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Nursing Steps to Prevent Surgery-Related Pressure Ulcers in Patients Undergoing Combined Hysteroscopy and Laparoscopy: A Double-Blind, Randomized, and Controlled Trial

Dong Ying Fu,^{*,Δ} Bi Chao Wang,^{*} Wen Jia Guo,^{*} Jia Nan Jiang^{*}

OBJECTIVE To evaluate the preventive effect of perioperative nursing interventions on acute pressure ulcer in patients undergoing combined hysteroscopy and laparoscopy.

METHODS A total of 144 patients who undergoing combined hysteroscopy and laparoscopy were randomly divided into an experimental group and a control group. The patients of the experiment were implemented by new interventions throughout the perioperative period. The patients in the control were provided only routine care. Assessment for skin integrity and pressure ulcer risk factors carried out during three periods. The outcomes including the patients' feedback, the incidence and the stage of pressure ulcer were collected.

RESULTS The incidence of pressure ulcer in the experiment was significantly less than that in the control group. The experimental group was placed in positions that they were able to tolerate comfortably. The score of their satisfaction is significantly higher than those in the control group. The patients of both groups developed stage I pressure sores, but no statistical difference.

CONCLUSION The nursing interventions of the experiment can be considered as an effective method of decreasing the incidence of pressure ulcer in patients undergoing combined hysteroscopy and laparoscopy. Those strategies that start in the preadmission areas and continue through the intraoperative to postoperative periods can have a noticeable impact on patient's outcomes. ■

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Keywords: Pressure ulcer – Nursing interventions – Operating room

Acute pressure ulcers are caused by excessive pressure, which occludes the flow of the arterioles at the capillary level, therefore tissue necrosis occurs. A number of contributing factors are associated with pressure ulcer and prolonged pressure is one of the main factors (1) that cause surgical position-related pressure sore. Cinsdile and colleagues (2) showed that tissue when subjected to 9.33kPa pressure for 2 hours began to show irreversible damage. Surgical patients present a unique challenge in preventing pressure ulcer because they are immobile and unable to perceive the discomfort of long-term pressure. The incidence of pressure ulcer in this high risk group reached 4.7%-66% (2). Hysteroscopy and laparoscopy as minimally invasive approaches are now available for almost all gynecological diseases. The patients undergoing combined hysteroscopy and laparoscopy will be in the lithotomy position. This position poses significant risks for pressure ulcers at ankle support sites, obturator nerve injury and common peroneal nerve injury (3). This study explored a series of nursing interventions provided from the preoperative period to the postoperative period to diminish ulcer risk and protect skin from ulcer in such group of patients.

METHODS

Ethical Considerations

The study was conducted at a tertiary teaching hospital in Nanjing, China, after approval by the Institutional Ethics Committee. One hundred forty four Chinese adult patients who had combined hysteroscopy and laparoscopy had provided informed consent for study participation from February to December, 2014.

Study Design

The experimental group had been provided a series of nursing interventions from the day before surgery to postoperative phase. The control

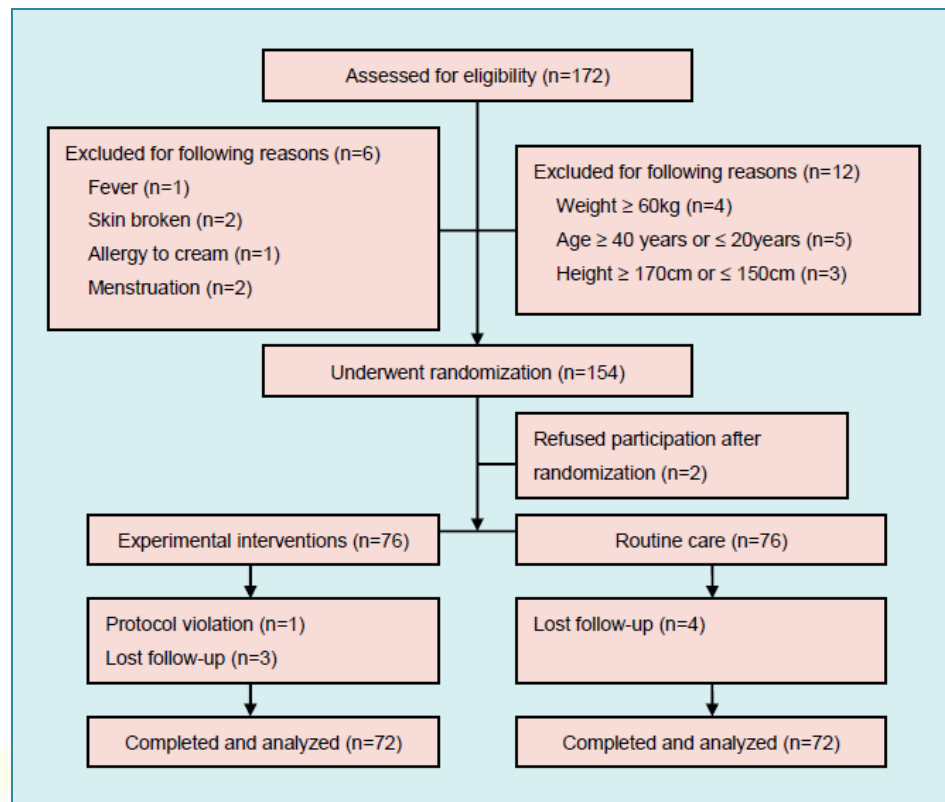


Figure 1. The study flowchart of the patient recruitment.

Flow chart shows that two patients refused to participate in this study for private reasons. Seven patients lost follow-up, because they were transferred to other hospitals. Eighteen patients were excluded for medical reasons and special demographic characteristics.

group had been provided routine nursing interventions depending on nurses' experience.

The Experimental

The Day before Surgery:

- (i) Circulation nurse visited the patients and explained all the details of the procedure in common words (4).
- (ii) RN can obtain the general information according to the skin assessment. Nurses may train patients how to do the positioning to make them familiar with the surgical position if necessary. The patients are informed that they might feel uncomfortable in this lithotomy position.
- (iii) Nurses should teach patients skills about preventing pressure ulcer.
- (iv) The humidity in the operating room should be maintained at 40%-60%.

The Day of Surgery:

(i) Preoperative period:

The patients were kept warming when they arrived at the holding bay. Preadmission nurses applied the normal cream to the skin surface of limbs and backs of the patients, and then gave them a three minutes period massage on their limbs and backs to make muscles relax (5).

(ii) Intraoperative period:

(a) The patients were placed in low lithotomy position in this procedure. Patient's thighs are elevated approximately 45 degrees according to the individual legs length and the feelings of patients (3). Nurses should communicate with the patients regarding potential areas of discomfort and possible remedies. They explained the steps and the importance of positioning to ensure that patients can cooperate with the optimal exposure and the access to the surgical site. The nurses make a promise that they will care patients with their best

Table 1. Demographic data of the patients.

Variable	Experimental Group (n=72)	Control Group (n=72)
Age – yr	24.1 ± 6.1	24.3 ± 7.2
Height – cm	161.5 ± 7.2	162.4 ± 8.7
Weight – kg	52.4 ± 5.0	51.1 ± 6.1
Time of operation – h	2.4 ± 0.4	2.3 ± 0.5

Data are presented as Mean ± standard deviation (SD).

effort during the operation. This maximally relieves the patient's anxiety. Smooth and soft pads are available on the stirrups to protect skin and to keep warm (6). The buttocks should be padded with Akton gel pads to reduce the localized pressure. The legs are raised to remain horizontal (3). The stirrup straps are used after nurses making sure that patients are able to tolerate comfortably.

(b) All of the positioning would be done before induction, so that the patients were able to tolerate uncomfortable feelings caused by surgical position during the postanesthesia period (7).

(c) The patients are vulnerable because the general anesthesia can alter cognitive function. Nurses monitored physiologic effects of position changes. They provided warmth to maintain normothermia and ensured that no equipment or personnel create pressure on the patient.

(d) The sterile plastic sheets were placed on the sterile drapes to prevent pooling of fluids under dependent areas in this procedure (3).

(iii) Postoperative period:

The patients were provided massage to their legs in order to relax muscles and prevent reperfusion injury (8).

The Next Day:

Circulation nurses started the regular visiting. They communicated with the patients to get the feedback of the interventions and their experi-

ence (4). Nurses also required patients to score their satisfaction on the surgical positioning in order to improve their job.

The Control

Preoperative visiting was carried out the day before surgery to obtain the information and plan individual care. Nurses provided routine care. Surgical position was placed after anesthesia procedure and depended on nurses' experience. Circulation nurse provided postoperative visiting to understand patients' feelings.

Data Collection

The length of the procedure, the stage of pressure ulcer, the number of pressure ulcer in each group and the score of patient's satisfaction were collected (the range of score: from complain 0 to fully satisfied 100). The trained nurses examined all patients and collected the feedback from circulation nurses' perioperative visiting. Nurses used wound and skin assessment tool translated from Harvey C: Wound healing (5) to do pressure ulcer assessment.

Data Analysis

Data were analyzed using the GraphPad Prism version 5.0 (GraphPad Software Inc., San Diego, CA). In the univariate analysis, the Chi-square test and independent t-test method were adopted to assess the differences of the mean value of categorical and continuous variables, respectively. The paired t-test was adopted for dependent sample. A *P*

value of less than 0.05 was considered statistically significant.

RESULTS

Sample Selection

This was a randomized, double-blind, controlled study. A total of 144 patients with the clinical diagnosis of infertility were randomly divided into experimental group and control group (Figure 1). Table 1 shows no significant difference between two groups regarding the age, the height, the weight and the lengths of surgeries. There was no difference between two groups in their BMI and the preadmission Braden score. No taking sedative and hypnotic drugs. None of them has the history of mental illness, diabetes, fracture and other conditions related to pressure ulcer. There was no statistically significant difference between two groups ($P > 0.05$).

Outcomes

As the bar showed in the Figure 2, the incidence of stage I acute pressure ulcer in the experimental group was lower than in the control group, the incidence had statistical significant difference between two groups ($P < 0.05$).

As showed in the Figure 3, the score of the patient's satisfaction was higher in the experimental group than in the control group ($P < 0.05$). The patients of the experiment experienced greater satisfaction than the patients of control group.

DISCUSSION

Pressure ulcer has multiple factors that include physical forces and OR conditions, such as pressure, shear, friction, moisture and temperature. This study focused on essential risk factors in order to carry out the appropriate interventions to prevent the surgery-related pressure ulcer. The preoperative visiting that focus on the concerns is the opportunity to identify patients at risk as soon as possible, so that a collaborative strategy and management can be achieved to reduce the risk factors (9).

The general anesthesia is administered for the procedure of combined hysteroscopy and laparoscopy. There are several risks factors of pressure ulcer related to the general anesthesia, such as immobilization, absence of skin sensitivity, changes in tissue perfusion and the patient's response to pain. If the patients under anesthesia are placed uncomfortably, the physical forces that establish and maintain a surgical position can damage the skin and nerves (3). In this study, nurses placed patients before the induction to ensure that patients can tolerate comfortably. The surgery-related skin and nerve injury can be minimized (3). Postoperative visiting showed that experimental group experienced greater satisfaction than the patients of control group. The incidences of pressure ulcer and nerve damage in the experimental group were lower than in the control group. The interventions implemented in the experimental group improved the quality of care for the patients undergoing this procedure. There was no difference between two groups in the stage of pressure ulcer which is the stage I and this result is the same with the Karadag' study (9).

In this surgery, liquid media can be used to distend the uterine cavity and maceration may occur. Adams (10) and Derler (11) report

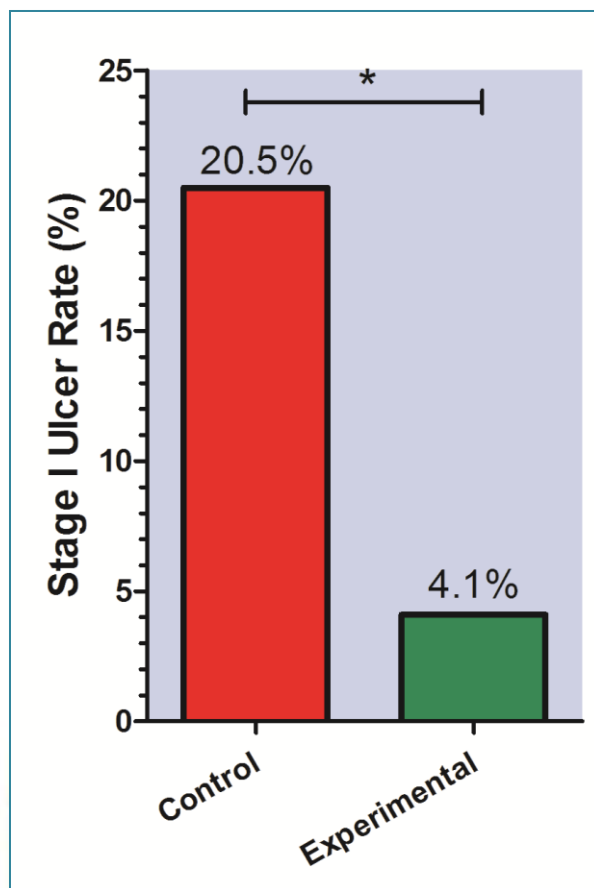


Figure 2. Comparison of pressure ulcer incidence.

The results of experimental group reveal a lower pressure ulcer incidence compared to control group. Only three patients (4.1%) suffered OR-induced pressure ulcer in the experimental group, compared with fifteen patients (20.5%) in the control group. This result can indicate that all these interventions, such as massaging high-risk areas before surgery, positioning before anesthesia and water-proof draping can remarkably diminish incidence of pressure ulcer.

that skin resistance to pressure from shearing force can be reduced by moisture and if friction occurs on macerated skin, skin becomes more vulnerable and weakened. In this study, applying the cream on the skin with massage can relax the muscles and promote the tissue perfusion. The cream is a water-repellent lubricant, so that maceration can be avoided and the impact of friction can be decreased. Furthermore, nurses provided water-proof sheet to avoid moisture. Compared with the control group, fewer patients in the experimental group suffered from OR – induced pressure ulcer. Applying the cream with massage and water-proof draping can reduce the incidence.

Fear of the unknown and anxiety are the common feelings for patients, so the physical, psychological and emotional preparation should be involved before surgery. Being familiar with the procedures and positioning can increase patients' confidence and bring better outcomes. Preoperative and postoperative visit-

ing contributed significantly to the patient's satisfaction. Nurses provided appropriate interventions to meet the physical, psychological and emotional needs for the experimental patients before, during, and after surgery. So the patient's feedback showed that the care interventions can fully satisfy them.

CONCLUSION

The purpose of this study is to explore some new strategies to diminish the surgery-associated pressure ulcer. Implementing the holistic interventions at all phases of surgical care can significantly reduce the incidence of pressure ulcer and the risk for intraoperatively acquired neuropathies in patients undergoing combined hysteroscopy and laparoscopy. Nursing actions in positioning should reflect an individualized plan of care designed to ensure injury prevention, while maintaining optimal surgical access, patient comfort, and physiologic support (3). Our study shows multiple interventions,

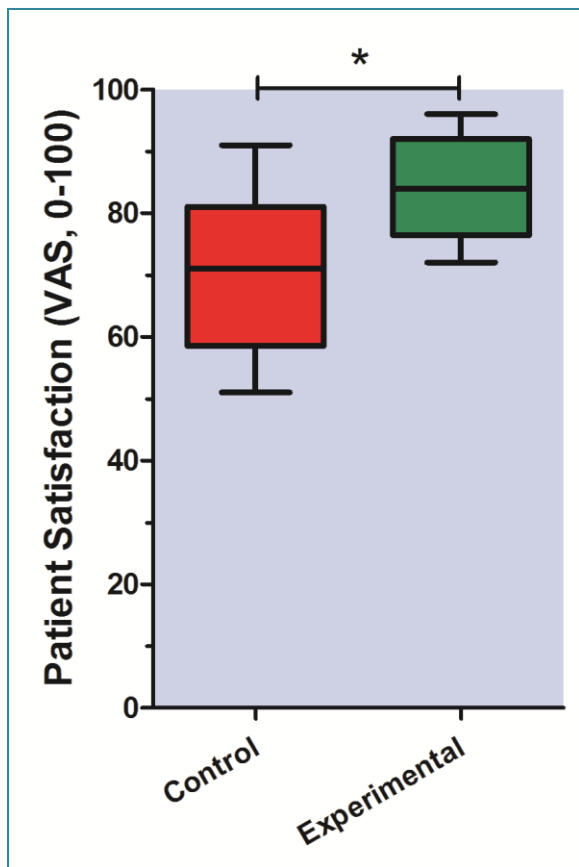


Figure 3. Patients' satisfaction score.

The comparison of the score of patient's satisfaction for the positioning between two groups with a mean score of 84 (84 ± 12) versus 71 (71 ± 20) and $P < 0.05$ can be considered significant. RN gave the preoperative education to develop patients' skills of preventing surgical complications. Furthermore, they communicated with patients about how to modify the positioning to make patients feel better before induction. Patients may better understand and cooperate with medical staff during procedure. In addition, they facilitated patients to establish a positive attitude towards treatment during postoperative visiting. Those strategies may explain why the mean score (84) in the experimental group was higher than the control group.

such as massaging high-risk areas before surgery, positioning before anesthesia, water-proof draping and perioperative education, those strategies going through all the periods of procedure can remarkably diminish incidence of OR induced pressure ulcer and increase the patient's satisfaction. Due to the limitations of demographic characteristics, further studies may need to be conducted among the patients of different ethnic groups.

Conflict of Interest

None

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References

1. Aronovitch SA. Intraoperatively acquired pressure ulcer prevalence: A national study. *Wound Ostomy Continence Nurs* 1999; 26: 130-136.
2. Schoonhoven L, Defloor T, Grypdonck MH. Incidence of pressure ulcers due to surgery. *Clin Nurs* 2002; 11: 479-487.
3. Heizenroth PA. Positioning the patient for surgery. *Alexander's Care of the Patient in Surgery*. Rothrock JC (Ed). ISBN: 978-0-323-06916-8. Mosby, Elsevier. 2011; pp144-173.
4. Hamlin L, Jenkins M, Conlon L. Patient safety. *Perioperative Nursing An introductory text*. Hamlin L, Richardson-Tench M, Davies M (Ed). ISBN: 978-0-7295-3887-9. Mosby, Elsevier. 2009; pp70-98.
5. Harvey C. Wound healing, skin integrity and wound care. *Potter & Perry's Fundamentals of Nursing*. Crisp J, Taylor C (Ed). ISBN: 978-0-7295-3862-6. Mosby, Elsevier. 2009; pp1326-1386.
6. Perez RO, Pecora RA, Giannini CG. Lower limb compartment syndrome associated with Lloyd-Davies/lithotomy position in colorectal surgery. *Hepato gastroenterology* 2004; 51: 100-102.
7. Szalay G, Meyer C, Ait V, Heiss C, Schnettler R, Hackethal A. Acute compartment syndrome of the lower leg as an interdisciplinary complication after long duration intervention in the lithotomy position. *Zentralbl Chir* 2010; 135: 163-167.
8. Struck AT, Hogg N, Thomas JP, Kalyanaraman B. Nitric Oxide compounds inhibit the toxicity low density lipoprotein to endothelial. *Febs Lett* 1995; 361: 291-293.
9. Karadag M, Gumuskaya N. The incidence of pressure ulcers in surgical patients: A sample hospital in Turkey. *Clin Nurs* 2006; 15: 413-421.
10. Xie HQ, Guo JS. Room temperature synthesis and mechanical properties of two kinds of elastomeric interpenetrating polymer networks based on castor oil. *Eur Polymer J* 2002; 11: 38.
11. Tran NB, Vialle J, Pham QT. Castor oil-based polyurethanes. *Polymer* 1997; 38: 2467-2473. ■