

Comparison of Perioperative Complications between Reconstructive Pelvic Surgery and General Gynecologic Surgery

Sang Wook Bai, Jung Mi An, Jong Seung Shin, Joo Hyun Park, Sei Kwang Kim, and Ki Hyun Park

Department of Obstetrics and Gynecology Yonsei University, College of Medicine, Seoul, Korea.

The purpose of this study was to compare the perioperative complication rates of reconstructive pelvic surgery and general gynecologic surgery, and to identify the predictive risk factors for perioperative complications in reconstructive pelvic surgery. The medical records of 148 reconstructive pelvic surgery patients and 146 general gynecologic surgery patients were reviewed, and the types of complications, along with their rates and predictive risk factors were examined. The statistical analysis included descriptive statistics and logistic regression. There was no difference in the type of complications between reconstructive pelvic surgery and general gynecologic surgery. The prevalences of perioperative complications were 34.4% in the reconstructive pelvic surgery group and 26.7% in the general gynecologic surgery group. Intraoperative blood loss ($p=0.006$) and the duration of surgery ($p=0.014$) were independent risk factors for perioperative complications in the reconstructive pelvic surgery group. The perioperative complication rates for the patients undergoing reconstructive pelvic surgery were not higher than those of the patients undergoing general gynecologic surgery, even though more procedures were performed and a longer duration of surgery was needed in the former cases. Since the duration of surgery and the amount of blood loss are the major factors affecting the complication rate, decreasing these two factors would be the key to improving the outcomes of patients undergoing reconstructive pelvic surgery.

Key Words: Perioperative complications, reconstructive pelvic surgery, general gynecologic surgery, predictive risk factors

INTRODUCTION

So far, the perioperative complication rate of general gynecologic surgery has been reported to range from 0.2 to 26%.¹⁻³ In particular, total abdominal hysterectomy is one of the most frequently performed gynecological surgical procedures, and 80-90% of perioperative urologic complications are reportedly associated with this operation, for which the incidence of complications has been reported to be 0.5-2.0%.²⁻⁴ Other perioperative complications of gynecologic surgery are fistula, bowel injury, vessel injury, infection and thromboembolism.⁵⁻⁶ In previous reports, the perioperative complication rate of gynecologic malignancy surgery was higher than that of general gynecologic surgery.⁷⁻¹⁰ However, there have been no reports on the pelvic reconstructive surgery-related-complication rate. Most patients undergoing pelvic reconstructive surgery for pelvic organ prolapse are elderly, and they generally have a previous surgical history, hypertension and diabetes mellitus. In the majority of cases with pelvic reconstructive surgery, many different surgeries have to be performed and they are commonly performed in structures that are close to the lower urinary tract. Therefore, the incidence of perioperative complications resulting from these procedures is known to be higher than that following general gynecologic surgery. However, there is a shortage of objective studies on this topic. Pelvic reconstructive surgery is not life threatening and it improves the quality of life in patients. Consequently, if the incidence and types of perioperative complications were better known,

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Reprint address: requests to Dr. Sang Wook Bai, Department of Obstetrics and Gynecology, Yonsei University College of Medicine, 134 Shinchon-dong, Seodaemun-gu, Seoul 120-752, Korea. Tel: 82-2-361-5490, Fax: 82-2-313-8357, E-mail: swbai@yumc.yonsei.ac.kr

this would provide the gynecologist with much needed information and would be very useful when he or she counsels patients. This study was performed to investigate whether or not there were any differences in the perioperative complication rates between pelvic reconstructive surgery and general gynecologic surgery and to identify the risk factors associated with the perioperative complications of pelvic reconstructive surgery.

MATERIALS AND METHODS

One hundred and forty eight patients with pelvic organ prolapse over stage II or who were associated with stress urinary incontinence and who visited the Department of Obstetrics and Gynecology at Yonsei Medical Center between March, 1999 and February, 2002 were enrolled in this study (Group A). A standard history and physical examination were performed and all patients were examined according to the Pelvic Organ Prolapse-Quantification (POP-Q) System.¹¹ Stress urinary incontinence was diagnosed with a stress test and a urodynamic test after reducing the prolapse. One hundred and forty six patients with uterine leiomyoma or ovarian tumor, and who were being treated during the same time period, were also enrolled in the study to act as the control group (Group B).

All patients with pelvic organ prolapse underwent pelvic reconstruction (including anti-incontinence surgery), while the control group patients underwent total abdominal hysterectomy or adnexectomy. All surgery was performed by the 1st author (S.W. Bai). Prior to surgery, the surgical procedure and the possible perioperative complications were explained to the patients, who gave their written consent for the operation. The age, parity, body mass index, previous explorative laparotomy history, the presence of medical disease, surgical method, the duration of surgery, the initial hemoglobin concentration, the amount of blood loss, and the type of perioperative complications were compared between group A and group B. Anemia was defined as a hemoglobin level below 11.0g/dl in pre-surgery and below 9.0g/dl in post-surgery. Massive bleeding was defined as a blood loss of over 1000 ml or a post-

operative hemoglobin drop of over 3.0 g/dl. In addition, the risk factors that are known to be related to perioperative complications in patients with pelvic organ prolapse were analyzed. SPSS (SPSS Inc., Chicago, Illinois, U.S.A.) software was used in the analysis. The student's t-test, χ^2 -test and logistic regression were used to analyze the statistics. A p value < 0.05 was considered to be statistically significant.

RESULTS

The average age was significantly higher in group A than in group B (57.7 ± 8.7 vs 48.3 ± 6.3 years, $p < 0.05$, respectively). There were no significant differences in the parity or the Body Mass Index (BMI) between the patients group and the control group (4.1 ± 1.3 vs 3.8 ± 1.7 , $p > 0.05$; 24.8 ± 2.7 kg/m² vs 23.9 ± 3.2 kg/m², $p > 0.05$, respectively). There were no significant differences in the number of patients having undergone previous surgical experiences, the number of patients with medical illness or the initial hemoglobin concentration between group A and group B (37 cases (25.1%) vs 33 cases (22.6%), $p > 0.05$; 57 cases (38.5%) vs 49 cases (33.5%), $p > 0.05$; 12.3 ± 1.2 g/dl vs 11.9 ± 1.7 g/dl, $p > 0.05$, respectively) (Table 1). The duration of surgery was significantly longer in the patients group than in the control group (154.9 ± 46.3 vs 104.3 ± 27.3 minutes, $p < 0.05$, respectively). The quantity of blood loss and the number of procedures per patient were significantly higher in the patients group than in the control group (426.7 ± 22.1 vs 321.9 ± 18.3 ml, $p < 0.05$; 5.98 ± 2.54 vs 1.61 ± 0.48 , $p < 0.05$, respectively) (Table 2). During surgery, there were 2 cases of ureteral obstruction and 6 cases of massive bleeding in the patients group. There were 2 cases of bladder injury, 1 case of ureter injury, 1 case of bowel injury and 4 cases of massive bleeding in the control group. However, the intraoperative complication rates in the patients group and the control group were similar ($p > 0.05$) (Table 3). After surgery, there were 24 cases of anemia (16.2%), 1 case of abdominal wall hematoma (0.68%), 5 cases of ileus (3.38%), 2 cases of wound infection (1.35%), 2 cases of pneumonia (1.36%) and 3 cases of urinary tract infection (2.03%) in

Table 1. Patients' Characteristics

	Group A (n=148)	Group B (n=146)	p-value
Age (years)	57.7 \pm 8.7	48.3 \pm 6.3	<0.05
Parity (No.)	4.1 \pm 1.3	3.8 \pm 1.7	NS
BMI (kg/m ²)	24.8 \pm 2.7	23.9 \pm 3.2	NS
Explo-lapa	37/148	33/146	NS
History (No.)	(25.1%)	(22.6%)	NS
Underlying	57/148	49/146	NS
Medical Disease	(38.5%)	(33.6%)	NS
Preoperative hemoglobin (g/dl)	12.3 \pm 1.2	11.9 \pm 1.7	NS

Group A, reconstructive pelvic surgery.

Group B, general gynecologic surgery.

BMI, body mass index.

Values are given as mean \pm SD or %.

Table 2. Summary of Surgical Procedures

	Group A (n=148)	Group B (n=146)
Total abdominal hysterectomy	89 (60.9%)	146 (100%)
Total vaginal hysterectomy	24 (16.2%)	
Adnexectomy	78 (52.7%)	117 (80%)
Anterior-posterior colporrhaphy	135 (91.2%)	
Abdominosacrocolpopexy	70 (47.3%)	
Cystoscopy	112 (75.6%)	
Suprapubic cystostomy	103 (69.5%)	
Paravaginal repair	113 (76.3%)	
Burch colposuspension	113 (76.3%)	
McCall culdoplasty	88 (60.2%)	
Procedures No./ Pt	5.98 \pm 2.54	1.61 \pm 0.48

group A. In group B, there were 17 cases of anemia (11.6%), 1 case of abdominal wall hematoma (0.68%), 2 cases of ileus (1.36%), 3 cases of wound infection (2.03%) and 2 cases of pneumonia (1.36%). The post-operative complication rates in the two groups were similar ($p > 0.05$) (Table 4).

The predictive risk factors related to the complications in reconstructive pelvic surgery were blood loss ($p = 0.0006$) and the duration of surgery ($p = 0.014$). Neither the patient's age, BMI, previous surgical experiences, the presence of medical illness, the initial hemoglobin concentration nor the number procedures per patient were related to the complication rate in reconstructive pelvic surgery.

DISCUSSION

Pelvic organ prolapse is the most common indication for all hysterectomies in patients over 55 years old. Its incidence increases with increasing age and peaks for patients in their sixties.¹² The patients concerned undergo reconstructive pelvic surgery in order to improve their life expectancy and to have a better quality of life.¹³ Therefore, if gynecologists were more aware of the perioperative complications and their related risk factors prior to surgery, they would be better able to advise their patients in the selection of the appropriate procedure and to counsel their patients before surgery.

Dicker et al. reported the complication rates

Table 3. Intraoperative Complications

	Group A	Group B	p-value
Bladder injury	0	2 (1.36%)	NS
Ureter injury	0	1 (0.68%)	NS
Ureter obstruction	2 (1.36%)	0	NS
Colon injury	0	1 (0.68%)	NS
Hemorrhage	6 (4.05%)	4 (2.74%)	NS

Table 4. Postoperative Complications

	Group A	Group B	p-value
Anemia	24 (16.2%)	17 (11.6%)	NS
Abdominal wall hematoma	1 (0.68%)	2 (1.36%)	NS
Pulmonary embolism	0	1 (0.68%)	NS
Ileus	5 (3.38%)	2 (1.36%)	NS
Wound infection	2 (1.36%)	3 (2.03%)	NS
Urinary tract infection	3 (2.03%)	0	NS
Pneumonia	2 (1.36%)	2 (1.36%)	NS
Wound dehiscence	6 (4.05%)	4 (2.74%)	NS

of total abdominal hysterectomy and total vaginal hysterectomy.¹ Their report has since been used as a standard for comparing the complication rates of total abdominal hysterectomy. Harris et al. reported that the complication rate of total abdominal hysterectomy had not changed since the report by Dicker et al.¹³ years earlier.³ In this study, the perioperative complication rate in the patients group was 34.4%, which was not significantly higher than that of the control group. Lambrou et al. reported that the complication rate of reconstructive pelvic surgery was 46%, and that its rate was higher than that of the general gynecologic surgery.¹⁴ However, Kjerulff et al. reported that the complication rate of reconstructive pelvic surgery was similar to that of general gynecologic surgery.¹⁵ Brown et al. reported that the complication rate and mortality rate in 225,964 patients who received reconstructive pelvic surgery were 15.5% and 0.03%, respectively.¹⁶

Even though some authors insist that endoscopic surgery can reduce the complication rate of reconstructive pelvic surgery,¹⁷⁻¹⁹ the necessity for a highly experienced gynecologist and the need to use highly skilled knotting techniques are the

main disadvantages of this type of surgery. However, endoscopic surgery has several advantages over conventional surgery, including a reduction in the admission time, good cosmetic effect, fast recovery and less pain. If the long duration and the high operating cost of endoscopic surgery can be reduced, though the accumulation of surgical experience and the development of better instruments, then there is no doubt that in the future endoscopic surgery will be used more routinely in reconstructive pelvic surgery. However, at present, there is no real way of reducing the complication rate of reconstructive pelvic surgery, and so further research is needed in this area. In this study, the rates of intraoperative complications such as bowel injury, bladder injury, ureter injury, ureter obstruction and massive bleeding in the patients group and the control group were similar. In this study, bladder and ureter injury only occurred in the control group. Benson et al. reported 1 case of bladder injury and 1 case of bowel injury in 80 patients who received reconstructive pelvic surgery,²⁰ Lambrou et al. reported bladder injury and bowel injury rates in reconstructive pelvic surgery of 6%, and 1%,

respectively,¹⁴ and Brown et al. reported that the near organ injury rate was 4.2%.¹⁶ Their data were similar to that reported in this study. Hoffman et al. reported that the bowel injury rate was 0.7% during total vaginal hysterectomy and in order to reduce the above complications, they recommended using hormone replacement therapy to make the vaginal wall thicker so that it would be easier to dissect during surgery.²¹ From 1990 to 1998, 5355 cases of total abdominal hysterectomy were performed in our hospital, and 11 cases of bladder injury and 9 cases of ureter injury occurred during this time period. These complications might be reduced by the accumulation of surgical skills and intraoperative cystoscopy.²²⁻²⁴ We introduced intraoperative cystoscopy during reconstructive pelvic surgery beginning in 1999 and as a result, the rate of lower urinary tract complications after surgery was reduced. In the patients group of this study, 24 cases (16.2%) of anemia occurred after surgery, making it the most commonly occurring complication. In the patients group, there were also 6 cases of massive bleeding (4.05%). This might be able to be reduced by shortening the duration of surgery though the preoperative correction of anemia. Seven cases of infection were encountered in the patients group. The number of urinary tract infections, cases of pneumonia, and wound infections were 3, 2 and 2, respectively. Pre-surgery antibiotics, a shorter operation time and the faster removal of the foley catheter might reduce the incidence of such infections after surgery.

In this study, the predictive risk factors related to complications in reconstructive pelvic surgery were blood loss ($p=0.0006$) and the duration of surgery ($p=0.014$). In this study neither the patients age, BMI, previous surgical experiences, presence of medical illness, initial hemoglobin concentration nor the number of procedures per patient were related to the incidence of complications in reconstructive pelvic surgery. The patients age, the presence of illness, the body mass index and the presence of gynecologic cancer were related to the postoperative complication rate of total hysterectomy,^{25,26} and in a previous study. Harris et al. reported that in order to minimize the effect of complications related to hysterectomy, they excluded patients over 44

years old, except for those who had a medical illness.³ Lambrou et al. reported that intraoperative blood loss and the number of procedures performed were closely related to the risk factors for perioperative complications.¹⁴ In particular, intraoperative blood loss was reported to be closely related to the incidence of perioperative complications, as was also the case in this study. Therefore, further research is needed in order to determine how to reduce the amount of intraoperative blood loss, including ways of shortening the duration of surgery.

Initially, it was expected that in this study the incidence of perioperative complications in reconstructive pelvic surgery might be higher than that in general gynecologic surgery. This is because the patients receiving reconstructive surgery were older than those receiving gynecologic surgery, the duration of surgery was longer, and the patients underwent a greater number of interventions. However, the perioperative complications rates for these two procedures were found to be similar. Therefore, if the amount of intraoperative blood loss and the duration of surgery could decrease the rate of perioperative complications in reconstructive pelvic surgery would be able to be greatly reduced.

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