

## Special Article

# The Importance of Analyzing and Standardizing Surgical Methods

Michael Stark, MD\*, S. Gerli, MD, and G. C. Di Renzo, MD, PhD

*From the New European Surgical Academy (NESA) and the HELIOS Hospital Group, Berlin, Germany (Dr. Stark), and the Department of Obstetrics and Gynecology, University Hospital Monteluce, Perugia, Italy (Drs. Gerli and Di Renzo).*

**ABSTRACT** The outcome of operations performed in different institutions or by different surgeons can hardly be compared if the operative methods are not standardized. Six different vaginal hysterectomy methods were studied. The steps common in all of them were defined. These steps were analyzed for optimal performance and sequence during the operation. The resultant modified method was subjected to a prospective randomized study, which showed that the operation time and the need for pain drugs were reduced. This method was introduced to several departments in different countries. The optimization and standardization of surgical methods are expected not just to improve the postoperative outcome, but also to enable a comparison between different departments and surgeons. *Journal of Minimally Invasive Gynecology* (2009) 16, 122–125 © 2009 AAGL. All rights reserved.

**Keywords:** Vaginal hysterectomy; Surgery; Hysterectomy; Vaginal surgery; Vaginal prolapse; Surgical technique; Surgical method

The comparison of operations in different hospitals is difficult not just because of the variations in the data collected, but also because of differences in surgical methods used and different protocols concerning perioperative treatment. Local traditions are among the major obstacles for progress in surgery. Many operative methods are based on local routines that were never subjected to evidence-based studies. For example, the Pfannenstiell incision, which was introduced in 1897 [1], was subjected only 74 years later to a comparative study with the longitudinal incision [2].

Despite advantages in endoscopic hysterectomy and laparoscopic-assisted vaginal hysterectomy [3–6], the traditional vaginal hysterectomy will keep its place in the repertoire of any gynecologic department because of the associated quick recovery, lack of abdominal scar, and short hospital stay [7,8]. It is forecasted that the laparoscopic-assisted vaginal hysterectomy will not replace the vaginal, but rather the abdominal hysterectomy [9,10].

With advanced experience gained, gradually less contraindications exist for vaginal hysterectomy.

Every step in each operation should have a definite purpose and its optimal way of performance. For this very

reason, to define the optimal way to perform vaginal hysterectomy, we compared commonly used vaginal hysterectomy methods for their different steps and sequences.

The optimization and standardization of surgical methods would improve the postoperative outcome, but also would enable a comparison between different departments and surgeons.

A study was conducted to find out whether a designed operative method using only the essential operative steps would influence the outcome.

## Material and Methods

Six vaginal hysterectomy methods in use (Chicago, Falk, Joel-Cohen, Porges, von Theobald, and Heaney) were analyzed [8,11–16]. Each step in these methods was examined for performance and timing during the operation. It was shown that the number of common steps considered essential by all authors was 11.

We evaluated these steps and found that 2 of them, the closure of the peritoneum and the cutting of the sacrouterine ligaments, as separate steps, were superfluous. Evidence exists that suturing peritoneum in vaginal hysterectomy is not necessary and leaving it open even has beneficial effects on the bowel function [17], and cutting of the sacrouterine ligaments as a separate step is time-consuming without benefits. Therefore, these 2 steps were eliminated, and the intentional nonclosure of the peritoneum was considered as 1 step (leaving the opportunity for repair of an enterocele, if indicated, in this stage). These 10 steps, their optimal performance, their logical sequence, and the instruments needed were defined as follows:

---

The authors have no commercial, proprietary, or financial interest in the products or companies described in this article.

Corresponding author: Michael Stark, MD, The New European Surgical Academy, Karower Str. 11/214, 13125 Berlin, Germany.

E-mail: mstark@nesacademy.org

Submitted July 31, 2008. Accepted for publication November 6, 2008.

Available at [www.sciencedirect.com](http://www.sciencedirect.com) and [www.jmig.org](http://www.jmig.org)

1. Circular incision around the cervix (in case of prolapse a droplike incision starting under the urethra encircling the uterine cervix).  
Instruments: speculum, 2 single-toothed tenaculi, scalpel, surgical forceps.
2. The detachment of the bladder from the uterus.  
Instruments: Allis clamp, scalpel, optionally scissors.
3. Opening the posterior peritoneum as a standard (opening the anterior peritoneum might result in damage to the bladder mainly after previous operations).  
Instruments: surgical forceps, scissors.
4. Dissection of the lower part of the uterus. This is done by placing 1 blade of an open clamp under the insertion of the sacrouterine ligament while rotating the uterus toward the instrument and at the same time contrarotating the clamp and closing it. After cutting the ligaments with scissors any uterus will descend. Thereafter the stumps are ligated and the whole length of the suture material is kept for their ligation at the end of the operation.  
Instruments: Wertheim or Heaney clamp, needle holder, surgical forceps, scissors, 2 sutures.
5. Cutting and ligating the uterine arteries.  
Instruments: Wertheim or Heaney clamp, needle holder, scissors, 2 sutures.
6. Descending the uterus and opening the anterior peritoneum by pulling down the uterus continuously while rotating it slowly. At the same time the right index and middle fingers are inserted beyond the fundus to lift the anterior peritoneum, which is opened under vision.  
Instruments: scissors.
7. Dissection of the upper part of the uterus (and appendages if indicated), placing ligature laterally first and transfixion suture medial to it to prevent bleeding into the parametrium should the needle cut a blood vessel.  
Instruments: Wertheim or Heaney clamp, scissors, needle holder, surgical forceps, 4 sutures.
8. The “nonstage”–leaving peritoneum open [17–20]. If enterocoele is to be prevented or repaired, it should be done now.
9. Reconstruction of the pelvic floor by binding the right and left ligaments (from stage 4) to each other.  
Instruments: scissors, needle holder, surgical forceps, optionally 1 suture.
10. Closing the vaginal wall continuously (recommended transversely in sexually active women).  
Instruments: Allis clamp, needle holder, surgical forceps, 1 suture.

As this method was not performed before, it is mandatory to find out whether this method is feasible, and if so, its outcome.

To avoid complexity this operation was compared with 1 method only, the Heaney method, which is very commonly in use. The differences between the Heaney method and the 10-step vaginal hysterectomy are as follows:

In the Heaney method, first the anterior peritoneum is opened (the posterior only in case of difficulties). In case of prolapse the vaginal mucosa is separated with an inverted T incision and the anterior repair, including the removal of the excess vaginal mucosa, is postponed until the uterus is removed. The sacrouterine ligaments and the lower part of the broad ligaments are clamped and sutured separately. After the removal of the uterus a suture is passed through the anterior vaginal cuff to pick up the anterior fold of the peritoneum. The peritoneum is closed and the broad and sacrouterine ligaments are fixed to the vaginal vault. Both sacrouterine ligaments are tied together to obliterate the cul-de-sac and the rest of the vaginal vault is closed with interrupted sutures [16].

The evaluation of the data was done using software (SPSS for Windows SPSS Inc., Chicago, IL). Frequencies and standard differences were calculated as mean variations. The  $\chi^2$  analysis was used. In this study other parameters like blood loss or time of return to normal activities were not considered.

### Results

A prospective randomized study was performed at the University Hospital of Perugia, Italy. After the introduction and demonstration of the method, 44 women underwent the 10-step vaginal hysterectomy and were compared with 52 women who underwent the Heaney method. For simplicity it was decided to use only 1 method in the control group to prevent heterogeneity.

Both the operation time and the need for pain drugs were significantly reduced in the women who underwent the modified operation ( $p < .05$ ) (Table 1) [21]. No significant difference existed in either group concerning age or duration of hospital stay.

Thereafter, this method was introduced by lectures and demonstrations in other hospitals, such as the University Hospital in Vienna, Austria; the University Hospital of Rotterdam, the Netherlands; the University Hospital in Adana, Turkey; the University Hospital of Zurich, Switzerland; and hospitals in Slovakia, Italy, Brazil, and Germany, mostly with high acceptance. This operation was performed in the City Hospital of Bruchsal, Germany, during the Women’s

Table 1  
Review of a study done at the University Hospital of Perugia, Italy, involving 96 women [21]

	Heaney method	10-Step vaginal hysterectomy
	(52 women)	(44 women)
	Median (25th–75th percentile)	Median (25th–75th percentile)
Age (yrs)	61.6 (46–75.9)	66.2 (53–77)
Operation time (min)	52.3 (23.3–90)	34.1 (20.5–50)
Pain drugs needed (hrs)	48.7 (19–86)	29.6 (8–75)
Average hospital stay (days)	5.8 (4–8)	5.9 (4–8)

Health in International Development Conference with the participation of African gynecologists from Cameroon and Burkina Faso, who transferred this method to their countries. A DVD recording of a live operation was produced during the conference and was distributed in several countries.

The method was recently introduced to 9 of the gynecologic departments at the HELIOS Hospitals in Germany. Between January and July 2008, 303 10-step vaginal hysterectomies were performed in these departments compared with 305 traditional operations in 6 other departments. There is still no long-term follow-up, but in these departments the mean operation time was 48.2 minutes compared with 70.6 minutes in the departments that did not use this method ( $p < .05$ ).

## Discussion

Each operation is composed of various steps. These should have a defined purpose and an optimally defined way of performance. For various reasons such as strong hierarchical structures in hospitals, fear of failure, and adherence to traditions, the ways of performing operations do not change. Many department heads introduced their own modifications to surgical procedures, and departments exist where operations continue to be performed exactly the way they were first described and transferred from one generation to the next.

To allow the comparison of the outcome of surgical procedures we have introduced the Misgav Ladach method [22], an optimized cesarean section, which is the only elective abdominal operation without any alternative at a time that the cesarean section rate is increasing worldwide [23–26]. This modified operation was introduced to 19 obstetric departments of the Helios Hospital Group after several peer-reviewed studies proved its advantages [27–30]. The implementation of this method in the Helios departments ranged between 68.9% and 100% with an average of 85.6% (January–March 2008). Performing operations with exactly the same proved optimal methods enables surgeons and departments to compare their results concerning febrile morbidity, operation time, and the duration of required pain drugs with others. Clinical studies should always take into account early (eg, febrile morbidity, needed analgesics) and late (adhesions, life quality) outcomes.

Studies that compared the outcome of the vaginal hysterectomy with the abdominal or laparoscopic-assisted vaginal hysterectomy concluded that the vaginal hysterectomy provided better patient outcomes, a lower complication rate, and lower costs [10,31,32]. More bladder injuries were reported in laparoscopic-assisted vaginal hysterectomy than in vaginal hysterectomy [32].

Very few studies have examined the outcome of vaginal hysterectomy in relation to the single steps [33,34]. It was shown, for example, that leaving the peritoneum open did not change any of the operative or postoperative parameters except the mentioned benefit on bowel function [17].

Advantages were reported when a mass closure of the vaginal cuff was performed [34]. This method takes into account not only anatomic issues but also the up-to-date physiologic know-how (leaving the peritoneum open).

As surgeons in gynecologic departments of different hospitals are now using the same surgical method, a chance is given to compare quality and results between surgeons and departments. New horizons are opened once a surgical method has proved to be optimal and becomes a standard.

## Conclusion

A long-term follow-up such as for vault prolapse is still needed. We believe, however, that the 10-step vaginal hysterectomy is an optimal method that should be distributed and studied. Other operations should be subjected to a similar analysis toward the standardization of optimized surgical methods, which will allow metaanalysis and enable the objective comparison of surgical outcome.

## References

1. Pfannenstiel J. On the advantages of a transverse cut of the fascia above the symphysis for gynecological laparotomies, and advice on surgical methods and indications. *Samml Klin Votr Gynäkol.* 1897;68:98.
2. Mowat J, Bonnar J. Abdominal wound dehiscence after cesarean section. *Br Med J.* 1971;2:256–257.
3. Everett RB. Laparoscopic assisted vaginal hysterectomy: a report of 26 cases. *J Okla State Med Assoc.* 1993;86:487–491.
4. Stanojević D, Šćepanović R, Perunović R, et al. Advantages of laparoscopically assisted vaginal hysterectomy in comparison with the traditional approach. *Acta Chir Jugosl.* 1997–1998;44–45:49–51.
5. Copăescu C, Munteanu R, Iosifescu R, et al. Laparoscopic hysterectomy. *Chirurgia (Bucur).* 2007;102:161–167.
6. Karaman Y, Bingol B, Günenç Z. Prevention of complications in laparoscopic hysterectomy: experience with 1120 cases performed by a single surgeon. *J Minim Invasive Gynecol.* 2007;14:78–84.
7. Cravello L, Bretelle F, Cohen D, et al. Vaginal hysterectomy: apropos of a series of 1008 interventions. *Gynecol Obstet Fertil.* 2001;29:288–294.
8. Kalogirou D, Antoniou G, Zioris C, et al. Vaginal hysterectomy: technique and results in the last twenty years. *J Gynecol Surg.* 1995;11:201–207.
9. Claeerhout F, Deprest J. Laparoscopic hysterectomy for benign diseases. *Best Pract Res Clin Obstet Gynaecol.* 2005;19:357–375.
10. American College of Obstetricians and Gynecologists. Appropriate use of laparoscopically assisted vaginal hysterectomy. *Obstet Gynecol.* 2005;105:929–930.
11. Leodolter S. The transvaginal surgical school in Austria: retrospect-present-future. *Gynakol Geburtshilfliche Rundsch.* 1995;35:142–148.
12. Falk HC, Soichet S. The technique of vaginal hysterectomy. *Clin Obstet Gynecol.* 1972;15:703–754.
13. Joel-Cohen SJ. Abdominal and Vaginal Hysterectomy. New Techniques Based on Time and Motion Studies. London: William Heinemann; 1972.
14. Paldi E, Filmar S, Naiger R, et al. Vaginal hysterectomy using the Porges method: report on 100 cases. *J Gynecol Obstet Biol Reprod (Paris).* 1988;17:233–236.
15. Von Theobald P. Simplified vaginal hysterectomy. *J Chir (Paris).* 2001;138:93–98.
16. Heaney NS. Vaginal hysterectomy—its indications and technique. *Am J Surg.* 1940;56:284–288.
17. Janschek EC, Hohlagschwandtner M, Nather A, et al. A study of nonclosure of the peritoneum at vaginal hysterectomy. *Arch Gynecol Obstet.* 2003;267:213–216.

18. Stark M. Clinical evidence that suturing the peritoneum after laparotomy is unnecessary for healing. *World J Surg.* 1993;17:419.
19. Lipscomb GH, Ling FW, Stovall TG, et al. Peritoneal closure at vaginal hysterectomy: a reassessment. *Obstet Gynecol.* 1996;87:40–43.
20. Royal College of Obstetrics and Gynecology. Peritoneal Closure Guideline No. 15. London: Royal College of Obstetrics and Gynecology; 2002.
21. Stark M, Gerli S, Di Renzo GC. The ten-step vaginal hysterectomy. *Prog Obstet Gynaecol.* 2006;17:358–368.
22. Holmgren G, Sjöholm L, Stark M. The Misgav Ladach method for cesarean section: method description. *Acta Obstet Gynecol Scand.* 1999; 78:615–621.
23. Villar J, Valladares E, Wojdyla D, et al. Cesarean delivery rates and pregnancy outcomes: the 2005 WHO global survey on maternal and perinatal health in Latin America. *Lancet.* 2006;367:1819–1829.
24. Martin JA, Kung HC, Mathews TJ, et al. Annual summary of vital statistics: 2006. *Pediatrics.* 2008;121:788–801.
25. Usha Kiran TS, Jayawickrama NS. Who is responsible for the rising cesarean section rate? *J Obstet Gynaecol.* 2002;22:363–365.
26. Dinas K, Mavromatidis G, Dovas D, et al. Current cesarean delivery rates and indications in a major public hospital in northern Greece. *Aust N Z J Obstet Gynaecol.* 2008;48:142–146.
27. Kulaš T, Habek D, Karša M, et al. Modified Misgav Ladach method for cesarean section: clinical experience. *Gynecol Obstet Invest.* 2008;65: 222–226.
28. Björklund K, Kimaro M, Urassa E, et al. Introduction of the Misgav Ladach cesarean section at an African tertiary center: a randomized controlled trial. *BJOG.* 2000;107:209–216.
29. Messalli EM, Cobellis L, Pierno G. Cesarean section according to Stark. *Minerva Ginecol.* 2001;53:367–371.
30. Nabhan AF. Long-term outcomes of two different surgical techniques for cesarean. *Int J Gynaecol Obstet.* 2008;100:69–75.
31. Campbell ES, Xiao H, Smith MK. Types of hysterectomy: comparison of characteristics, hospital costs, utilization and outcomes. *J Reprod Med.* 2003;48:943–949.
32. Meikle SF, Nugent EW, Orleans M. Complications and recovery from laparoscopy assisted vaginal hysterectomy compared with abdominal and vaginal hysterectomy. *Obstet Gynecol.* 1997;89:304–311.
33. Kudo R, Yamauchi O, Okazaki T, et al. Vaginal hysterectomy without ligation of the ligaments of the cervix uteri. *Surg Gynecol Obstet.* 1990;170:299–305.
34. Miskry T, Magos A. Mass closure: a new technique for closure of the vaginal vault at vaginal hysterectomy. *Br J Obstet Gynaecol.* 2001; 108:1295–1297.