International Journal of Women's Health

Dovepress
open access to scientific and medical research

Open Access Full Text Article

ORIGINAL RESEARCH

Incidence of and risk factors for febrile morbidity after laparoscopic-assisted vaginal hysterectomy

This article was published in the following Dove Press journal:
International Journal of Women's Health
8 April 2014
Number of times this article has been viewed

Iyara Wongpia
Jadsada Thinkhamrop
Kanok Seejorn
Pranom Buppasiri
Sanguanchoke Luanratanakorn
Teerayut Temtanakitpaisan
Kovit Khampitak

Department of Obstetrics and Gynecology, Faculty of Medicine, Khon Kaen University, Khon Kaen, Thailand

Background: The purpose of this study was to assess the incidence of and risk factors for postoperative febrile morbidity after laparoscopic-assisted vaginal hysterectomy (LAVH).

Methods: This retrospective study was carried out using the medical records of women with benign gynecologic conditions who underwent LAVH between June 2007 and May 2012 at Srinagarind Hospital in Thailand. Data were collected to assess baseline patient characteristics, occurrence of body temperature ≥38°C on two occasions at least 6 hours apart in the 24 hours following the surgical procedure, and possible risk factors related to postoperative febrile morbidity.

Results: In total, 199 women underwent LAVH during the study period. They had a mean age of 46±6 years, a mean body mass index of 24.0±3.2 kg/m^2, a mean surgical duration of 134±52 minutes, median estimated blood loss of 200 mL, a mean total hospital stay of 5±2 days, and a mean postoperative hospital stay of 3±2 days. Postoperative febrile morbidity was documented in 31 cases (15.6%). The cause of postoperative fever was unknown in most cases, with only two cases having an identifiable cause. The risk of postoperative febrile morbidity was highest in women treated with more than two antibacterial agents and with a regimen of more than 3 days.

Conclusion: This study shows a moderately high rate of febrile morbidity after LAVH, for which the main risk factors were use of multiple drugs and doses for antibiotic prophylaxis.

Keywords: laparoscopic-assisted vaginal hysterectomy, febrile morbidity, incidence, risk factors

Introduction

Laparoscopic-assisted vaginal hysterectomy (LAVH) is increasingly being accepted and has become a popular alternative to total abdominal hysterectomy, because it is associated with less postoperative pain, a shorter hospital stay, and less time until return to work. Furthermore, LAVH does not increase intraoperative or postoperative complications and is comparable with total abdominal hysterectomy cost-wise.[1–3] The most common morbid event after hysterectomy is infection. Based on more than 30 randomized controlled trials and two meta-analyses, the American College of Obstetricians and Gynecologists recommends use of antibiotic prophylaxis to reduce postoperative infectious morbidity only for vaginal hysterectomy and total abdominal hysterectomy.[4] However, the evidence for antibiotic prophylaxis in LAVH is still limited.

LAVH seems to cause less tissue trauma and less contamination than total abdominal hysterectomy. It has been reported that antibiotic prophylaxis reduces

Correspondence: Jadsada Thinkhamrop
Department of Obstetrics and Gynecology, Faculty of Medicine, Khon Kaen University, Khon Kaen, Thailand 40002
Email jadsada@kku.ac.th

the risk of postoperative febrile morbidity after LAVH, abdominal hysterectomy, or vaginal hysterectomy.[5] LAVH seems to have lower risk than other routes since it has less tissue manipulation.[6] In a study of 1,045 women, the incidence of febrile morbidity in hospital after LAVH decreased from 6.1% in 1994–1997 (462 cases) to 4.5% in 1998–2001 (583 cases), despite all patients receiving antibiotic prophylaxis for one day following surgery.[7] This decrease in postoperative febrile morbidity could be interpreted in part as the surgeon gaining more experience with the procedure. In a further two studies for the effectiveness of single-dose versus multiple-dose antibiotic prophylaxis in patients undergoing LAVH, the rate of postoperative infectious morbidity was 5.4% in the single-dose group and 6.1% in the multiple-dose group.[8,9] Two studies in Thailand that compared LAVH and total abdominal hysterectomy outcomes and were reported in 2007 and 2012, indicated postoperative febrile and infectious morbidity rates of 18% and 4%, respectively.[3,10] The aim of this study was to assess the magnitude of febrile morbidity and related risk factors and to evaluate antibiotic prophylaxis in LAVH with regard to its cost-effectiveness given that its incidence has decreased substantially as surgeons become more experienced with the procedure.

Materials and methods

We obtained approval from the Khon Kaen University Ethics Committee for Human Research to collect data retrospectively from the medical records of women who underwent LAVH at Srinagarind Hospital, a tertiary care center in northeast of Thailand, from June 2007 to May 2012. We retrieved all medical records for women who had undergone LAVH for benign gynecologic conditions, and extracted their demographic and clinical data including age, weight, height, parity, surgical indication, operative time, intraoperative complications, type of concurrent surgical intervention, blood loss, and duration of hospitalization. We also reviewed the type, dose, and duration of antibiotic prophylaxis, defined as any antibiotic therapy in which the first dose was administered before or at the time of surgery. Postoperative febrile morbidity was defined as a temperature ≥38°C recorded on two occasions at least 6 hours apart in the 24 hours following the surgical procedure. The cause of postoperative febrile morbidity was identified as that documented by the attending physicians. If there was no specific site of infection, the cause of fever was deemed to be unexplained. The LAVH procedures were categorized according to whether they were performed by senior surgeons (with more than 5 years' experience) or junior surgeons (with less than 5 years' experience). Statistical analysis planned for incidence rate of febrile morbidity with 95% confidence interval and possible risk factors which might cause, or imply difficulty for the operation such as: pelvic adhesion from previous operation, obesity, duration of operative time, amount of blood lost, the number and doses of antibiotic usage. The chi-squared test or Fisher's exact test for categorical data and the Student's *t*-test for continuous data were used. *P*-values <0.05 were considered to be statistically significant.

Results

One hundred and ninety-nine women underwent LAVH for benign gynecologic conditions during the study period. All relevant demographic and baseline clinical information for these women is shown in Table 1. Most were healthy, and only two had concomitant illness (diabetes mellitus, aortic stenosis post aortic valve replacement). All received their first dose of antibiotic prophylaxis before surgery. The regimen, dose, and duration of antibiotic prophylaxis was implemented according to the preference of the attending physician. The single-dose regimen was cefazolin 1 g; the two-drug regimen comprised clindamycin plus gentamicin, metronidazole plus gentamicin, or ceftriaxone plus metronidazole; and the three-drug regimen could be a combination of ampicillin plus gentamicin plus metronidazole, ampicillin plus cefazolin plus gentamicin, or clindamycin plus gentamicin plus metronidazole. The most preferred prophylactic antibiotic regimen was a single drug

Table 1 Demographic and clinical characteristics of women who underwent LAVH

Characteristics	Results
Age, years (mean ± SD)	46.2±6.3
Body mass index (BMI), kg/m^2 (mean ± SD)	24.0±3.2
Parity (mean ± SD)	2.0±2.0
Previous intra-abdominal surgery (no of patients)	102 (51.3%)
Regimens of antibiotic prophylaxis (no of patients)	
Single drug	156 (78.4%)
Two drugs	38 (19.1%)
Three drugs	5 (2.5%)
Duration of antibiotic prophylaxis (no of patients)	
Single dose	26 (13.1%)
One day	51 (25.6%)
Three days	103 (51.8%)
Five days	12 (6.0%)
Seven days	7 (3.5%)
Postoperative diagnosis (no of patients)	
Uterine myoma	130 (65.3%)
Adenomyosis	35 (17.6%)
Others*	34 (17.1%)

Note: *Including endometrial hyperplasia, benign ovarian cysts, precancerous cervical cancer, pelvic organ prolapse.
Abbreviations: BMI, body mass index; LAVH, laparoscopic-assisted vaginal hysterectomy; no, number; SD, standard deviation.

for 3 days, as shown in Table 1. Postoperative febrile morbidity occurred in 31 cases (15.57%; 95% confidence interval 10.84–21.38). In most cases, the cause was not identified (Table 2). The risk factors for postoperative febrile morbidity are shown in Table 3. The most significant risk factors were related to antibiotic regimens containing greater numbers of drugs and a longer duration of administration.

Discussion

Antibiotic prophylaxis for vaginal and abdominal hysterectomy is recommended to prevent postoperative febrile morbidity. However, for a less invasive procedure like LAVH, there seems to be less benefit from this recommendation. It has been widely reported that the incidence of postoperative febrile morbidity after LAVH has decreased substantially now that surgeons have gained more skill and experience with the procedure.[3,8–10] However, this retrospective study found a moderate high incidence of postoperative febrile morbidity (15.6%) and that the most significant risk factors were use of multiple drugs (more than one drug, odds ratio [OR] 2.23; more than two drugs, OR 10.81), number of doses given (more than two doses, OR 3.33; for more than three days, OR 25.00), and duration of surgery (>130 minutes, OR 2.6).

In a previous study, we found that after a period of time (8 years) to implement LAVH in the hospital, the incidence of postoperative febrile morbidity reduced gradually year by year,[7] so our present findings were not expected. In our study results, the incidence rate did not decrease year by year as expected due to the physicians gaining more experience and surgical skill over time. This might be due to the recruitment of new physicians to train and perform LAVH each year. Some of our setting's physicians had more than 5 years experience while some had only 1–2 years experience. Other than this, we have such a high proportion of patients who had prior pelvic surgery (51.3%), which may have caused more tissue trauma and surgical difficulty. Further, the risk of infectious morbidity in these women was related to antibiotic prophylaxis comprising multiple drugs and multiple-dose regimens. The single dose antibiotic prophylaxis was not applied according to the recommendation in many of the cases that underwent LAVH; only 13.1% received single dose regimen antibiotic prophylaxis. They might still use multiple doses rather than single dose, with the most preferable being a single drug administered for at least 3 days.

In this study, the greatest risk of febrile morbidity was associated with multiple drugs and doses of antibiotic prophylaxis, suggesting that, rather than preventing postoperative febrile morbidity, it is a major risk factor, and that single-dose antibiotic prophylaxis might be the optimal regimen for prevention of postoperative febrile morbidity.

This retrospective study has some limitations, in that we only collected the limited information available in medical records. This may be the reason that the main cause of febrile morbidity was unexplained fever; fever with no specific causes identified, due to no available medical recorded information. Prospective data collection in a future study would be necessary to obtain more accurate data on causes of febrile morbidity following LAVH.

Table 2 Clinical outcomes after LAVH

Clinical outcomes	Results
Operative time (min)	134.1±52.3
Median estimated blood loss (mL)	200
Complications	18 (9.0%)
Hemorrhage with blood transfusion	11 (5.5%)
Bladder injury	3 (1.5%)
Bowel injury	1 (0.5%)
Laparotomy	2 (1.0%)
Infected vaginal stump	3 (1.5%)
Uretero-vaginal fistula	1 (0.5%)
Febrile morbidity	31 (15.6%)
Unexplained fever	29 (14.6%)
Urinary tract infection	1 (0.5%)
Surgical site infection	1 (0.5%)
Antibiotic cost (baht)	389.8±476.1
Duration of hospitalization (days)	5.5±2.4
Total admission cost (baht)	31,482.7±9,761.3

Abbreviations: min, minute; LAVH, laparoscopic-assisted vaginal hysterectomy.

Table 3 Risk factors of postoperative febrile morbidity

Risk factors	OR (95% CI)
BMI >25 kg/m^2	0.8 (0.4–1.8)
BMI >30 kg/m^2	1.6 (0.3–8.6)
Previous intra-abdominal surgery	0.5 (0.2–1.2)
Operative time >130 min	2.6 (1.2–5.7)
Blood lost >500 mL	1.3 (0.5–3.9)
Blood lost >1,000 mL	5.7 (0.8–41.9)
Antibiotic prophylaxis ≥ two doses vs single dose	3.33 (0.37–29.27)
Antibiotic prophylaxis >3 days vs single dose	25.00 (2.51–248.57)*
Antibiotic prophylaxis >1 drugs vs single drugs	2.23 (0.92–5.44)
Antibiotic prophylaxis >2 drugs vs single drugs	10.81 (1.69–69.95)*

Note: *P-value<0.05.
Abbreviations: BMI, body mass index; CI, confidence interval; OR, odds ratio; vs, versus.

Conclusion

This study shows a moderately high risk of febrile morbidity after LAVH, for which the main risk factor appears to be the use of multiple drugs and doses used for antibiotic prophylaxis.

Acknowledgment

The authors acknowledge the Faculty of Medicine for financial support and Kaewjai Thepsuthammarat, biostatistician, Clinical Epidemiology Unit, Faculty of Medicine, Khon Kaen University, for technical support with the data analysis.

Disclosure

The authors report no conflicts of interest in this work.

References

1. Jahan S, Das TR, Mahmud N, et al. A comparative study among laparoscopically assisted vaginal hysterectomy, vaginal hysterectomy and abdominal hysterectomy: experience in a tertiary care hospital in Bangladesh. *J Obstet Gynaecol*. 2011;31(3):254–257.
2. McCracken G, Hunter D, Morgan D, Price JH. Comparison of laparoscopic-assisted vaginal hysterectomy, total abdominal hysterectomy and vaginal hysterectomy. *Ulster Med J*. 2006;75(1):54–58.
3. Jaturasrivilai P. A comparative study between laparoscopically assisted vaginal hysterectomy and abdominal hysterectomy. *J Obstet Gynaecol*. 2007;90(5):837–843.
4. ACOG Committee on Practice Bulletins – Gynecology. ACOG practice bulletin No 104: antibiotic prophylaxis for gynecologic procedures. *Obstet Gynecol*. 2009;113(5):1180–1189.
5. Meltomaa SS, Makinen JI, Taalikka MO, Helenius HY. Incidence, risk factors and outcome of infection in a 1-year hysterectomy cohort: a prospective follow-up study. *J Hosp Infect*. 2000;45(3):211–217.
6. Peipert JF, Weitzen S, Cruickshank C, Story E, Ethridge D, Lapane K. Risk factors for febrile morbidity after hysterectomy. *Obstet Gynecol*. 2004;103(1):86–91.
7. Seow KM, Tsou CT, Lin YH, Hwang JL, Tsai YL, Huang LW. Outcomes and complications of laparoscopically assisted vaginal hysterectomy. *Int J Gynaecol Obstet*. 2006;95(1):29–34.
8. Chang WC, Lee MC, Yeh LS, Hung YC, Lin CC, Lin LY. Quality-initiated prophylactic antibiotic use in laparoscopic-assisted vaginal hysterectomy. *Aust N Z J Obstet Gynaecol*. 2008;48(6):592–595.
9. Chang WC, Hung YC, Li TC, Yang TC, Chen HY, Lin CC. Short course of prophylactic antibiotics in laparoscopically assisted vaginal hysterectomy. *J Reprod Med*. 2005;50(7):524–528.
10. Kongwattanakul K, Khampitak K. Comparison of laparoscopically assisted vaginal hysterectomy and abdominal hysterectomy: a randomized controlled trial. *J Minim Invasive Gynecol*. 2012;19(1):89–94.