

Risk Factors Related to Febrile Morbidity after Abdominal Hysterectomy

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Objective: To assess risk factors related to febrile morbidity (FM) after abdominal hysterectomy for non-malignant diseases.
Material and Method: Retrospective review and analysis of the data was carried out on the medical records of patients who had undergone total abdominal hysterectomy (TAH) with or without bilateral salpingo-oophorectomy (BSO) for non-malignant gynecological diseases during the period of January 1, 2006 to July 31, 2007. Patients who had had fever before surgery, had been treated with antibiotics within 1 week prior to surgery, had an emergency operation or incomplete data were excluded.
Results: FM was found in 47 of the 450 patients (10.4%) and unexplained fever was the most common cause of febrile morbidity. Type of operation, operative time, estimated blood loss, indication for surgery, antibiotic therapy use, and surgeons' skill were all statistically significant risk factors when univariate analysis was used. After multiple logistic regressions were analyzed, however, only type of operation and skill of surgeons were still significant risk factors.
Conclusion: The significant risk factors related to febrile morbidity were type of operation, and surgeons' skill.

Keyword: Febrile morbidity, Total abdominal hysterectomy, Non-malignant diseases

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Hysterectomy is one of the most frequently used operative procedures with gynecological patients at Rajavithi Hospital. There are many indications for hysterectomy and various techniques and approaches are used, including abdominal, laparoscopic and vaginal hysterectomy. Among the post-hysterectomy morbidity events, febrile morbidity (FM) is the most commonly reported adverse event, with a variety of etiologies including both infectious and non-infectious causes⁽¹⁾. Risk factors of FM included old age, multiparity, medical illness, obesity, poor nutrition, anemia, lack of antibiotic prophylaxis, contamination of the surgical field from infected tissues or from spillage of large bowel contents, prolonged operative time, surgeons' skill, use of the abdominal approach, history of previous surgery and high blood loss⁽¹⁻⁵⁾. In the past, several studies have identified several risk factors of FM, including prolonged operative time of more than 120 minutes,

administration of prophylactic antibiotic, the use of resident surgeons, the use of the abdominal approach, high blood loss and malignant disease⁽³⁻⁶⁾.

The reported prevalence of FM in the available literature varies from 2 to 37.4%⁽²⁻⁵⁾. Postoperative FM lasting more than 24 hours requires evaluation and is often followed by empirical treatment with antibiotics for suspected infection. Hence, reducing postoperative fever may significantly curtail expenditure by reducing the length of hospital stay and the need for evaluation and empirical treatment. The present study is designed to assess the prevalence of FM and the risk factors associated with it after abdominal hysterectomy for non-malignant diseases in Rajavithi Hospital.

Material and Method

Retrospective analysis of data was carried out on the medical records of the patients who had undergone total abdominal hysterectomy (TAH) with or without bilateral salpingo-oophorectomy (BSO) for non-malignant gynecological diseases between January 1, 2006 and July 31, 2007, after receiving the approval of the hospital Ethics Committee. Patients who had had fever before surgery, had been treated with antibiotics within one week prior to surgery, had an

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emergency operation or whose data were incomplete were excluded from the study.

The qualitative data were analyzed using the Chi-square test and the Fisher exact test when the frequency in each cell was less than 5. The quantitative data were analyzed using arithmetic mean, median, standard deviation and unpaired t-test. Comparison of the FM group and the control group was conducted using odds ratio and multiple logistic regression analysis. All data were collected and analyzed using SPSS for Windows version 15. The p-value of less than 0.05 was considered the statistical significance.

Definition

FM was defined as the presence of a temperature higher than or equal to 38°C (100.4°F) on two occasions at least 4 hours apart during the postoperative period, excluding the first 24 hours after surgery⁽⁷⁾. Infectious morbidity included urinary tract infection, abdominal wound infection and vaginal cuff infection. The urinary tract infection was diagnosed when clean mid-stream urine showed bacterial growth of more than 10⁵ colony forming unit⁽²⁾. The abdominal wound and vaginal cuff infection were defined as redness, tenderness and infiltration or abscess⁽²⁾.

Results

During the study period, 47 of the 450 patients were febrile, so that the overall prevalence of FM was 10.4% and unexplained fever was the most common cause of FM (93.61%). The mean age, BMI, median parity, previous abdominal surgery, antibiotic prophylactic were not statistically significant difference between febrile and non-febrile group, the p-value were of 0.654, 0.744, 0.742, 0.287 and 0.198 respectively. Estimated blood loss, surgeons' skill, indication for surgery, operative time 120 ml or more, antibiotic therapeutic, and type of operation were significant difference between febrile and non-febrile group when univariate analysis was used (Table 1).

Only type of operation and surgeons' skill were still significant risk factors after multiple logistic regression analysis was used to exclude the effect of confounders (Table 2).

Discussion

The occurrence of FM, a common post-operative hysterectomy morbidity, varied from 2% to 37.4%⁽¹⁻⁵⁾. Although the incidence of fever was often the first sign of an infection, it did not always indicate infection. The extremely low prevalence of FM (2%) came from the study of Saha et al⁽²⁾ in KMCTH,

Table 1. The patients' characteristics and potential risk factors of patient undergoing hysterectomy for febrile morbidity

| Characteristics and potential risk factors | Febrile morbidity (n = 47) No. (%) | Non-febrile morbidity (n = 403) No. (%) | OR | 95% CI | p-value |
|--|--|---|------|------------|---------|
| Type of operation | | | | | 0.031* |
| TAH | 7 (14.9) | 137 (34.0) | 1 | | |
| TAH + USO/BSO | 32 (68.1) | 223 (55.3) | 2.81 | 1.21-6.54 | 0.017* |
| TAH + USO/BSO + appendectomy | 8 (17.0) | 43 (10.7) | 3.64 | 1.25-10.62 | 0.018* |
| Operative time (mean ± SD) | 129.11 ± 31.26 | 122.78 ± 42.13 | | | 0.050 |
| 120 min or more | 27 (57.4) | 166 (41.2) | 5.45 | 1.26-23.56 | 0.023* |
| Estimate blood loss 750 ml or more | 16 (34.0) | 66 (16.4) | 2.64 | 1.36-5.09 | <0.001* |
| Surgical indication | | | | | |
| Myoma uteri | 19 (40.4) | 219 (54.3) | 1 | | 0.005* |
| Adeomyosis | 8 (17.0) | 74 (18.4) | 1.25 | 0.52-2.97 | 0.619 |
| Endometriosis | 9 (19.1) | 19 (4.7) | 5.46 | 2.17-13.72 | <0.001* |
| Benign ovarian tumor | 2 (4.3) | 40 (9.9) | 0.58 | 0.13-2.57 | 0.470 |
| Surgical indication 1 or more | 8 (17.0) | 49 (12.2) | 1.88 | 0.78-4.55 | 0.160 |
| Endometrial hyperplasia | 1 (2.1) | 2 (0.5) | 5.76 | 0.50-66.51 | 0.160 |
| Surgeons' skill | | | | | |
| Resident | 29 (61.7) | 186 (46.2) | 1.88 | 1.01-3.49 | 0.046* |
| Antibiotic therapy use | 27 (57.4) | 67 (16.6) | 6.77 | 3.59-12.77 | <0.001* |

* Statistical significance, p < 0.05

TAH = total abdominal hysterectomy; USO = unilateral salpingo-oophorectomy; BSO = bilateral salpingo-oophorectomy

Sinamangal. In that study, only 50 cases were enrolled, of which 62% were TAH and 38% were vaginal hysterectomy.

Compared with FM in the two previous studies in Thailand (26.1% and 37.4%)^(5,3), the present study had the lowest prevalence of FM (10.4%). The study at Srinagarind Hospital in the northeastern region was performed 17 years before the present one and the different times and locations of the studies could account for the differences in their results. Another possible reason could be the fact that 99.6% of the participants in our study and 96.3% in the study by Chirdchim et al⁽⁵⁾ received prophylactic antibiotics, compared with only 71.6% of those in the Srinagarind Hospital. Antibiotic prophylaxis was administered in the belief that it could enhance the immune mechanisms in the host tissues to prevent infections by killing bacteria that inoculate the surgical site at the time of surgery⁽⁷⁾. Further studies support the idea that prophylactic antibiotics are very effective in providing protection against postoperative FM and infection⁽⁸⁻¹¹⁾. Different time and location, as well as variations in the definition of FM, were proposed as

reasons for different prevalence rates of FM between studies. Another important reason was that the present study excluded malignant diseases while both previous studies^(3,5) did not.

Enrolling only non-malignant cases similar to the present study, Peipert et al⁽⁴⁾ reported that the prevalence of FM was 14%, but their study included hysterectomy by abdominal approach, laparoscopic approach and vaginal approach. The prevalence increased to 18.1% when only TAH was included. With regard to the causes of FM, 93.61% of cases were unexplained fever similar to those in Chirdchim et al's study⁽⁵⁾ (76.6%). This event could be a result of the use of retrospective design in both studies. Not all FM patients were fully investigated for all possible infections.

The intra-operative blood loss 750 ml or more was the only significant risk factor related to FM, which was found in both Peipert et al's⁽⁴⁾ and Chirdchim et al's⁽⁵⁾ studies. An interesting different significant risk factor related to FM between Pothinam et al's⁽³⁾ and the present study is that TAH only was a significant risk factor in the previous study while TAH

Table 2. Multiple Logistic regression of potential risk factors for febrile morbidity among patient undergoing total abdominal hysterectomy

| Potential risk factors | OR | 95% CI | p-value |
|-------------------------------|------|-------------|---------|
| Type of operation | | | 0.049* |
| TAH | 1 | | |
| TAH + USO/BSO | 2.66 | 0.94-7.55 | 0.066 |
| TAH + USO/BSO + appendectomy | 1.18 | 1.18-19/02 | 0.028* |
| Operative time (min) | | | |
| Less than 90 | 1 | | 0.704 |
| 90 to 119 | 1.90 | 0.39-9.16 | 0.426 |
| 120 or more | 1.59 | 0.32-8.00 | 0.575 |
| Surgeons' skill | | | |
| Staff | 1 | | |
| Resident | 2.80 | 1.24-6.37 | 0.014* |
| Estimate blood loss (ml) | | | |
| Less than 750 | 1 | | |
| 750 or more | 1.11 | 0.45-2.76 | 0.821 |
| Surgical indication | | | |
| Myoma uteri | | | 0.566 |
| Adeomyosis | 1.03 | 0.37-2.89 | 0.955 |
| Endometriosis | 2.24 | 0.63-8.03 | 0.215 |
| Benign ovarian tumor | 0.34 | 0.06-2.14 | 0.253 |
| Surgical indication 1 or more | 1.43 | 0.49-4.18 | 0.509 |
| Endometrial hyperplasia | 3.22 | 0.10-103.75 | 0.509 |

* Statistical significance, $p < 0.05$

TAH = total abdominal hysterectomy; USO = unilateral salpingo-oophorectomy; BSO = bilateral salpingo-oophorectomy

with unilateral/bilateral salpingo-oophorectomy (BSO) and appendectomy was a significant risk factor in the present study. Pothinam et al⁽³⁾ also reported that operative time longer than 120 minutes was another significant risk factor. Usually, additional operative procedures require more operative time, but operative time was not a significant risk factor in the present study, or in the other studies^(4,5).

In conclusion, the prevalence of FM in patients who underwent TAH with or without BSO in Rajavithi Hospital was 10.4%. The significant risk factors related to FM were type of operation and surgeons' skill.

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Potential conflict of interest

None.

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ปัจจัยเสี่ยงสัมพันธ์กับภาวะป่วยไข้หลังตัดมดลูกทางหน้าท้อง

เอกชัย โควาวีสารัช, อรุณช ศิริวงษ์

วัตถุประสงค์: เพื่อประเมินปัจจัยเสี่ยงสัมพันธ์กับภาวะป่วยไข้หลังตัดมดลูกทางหน้าท้อง กรณีโรค/ภาวะที่ไม่ใช่มะเร็ง
วัสดุและวิธีการ: ทบทวนและวิเคราะห์ย้อนหลังข้อมูลเวชระเบียนผู้ป่วยตัดมดลูกทางหน้าท้องกรณีโรค/ภาวะที่ไม่ใช่มะเร็ง ระหว่างวันที่ 1 มกราคม พ.ศ. 2549 ถึง วันที่ 31 กรกฎาคม พ.ศ. 2550 การคัดออกจากการศึกษาได้แก่ ผู้ป่วยมีไข้ก่อนผ่าตัด รักษาด้วยยาปฏิชีวนะภายใน 1 สัปดาห์ก่อนผ่าตัด และผู้รับการผ่าตัดฉุกเฉินหรือข้อมูลไม่ครบถ้วน

ผลการศึกษา: พบภาวะป่วยไข้ 47 ใน 450 ราย (ร้อยละ 10.4) ภาวะไข้อธิบายไม่ได้เป็นสาเหตุพบมากที่สุดของภาวะป่วยไข้ ชนิดการผ่าตัดระยะเวลาการผ่าตัด คะแนนการเสียเลือด ข้อบ่งชี้การผ่าตัด การให้ยาปฏิชีวนะเพื่อการรักษาและทักษะของแพทย์ผ่าตัด เป็นปัจจัยเสี่ยงที่มีนัยสำคัญด้วยการวิเคราะห์แบบ univariate ส่วนการวิเคราะห์แบบ multiple logistic regression พบว่าชนิดการผ่าตัด และทักษะของแพทย์ผ่าตัด เป็นปัจจัยเสี่ยงที่มีนัยสำคัญ

สรุป: ชนิดการผ่าตัด และทักษะของแพทย์ผ่าตัดเป็นปัจจัยเสี่ยงที่มีนัยสำคัญสัมพันธ์กับภาวะป่วยไข้
