

Factors associated with complications in gynecological surgeries

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ABSTRACT

Objective: To evaluate the factors associated with complications in major gynecological surgeries.

Method: A retrospective study on major gynecological surgeries performed at King Khalid University Hospital, Riyadh, Kingdom of Saudi Arabia, from the year 1997-2001. A total of 555 cases were included. Risk factors associated with complications were evaluated by a unique regression analysis.

Results: High blood loss was associated with salpingectomy/salpingotomy, myomectomy, and total abdominal hysterectomy (TAH). Old age was associated

with TAH, oophorectomy and vaginal hysterectomy. Prolonged hospitalization was associated with TAH and oophorectomy. Urinary tract infection, wound infection, nausea and vomiting were not significant postoperative complications in major gynecological surgeries.

Conclusion: The recognition of the specific complications associated with each type of surgery are important for counseling the patients and preoperative preparation to reduce the risk of long term morbidity.

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Operative surgeries have become safer and thus, operations are being carried out on people who previously been considered unsuitable. The majority of potential and immediate postoperative complications associated with gynecological surgery are common to other surgical procedures and represent the complicated response of the body to the stresses imposed by surgery due to the considerable techniques, in addition to postoperative management. Careful preoperative assessment of the patient is essential. Some pre-existing conditions are known to be associated with increased risk of postoperative complications,¹ such as respiratory or cardiovascular diseases,² obesity,³ history of smoking,⁴ drug or alcohol abuse.⁵

Most of the studies reported the morbidity accompanying abdominal and vaginal hysterectomy or have dealt with one or 2 complications associated with gynecological surgery. Studies covering all the

morbid events following different gynecological surgeries would be worthwhile in identifying the risk factors related to postoperative complications of gynecological surgeries. The present study was undertaken to find the incidence of various immediate postoperative complications, which follow different gynecological operations. It also aimed at studying the factors associated with these complications using logistic regression analysis in a unique way.

Method. A retrospective study of the immediate postoperative complications (within the first 5 days post operative) following major gynecological surgery (all laparotomies) was conducted in King Khalid University Hospital, Riyadh, Kingdom of Saudi Arabia, during the 5 year period January 1997 through to December 2001. This included a total of

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Table 1 - Type of gynecological surgeries performed in 555 women.

Type of surgery	n	(%)
Adhesion release	2	(0.4)
Bilateral tubal ligation	4	(0.7)
Ovarian cystectomy	102	(18.4)
Vaginal hysterectomy	33	(5.9)
Myomectomy	110	(19.8)
Strassman repair	9	(1.6)
Fistula repair	17	(3.1)
Ovarian biopsy	3	(0.5)
Salpingectomy/ salpingotomy	141	(25.4)
Total abdominal hysterectomy	134	(24.1)

555 cases of major gynecological operations. The data retrieved from patient's charts included information on patient's age, type of surgery, duration of hospital stay, and postoperative complications.

Statistical analysis. Logistic regression analysis was used to investigate the postoperative complications and other factors that were positively correlated with each gynecologic surgeries performed. The logistic regression analysis included only those surgeries that involved at least thirty cases, and these were oophorectomy, ovarian cystectomy, vaginal hysterectomy, myomectomy, salpingectomy/salpingotomy, and total abdominal hysterectomy (TAH). As our interest was only in identifying positive associations, we conducted investigative logistic regression rather than stepwise logistic regression, using the MODEL option incorporated in program LR from the BMDP statistical software. The logistic regression was repeated separately for each type of surgery used as the dependent variable. The independent variables included in the model command were only those postoperative complications that involved at least 10 cases, and these were: acute pain, cardiac dysrhythmia, hemorrhage, hypertension, hypoxemia, nausea and vomiting, pyrexia, urinary tract infection, and wound infection.

Age (>50 years), and blood loss (>500 mL) were also included as independent variables in the MODEL command. Furthermore, the logistic regression analysis was conducted using the MARGINAL option incorporated in the program LR, whereby there is no category or group of reference when interpreting the risks. Therefore, our results from the analysis are reported using "odds" rather than the "odds ratio" as the estimate of risk. We chose this option as the odd ratio would

Table 2 - The incidence of postoperative complications in 555 women who had gynecological surgeries.

Complication	n	(%)
Abdominal pain	6	(1.1)
Cardiac dysrhythmia	10	(1.8)
Hemorrhage	13	(2.3)
Hypercarbia	3	(0.5)
Hypertension	33	(5.9)
Hypotension	2	(0.4)
Hypoxemia	15	(2.7)
Nausea and vomiting	60	(10.8)
Palpitation	2	(0.4)
Pyrexia	67	(12.1)
Urinary tract infection	80	(14.4)
Wound infection	37	(6.7)

Some surgeries carried out had more than one complications.

have no meaningful interpretation in the present context.

Results. A total of 555 major gynecological surgeries were included. Three hundred and six patients (55.1%) were less than 50 years of age, 249 (44.9%) patients aged 50 years or more. There were 134 cases of TAH, 141 cases of salpingectomy/salpingotomy, 110 cases of myomectomy, 102 cases of ovarian cystectomy, 33 cases of vaginal hysterectomy, 3 cases of ovarian biopsy, 17 cases of fistula repair, 9 cases of stassman repair of uterus, 4 cases of bilateral tubal ligation, and 2 cases of release of pelvic adhesions (**Table 1**).

Table 2 shows the incidence of postoperative complications in those patients. There were 6 cases of abdominal pain, 10 cases of cardiac dysrhythmia, 13 cases of hemorrhage, 3 cases of hypercarbia, 33 cases of hypertension, 2 cases of hypotension, 15 cases of hypoxemia, 60 cases of nausea and vomiting, 2 cases of palpitation, 67 cases of pyrexia, 80 cases of urinary tract infection (UTI), and 37 cases of wound infection.

The results from the logistic regression analysis were as presented in **Table 3**. Myomectomy was significantly associated with blood loss of more than 500 mL (odds 4.29; 95% CI=1.96-9.39). In addition, this surgery was associated with UTI, hypertension, cardiac dysrhythmia, and long hospital stay (>2 weeks), but these associations were not significant statistically. In addition, salpingectomy/salpingotomy was significantly associated with high blood loss (>500 mL) (odds=9.01; 95% CI=4.4-18.5). Moreover, this surgery was associated with nausea and vomiting, pyrexia, and cardiac dysrhythmia, but these

Table 3 - Results from the logistic regression analysis showing variables associated with each surgery.

Factors associated with the surgery	Myomectomy odds (95% CI)	Salpingectomy/ salpingotomy odds (95% CI)	Vaginal hysterectomy odds (95% CI)	Ovarian cystectomy odds (95% CI)	Bilateral salpingo-oophorectomy Odds (CI)	Total abdominal hysterectomy odds (CI)
Nausea and vomiting		1.26 (0.815-1.94)		1.24 (0.759-2.04)	1.48 (0.978-2.23)	1.20 (0.812-1.78)
Pyrexia		1.16 (0.753-1.78)	1.46 (0.85-2.50)			1.03 (0.701-1.52)
Urinary tract infection	1.06 (0.746-1.51)		1.66 (1.00-2.77)			
Hypertension	1.44 (0.847-2.45)			1.09 (0.502-2.38)		1.17 (0.706-1.94)
Cardiac dysrhythmia	1.11 (0.325-3.80)	1.94 (0.536-7.02)	2.78 (1.09-7.13)*	2.94 (0.730-11.8)		
Hospital stay (>2 weeks)	2.03 (0.807-5.13)		1.09 (0.329-3.59)		1.79 (1.07-3.01)*	2.79 (1.20-6.48)*
Blood loss (>500 mL)	4.29 (1.96-9.39)*	9.01 (4.40-18.5)*	1.14 (0.461-2.83)		2.38 (1.46-3.88)*	2.40 (1.57-3.67)*
Age (>50 years)			2.56 (1.56-4.19)*		3.88 (2.70-5.58)*	3.53 (2.40-5.18)*
Wound infection				1.92 (0.882-4.18)		
Hypoxemia					1.81 (0.876-3.72)	3.71 (1.55-8.85)*

*Statistically significant, CI - confidence interval

associations were statistically not significant. Vaginal hysterectomy was significantly associated with cardiac dysrhythmia (odds=2.78; 95% CI=1.09-7.13) and old age (>50 years) (odds=2.56; 95% CI=1.56-4.19). In addition, vaginal hysterectomy was indicated to be associated with pyrexia, UTI, blood loss (>500 mL) and hospital stay of 7-14 days. However, these associations did not attain statistical significance. Ovarian cystectomy was associated with nausea and vomiting, wound infection, hypertension and cardiac dysrhythmia, but these associations did not attain statistical significance. Oophorectomy was significantly associated with old age (>50 years) (odds=3.88; 95% CI=2.7-5.58), blood loss >500 mL (odds=2.38; 95% CI=1.46-3.88) and long hospital stay (7-14 days) (odds=1.79; 95% CI=1.07-3.01). This surgery was also associated with nausea and vomiting, and hypoxemia, but these associations were not significant statistically. Total abdominal hysterectomy was significantly associated with old age (>50 years) (odds=3.53; 95% CI=2.40-5.18), high blood loss (>500 mL) (odds=2.40; 95% CI=1.57-3.67), long hospital stay (odds=2.79; 95% CI=1.20-6.48), and hypoxemia (odds=3.71; 95% CI=1.55-8.85). This surgery was also indicated to be associated with nausea and vomiting, pyrexia, and hypertension, but these associations did not attain statistical significance.

Discussion. Gynecological surgery, like any other surgery, has a number of potential complications, which have the potential results in

serious events. Early recognition and correction of these complications is necessary to reduce the risk of long term morbidity. There are common complications that are known to be associated with any major surgery, but this study is unique as the analysis is carried out to allow identification of special complications associated with each surgical procedure on its own. These information are important in counseling patients preoperatively as many new approaches are available for management of gynecological problems such as medical treatment for ectopic pregnancy, endometrial ablation for noncancerous bleeding problems, and the new trend to perform major surgeries by laparoscopy and avoiding laparotomy.

The most interesting finding in our study came from the result of the regression analysis (Table 3). Excessive bleeding was found to have high association with salpingectomy/ salpingotomy (odds 9.01, CI=4.4-18.5) followed by myomectomy (odds 4.29, CI=1.96-9.39), TAH (odds=2.4, CI=1.57-3.67) and oophorectomy (odds=2.38, CI=1.46-3.88). This can be due to the fact that salpingectomy / salpingotomy is a surgery that is carried out due to rupture ectopic pregnancy. Vaginal hysterectomy, however, was not found to have significant bleeding problem (odds=1.14, CI=0.461-2.83).

Old age >50 years was associated with TAH (odds=3.53, CI=2.4-5.18), oophorectomy (odds=3.88, CI=2.7-5.58) and vaginal hysterectomy (odds=2.56, CI=1.56-4.19) and this is due to the fact that the cause for performing such operations are associated with old age. This is also the explanation

for the prolonged hospitalization found associated with TAH and oophorectomy. The hypoxemia associated with TAH (odds=0.71, CI=1.55-8.85) can be explained by the fact that this surgery is associated with high blood loss and old age.

Wound infection was interestingly of no association with the gynecological surgeries, also pyrexia, nausea and vomiting, and UTI, although these are known complications to major surgeries.⁶ Cardiac problems have been reported in up to 3% of patients.⁷ Four cases had previous cardiac problems in our study. There was one death (0.18%) resulting from massive pulmonary embolism in an elderly woman 56 years of age who was diabetic and hypertensive and who underwent TAH. A death rate of approximately 4 per 100,000 (0.004%) following abdominal hysterectomy has been reported.¹

Blood transfusion rate was 0.5% in our study which is lower than previous studies which reported an incidence ranging from 8.3-15.4%.⁸ However transfusion rate has clearly decreased after 1985 and has been reported to be ranging from 0.7-11%.⁹ This could be due to the risk associated with blood transfusion, which led to its use mainly on life saving measure and the trend for bloodless medicine.

Postoperative complications remain a problem of a major concern in spite of modern standards of preoperative preparation, antibiotic prophylaxis and refinements in anesthetic and operative techniques. In addition, there are other quantifiable consequences such as cost and time. The results

from our analysis are useful for decision making, counseling and preoperative preparations for each type of major gynecological surgery.

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