

To increase the response rate, 2 reminder e-mails were sent after 8 weeks and 12 weeks, and follow-up calls were made. The collected data were compared with previous data obtained from 2002 and 2007 [9,11].

The percentages of hospitals in which the different types of laparoscopic and robotic procedures are performed were determined. Subgroup analysis was performed with respect to teaching hospitals (both academic and nonacademic) and nonteaching hospitals. Furthermore, the mean numbers, median, minimum, maximum and standard deviation (SD) of procedures performed per hospital were determined, including only the hospitals in which procedures were performed. To compare the absolute total number of advanced procedures performed in 2007 and in 2012, a subcalculation was done including only the hospitals that provided data in both years. In addition, the number of gynecologists performing each procedure was collected, to calculate the mean number of annually performed advanced procedures per gynecologist and per hospital. The number of procedures were stratified by volume into 3 groups: low volume (<20 procedures), medium volume (20–59 procedures), and high volume (≥ 60 procedures). The percentages of the different approaches to hysterectomy and sacrocolpopexy were determined.

Statistical analyses were performed using SPSS version 20.0 (IBM, Armonk, NY). The paired t test was used to assess the significance of differences in the total number of procedures for 2007 and 2012 and to calculate the 95% confidence intervals (CIs) of these differences. The χ^2 test and Fisher's exact test were used to calculate the differences in hysterectomy techniques in 2002, 2007, and 2012 and the differences between teaching and nonteaching hospitals. Here p values $<.05$ were considered statistically significant.

Results

Advanced Laparoscopic Procedures

Of the 90 hospitals in The Netherlands, 86 (96%) provided the requested data on the procedures performed in 2012 and the number of performing gynecologists. The distribution of the responding hospitals was 52% teaching (45 of 86) and 48% nonteaching (41 of 86), which reflects the national distribution in The Netherlands (50% teaching and 50% nonteaching).