Review Article
The effect of perioperative nursing intervention on the pain control and nursing satisfaction of patients with gallstones after laparoscopic surgery

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Abstract: Objective: To explore the effect of perioperative nursing intervention on the pain control and nursing satisfaction of patients with gallstones after laparoscopic cholecystectomy (LC) surgery. Methods: 130 patients with gallstones treated laparoscopically in our hospital from October 2017 to October 2019 were recruited as the study cohort. Among them, the 80 patients in group A were given perioperative nursing intervention, and the 50 patients in group B were given routine nursing intervention. The surgical indications, epinephrine and norepinephrine levels, pain durations, mental health, IL-6 and ICAM-1 expression levels, quality of life, complications, and patient satisfaction in the two groups during and after the operation were determined. Results: The intraoperative and postoperative nursing indications of the patients in group A were better, with lower epinephrine and norepinephrine levels, lower HAMA and SDS scores, lower NPRS scores, shorter pain durations, lower IL-6 and ICAM-1 expression levels, lower complication rates, higher GOOLI-74 scores, and higher patient satisfaction. Conclusion: Perioperative nursing intervention can effectively improve patients' pain and numerous complications after LC, and the patients have a higher satisfaction with the nursing.

Keywords: Perioperative nursing intervention, gallstones, laparoscopic cholecystectomy, NPRS, GOOLI-74

Introduction

Gallstones are a common condition worldwide, especially in developed countries and regions. A gallstone is a large amount of solid material formed in the gallbladder. Excessive cholesterol and a lack of bile acids can easily lead to the formation of these solid substances [1-3]. Too much cholesterol can turn into solid crystals, which can precipitate and form gallstones. If the physiological state is normal, the cholesterol in the human body forms a dynamic equilibrium state in a mixed micelle composed of phospholipid and bile salt. If the body has pathological changes, such as excessive cholesterol, the excess cholesterol will become solid crystals and precipitate as described above, and then aggregate and fuse to form gallstones, causing further pathological changes [4, 5]. Gallstone patients usually have a higher risk of cardiovascular diseases, making cardiovascular and cerebrovascular diseases, such

as obesity and metabolic syndrome, more serious [6-9].

In recent years, laparoscopic cholecystectomy (LC) has gradually replaced traditional open surgery in the treatment of gallstones and has become the choice of many patients because it is less invasive and a leads to a better cure. However, compared with open surgery, LC is associated with more complications and a higher risk of postoperative stone recurrence if it is performed improperly and the patient is uncooperative. And ongoing complications can result in the hoped-for advantage of minimally invasive treatment being more than offset [10, 11]. Therefore, if we can solve the problems of improper LC operation and the patient's lack of cooperation, we can further improve the treatment method, and it will be more beneficial for the promotion of laparoscopic surgery. Meanwhile, preoperative education and postoperative nursing for patients are particularly impor-

tant for solving the problems of numerous postoperative complications and stone recurrence. Perioperative nursing intervention has a great effect on solving these problems in patients. Due to advances in medical technology, patients lack contact with medical staff during the perioperative period, resulting in their inability to receive better nursing care [12]. Therefore, during the perioperative period, the nursing of patients can be realized by adhering to evidence-based guidelines [13]. At the same time, the patients' family members can be involved in the preoperative evaluation, education, intervention, and decision-making, enabling them to participate in the nursing [14]. During the perioperative nursing period, nurses must pay attention to the personality and preferences of patients and formulate personalized nursing plans according to these needs of patients [15]. In recent years, however, few studies have been done on the effect of perioperative nursing intervention on LC and postoperative gallstone resection. This study will examine the effect of this nursing method on patients with gallstones after laparoscopic surgery from the point of view of the postoperative pain, nursing satisfaction, and other related indicators.

Methods

General data

Altogether 130 gallstone patients treated using LC in our hospital from October 2017 to October 2019 were selected as the study cohort. Among them, the 80 patients in group A were given perioperative nursing intervention, and the 50 patients in group B were given routine nursing intervention. Each patient's family members were informed of the study and signed a consent form. The ethics committee of our hospital approved the study.

Inclusion and exclusion criteria

Inclusion criteria: The patients in the study were clearly diagnosed according to the clinical diagnostic criteria for gallstones and were found to be eligible for laparoscopic surgery without any relevant contraindications, and they passed the routine examination and medical history inquiry after admission. Exclusion criteria: patients with malignant tumors, systemic diseases, and with contraindications related to laparoscopic surgery.

Methods

Both groups of patients were treated with LC. After the surgery, group B underwent routine nursing. The vital signs of the patients, such as routine blood pressure and heart rate were monitored. The patients received oxygen inhalation care and conventional drugs. In addition to this nursing, group A underwent perioperative nursing intervention. Before the surgery, the medical staff actively and effectively communicated with the patients, effectively controlled their mental health level changes, and relieved their adverse emotions such as anxiety and depression to make sure that they had confidence they would recover from the disease and regulate their diet, sometimes requiring fasting. During the surgery, the patient was asked to lie in a supine position, and the positions of the head and feet were adjusted according to the his/her perception. A vein channel was built in the patient's arm, and the appropriate blood transfusion scheme would be chosen if the patient needed one. The medical staff paid attention to cleaning the patients' wounds after the surgery. During the nursing process after the surgery, it was also necessary to monitor the patients' various vital signs, such as routine blood pressure, heart rate, etc. If the patient had pain-related symptoms, corresponding relief measures were taken. In addition, the wound and drainage tube were given care, and the patients' diets were regulated and guided accordingly.

Clinicopathological data

Surgical indications: The surgical indications of the two groups of patients during and after the surgery were observed and compared, including surgery time, average blood loss, postoperative hospital stay, time to getting out of bed, and exhaust time.

Epinephrine and norepinephrine levels: The epinephrine and norepinephrine levels at admission were measured and compared in the two groups. Before the postoperative nursing, 3 days after postoperative nursing, and 7 days after postoperative nursing, 5 ml of each patient's blood was extracted to measure their levels of epinephrine and norepinephrine.

Pain: The NPRS of the two groups at 3 days after the postoperative nursing and 7 days

Table 1. General data of the two groups

Classification	Group A (n=80)	Group B (n=50)	t/X^2	P
Gender			0.25	0.618
Male	38 (47.50)	26 (52.00)		
Female	42 (52.50)	24 (48.00)		
Age (years)	55.66±5.32	55.43±5.41	0.24	0.812
BMI (kg/m^2)	21.21±1.55	21.43±1.68	0.76	0.447
Smoking			0.21	0.648
Present	48 (60.00)	32 (64.00)		
Absent	32 (40.00)	18 (36.00)		
Drinking			0.12	0.725
Present	52 (65.00)	34 (68.00)		
Absent	28 (22.50)	16 (32.00)		
Hyperlipidemia			0.14	0.705
With	60 (75.00)	36 (72.00)		
Without	20 (25.00)	14 (28.00)		
Hypertension			0.75	0.388
With	70 (87.50)	41 (82.00)		
Without	10 (12.50)	9 (18.00)		
Diabetes			0.02	0.878
With	68 (85.00)	42 (84.00)		
Without	12 (15.00)	8 (16.00)		

after postoperative nursing were observed and compared [16], and the pain durations of the patients in the two groups were observed and compared. The higher the NPRS score, the longer the duration, indicating a worse pain situation.

Mental health: The mental health levels of the patients in group A and group B at admission and after one month of postoperative nursing were evaluated and compared. The Hamilton anxiety rating scale (HAMA) [17] and the self-rating depression scale (SDS) [18] were applied as the evaluation criteria. The worse the mental health level of the patients, the higher the scores.

The expression levels of IL-6 and ICAM-1: The expression levels of IL-6 and ICAM-1 were measured and compared between the two groups before the postoperative nursing, at 14 days after the postoperative nursing, and at 1 month after the postoperative nursing. At the time of admission, at 14 days after the operation, and at 1 month after the operation, 5 ml of the patient's blood was drawn. The blood was first allowed to stand for stratification, then centri-

fuged at 1500× at 4°C for 10 min to separate the serum. Then it was stored at -20°C for testing. IL-6 and ICAM-1 were measured using ELISA.

Quality of life: The patients' quality of life was evaluated and compared. The Generic Quality of Life Inventory-74 (GOOLI-74) [19] was used as the evaluation standard. A higher score indicated a better quality of life.

Complications: The postoperative complications of the two groups were analyzed and compared, including bile duct injuries, subcutaneous emphysema, abdominal infections, and incision infections.

Treatment satisfaction: The treatment satisfaction of the two groups of patients was measured and compared in the form of a questionnaire, with a self-made test content and scoring standard. The total possible score was 100 points, of which 100-85 points indicated satisfied, more than 65 points indicated basically satisfied, and less than 65 points indicated dissatisfied.

Statistical methods

SPSS 19.0 (Asia Analytics Formerly SPSS China) was used for °C statistical analysis of °C comprehensive data. X^2 tests were applied for °C counting data. The measurement data were represented as (X±S), and t tests were adopted. When P<0.05, a difference was considered statistically significant.
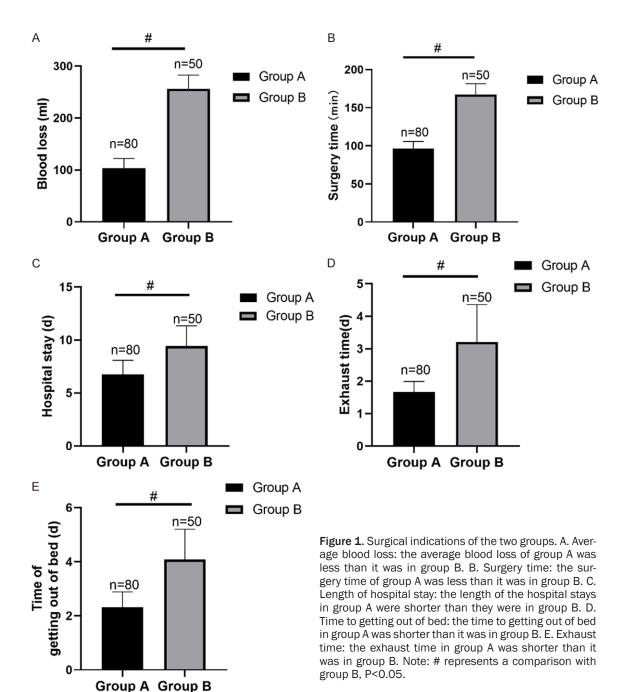
Results

General data

There were no significant differences between the two groups in terms of the general data, including gender, age, BMI, smoking history, drinking history, or obesity (P>0.05), as shown in **Table 1**.

Group A had better intraoperative and postoperative surgical indications than group B

The surgical indications were compared between the two groups. Compared with group B, the patients in group A had less average blood loss, shorter surgery times, shorter postoperative hospital stays, shorter times getting out of

Figure 1. Surgical indications of the two groups. A. Average blood loss: the average blood loss of group A was less than it was in group B. B. Surgery time: the surgery time of group A was less than it was in group B. C. Length of hospital stay: the length of the hospital stays in group A were shorter than they were in group B. D. Time to getting out of bed: the time to getting out of bed in group A was shorter than it was in group B. E. Exhaust time: the exhaust time in group A was shorter than it was in group B. Note: # represents a comparison with group B, P<0.05.

bed, and shorter exhaust times (P<0.05), as shown in **Figure 1**.

The epinephrine and norepinephrine levels in group A were lower than those in group B

The epinephrine and norepinephrine levels were compared. There was no significant difference in the levels of the two between group A and group B before the postoperative nursing, but the two levels in group A at 14 days and one

month after the postoperative nursing were lower than the levels in group B (P<0.05), as shown in **Figure 2**.

The pain duration scores in group A were less than they were in group B

By comparing the NPRS scores and the pain durations of the two groups, it could be seen that the NPRS scores in group A were remarkably lower than they were in group B (P<0.05),
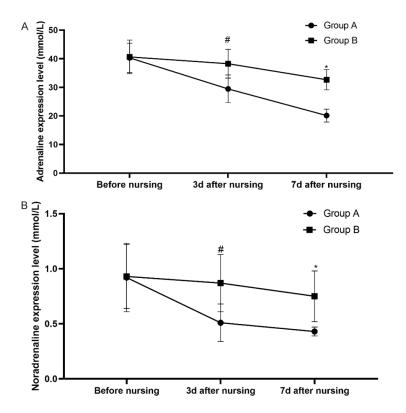
Figure 2. The epinephrine and norepinephrine levels in the two groups. A. Epinephrine: the epinephrine level in group A was notably lower than it was in group B at 3 days and 7 days after the nursing. B. Norepinephrine: the norepinephrine level in group A was notably lower than it was in group B at 3 days and 7 days after the nursing. Notes: # represents a comparison with the level before treatment, $P<0.05$, * represents a comparison with the level after treatment, $P<0.05$.

Table 2. Pain scores and durations in the two groups

Classification	Group A (n=80)	Group B (n=50)	t	P
NPRS score	1.98±0.45	3.96±1.32	12.34	<0.001
Duration (d)	3.32±0.56	6.31±1.65	14.92	<0.001

and the pain duration of group A was notably shorter than it was in group B (P<0.05). More details are shown in **Table 2**.

The mental health level of group A was better than it was in group B

The HAMA and SDS scores of the patients in the two groups at the time of admission and at one month after the postoperative nursing were compared. It was found that the two scores in the patients in the two groups at the time of admission were not significantly different. After one month of postoperative nursing, the two scores in group A were remarkably lower than the scores in group B (P<0.05), as shown in **Figure 3**.

The IL-6 and ICAM-1 expression levels in group A were lower than they were in group B

The IL-6 and ICAM-1 expression levels were compared. It was found that there was no significant difference in the expression levels of the two between group A and group B before admission, but the two levels in group A were lower than they were in group B at 14 days and at 1 month of postoperative nursing (P<0.05). As shown in **Figure 4**.

Group A had a better quality of life than group B

By comparing the GOOLI-74 scores between the two groups, it was found that the material life condition, social function, physical function, and psychological function scores in group A were considerably higher than the corresponding scores in group B (P<0.05), as shown in **Table 3**.

The complication rate in group A was lower than it was in group B

By investigating the incidence of complications in the two groups of patients, it was found that the incidence of complications in group A was remarkably higher than it was in group B (P<0.05), as shown in **Table 4**.

Group A had higher treatment satisfaction than group B

Our investigation of the patient satisfaction with the treatment indicated that the patients in group A had a remarkably higher degree of satisfaction than the patients in group B did (P<0.05). More details are shown in **Table 5**.

Discussion

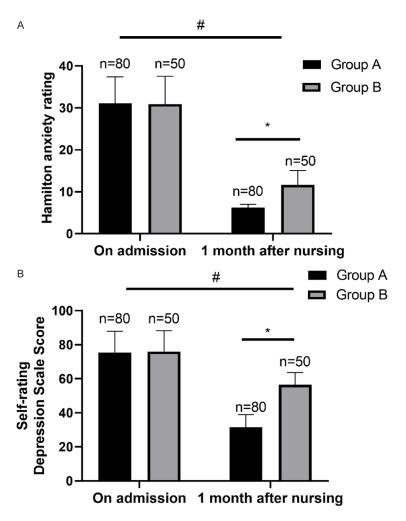For patients suffering from gallstones and their healthcare providers, it is extremely important

Figure 3. The mental health levels of the two groups. A. HAMA scores: one month after surgery, the HAMA scores decreased in both groups, and group A had notably lower scores than group B (P<0.05). B. SDS scores: one month after the surgery, the SDS scores decreased in both groups, and group A had notably lower scores than group B (P<0.05). Notes: # represents a comparison with before the treatment, P<0.05, * represents a comparison with group B, P<0.05.

remarkably lower pain scores and shorter pain durations. The probability of complications was also much lower than it was in group B using conventional nursing methods. At the same time, according to the inflammatory reactions observed in this experiment, the expression inflammatory factor IL-6 and ICAM-1 expression levels in group A were lower than they were in group B after the laparoscopic surgery. Although most of the damage caused by laparoscopic cholecystectomy is mild, this type of surgery is prone to cause extensive and complex damage to the biliary system and may ultimately have serious consequences for the patient. The patients will not only feel pain, but they will also be affected by a series of complications caused by bile duct injury [22]. Bile duct injury may lead to bile leakage, peritonitis and inflammatory reactions caused by a series of infections, eventually triggering septicemia, secondary biliary cirrhosis, liver failure, and even death in serious cases. Even if these complications can be relieved after surgery, these patients need to pay a return visit from time to time to confirm whether the complications will recur. Lots of these intraoperative complications are the result of mistakes made during the surgery [23]. The application of perioperative nursing intervention enables medical staff to provide better nursing for patients before, during, and after the operation, so that they can have a good dialogue with patients before the operation and conduct careful health education for them, so as to avoid various mistakes during the operation. In addition, fewer surgical errors occur due to the better intraoperative status of the medical staff and the patient's cooperation [24, 25]. Therefore, due to the lower number of errors, the complications in group A were also less frequent. From the perspective of the
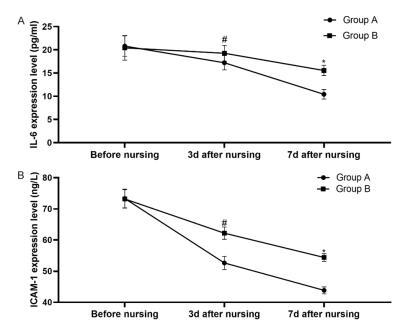
to ensure the safety of the surgery. LC is one of the most commonly used conventional surgeries in the world, especially in the treatment of gallstones. However, this kind of surgery tends to cause a high incidence of complications and has the risk of serious biliary tract injuries [20, 21]. A good nursing method can reduce the risks brought by surgery; therefore, in this experiment, we explored the effect of perioperative nursing intervention on patients with gallstones.

Judging from the pain and complication rates of the two groups of patients, group A, which applied perioperative nursing intervention, had

Figure 4. The IL-6 and ICAM-1 expression levels in the two groups. A. Expression level of IL-6: the IL-6 expression level in group A was notably lower than it was in group B at 3 days and 7 days after nursing. B. Expression level of ICAM-1: the ICAM-1 expression level in group A was notably lower than it was in group B at 3 days and 7 days after the nursing. Notes: # represents a comparison with before the treatment, $P<0.05$, * represents a comparison with after the treatment, $P<0.05$.

Table 3. GOOLI-74 quality of life scores in the two groups of patients

Classification	Group A (n=80)	Group B (n=50)	t	P
Material life conditions	74.65±10.21	65.54±8.67	5.24	<0.001
Social functioning	78.73±12.97	70.69±9.43	3.80	<0.001
Physical function	76.32±11.57	68.43±7.35	4.31	<0.001
Psychological function	79.86±13.45	71.65±9.79	3.74	<0.001

Table 4. Complication rates in the two groups

Classification	Group A (n=80)	Group B (n=50)	X^2	P
Bile duct injury	2 (2.50)	5 (10.00)		
Subcutaneous emphysema	0 (1.25)	3 (10.00)		
Abdominal infection	0 (0.00)	1 (6.25)		
Incision infection	0 (2.50)	3 (2.50)		
Complication rate (%)	2 (2.50)	11 (22.00)	13.00	<0.001

Table 5. Patient satisfaction in the two groups

Classification	Group A (n=80)	Group B (n=50)	X^2	P
Satisfied	52 (65.00)	24 (48.00)	-	-
Basically satisfied	24 (30.00)	14 (28.00)	-	-
Dissatisfied	4 (5.00)	12 (24.00)	-	-
Total effective rate %	76 (95.00)	38 (76.00)	10.29	0.001

NPRS scores and the pain durations, it was also because of fewer errors that the patients in group A experienced less pain and a shorter pain duration during surgery. The experimental results showed that perioperative nursing can effectively reduce the pain of patients with gallstones who have undergone laparoscopic surgery and can reduce the occurrence of complications and inflammatory reactions caused by it.

Seen from the perspective of the epinephrine and norepinephrine levels in the patients, the two indexes after the surgery in group A were lower than they were in group B. The epinephrine and norepinephrine levels were correlated with the postoperative outcomes. If a patient has lower levels of epinephrine and norepinephrine, it means that the patient's anxiety and depression are lower [26]. At the same time, the HAMA and SDS scores in group A were lower, suggesting that the patients' anxiety and depression was relieved, and the perioperative nursing intervention was better able to relieve the patients' anxiety and depression. Due to the emotional relief, group A had shorter surgery times, less average blood loss, shorter times to getting out of bed after surgery, shorter exhaust times, and they avoided long hospital stays. From the conclusion drawn above, as the patients were no longer anxious and had more confidence, and with the better surgical status of the medical staff and the patient's cooperation, the number of errors during the operations were reduced, the operation times were shortened, and the intra-

operative bleeding was reduced. In this case, the incidence rate of the complications and the expression levels of the inflammatory factors of the patient are also greatly reduced. As the nursing effect is better, the quality of life of the group A patients was also better. In our survey of the patients' satisfaction after surgery, the patients in group A who received perioperative nursing intervention were more satisfied with the nursing. Based on the survey results examining patient satisfaction with the surgery, perioperative nursing intervention can make patients more satisfied. However, we have not been able to observe the degree of cooperation between the two groups during the study and the compliance of postoperative nursing. Therefore, we cannot judge whether the patients were satisfied with the processes of intraoperative and postoperative nursing, which is a defect of this study. In future research, the patients' intraoperative cooperation and postoperative nursing compliance need to be included in the examined quantitatively to better improve the nursing mode.

To sum up, perioperative nursing intervention can effectively improve patients' pain and reduce the number of complications after LC, and the patients have a higher satisfaction with the nursing.

Disclosure of conflict of interest

None.

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References

[1] Ferkingstad E, Oddsson A, Gretarsdottir S, Benonisdottir S, Thorleifsson G, Deaton AM, Jonsson S, Stefansson OA, Norddahl GL, Zink F, Arnadottir GA, Gunnarsson B, Halldorsson GH, Helgadottir A, Jensson BO, Kristjansson RP, Sveinbjornsson G, Sverrisson DA, Masson G, Olafsson I, Eyjolfsson GI, Sigurdardottir O, Holm H, Jonsdottir I, Olafsson S, Steingrimsdottir T, Rafnar T, Bjornsson ES, Thorsteinsdottir U, Gudbjartsson DF, Sulem P and Stefansson K. Genome-wide association meta-analysis yields 20 loci associated with gallstone disease. Nat Commun 2018; 9: 5101.

[2] Lammert F, Gurusamy K, Ko CW, Miquel JF, Mendez-Sanchez N, Portincasa P, van Erpecum KJ, van Laarhoven CJ and Wang DQ. Gallstones. Nat Rev Dis Primers 2016; 2: 16024.

[3] Wang TY, Portincasa P, Liu M, Tso P and Wang DQ. Mouse models of gallstone disease. Curr Opin Gastroenterol 2018; 34: 59-70.

[4] Claudel T, Zollner G, Wagner M and Trauner M. Role of nuclear receptors for bile acid metabolism, bile secretion, cholestasis, and gallstone disease. Biochim Biophys Acta 2011; 1812: 867-878.

[5] Cheng S, Zou M, Liu Q, Kuang J, Shen J, Pu S, Chen L, Li H, Wu T, Li R, Li Y, Jiang W, Zhang Z and He J. Activation of constitutive androstane receptor prevents cholesterol gallstone formation. Am J Pathol 2017; 187: 808-818.

[6] Chavez-Tapia NC, Kinney-Novelo IM, Sifuentes-Renteria SE, Torres-Zavala M, Castro-Gastelum G, Sanchez-Lara K, Paulin-Saucedo C, Uribe M and Mendez-Sanchez N. Association between cholecystectomy for gallstone disease and risk factors for cardiovascular disease. Ann Hepatol 2012; 11: 85-89.

[7] Chen LY, Qiao QH, Zhang SC, Chen YH, Chao GQ and Fang LZ. Metabolic syndrome and gallstone disease. World J Gastroenterol 2012; 18: 4215-4220.

[8] Jiang ZY, Sheng X, Xu CY, Li WW, Chang XX, Sun LY, Yang XB and Yu LF. Gallbladder gallstone disease is associated with newly diagnosed coronary artery atherosclerotic disease: a cross-sectional study. PLoS One 2013; 8: e75400.

[9] Fairfield CJ, Wigmore SJ and Harrison EM. Gallstone disease and the risk of cardiovascular disease. Sci Rep 2019; 9: 5830.

[10] Goldacre MJ, Wotton CJ, Abisgold J, Yeates DG and Collins J. Association between cholecystectomy and intestinal cancer: a national record linkage study. Ann Surg 2012; 256: 1068-1072.

[11] Zhang Y, Peng J, Li X and Liao M. Endoscopic-laparoscopic cholecystolithotomy in treatment of cholecystolithiasis compared with traditional laparoscopic cholecystectomy. Surg Laparosc Endosc Percutan Tech 2016; 26: 377-380.

[12] Mazurenko O, Zemke D, Lefforge N, Shoemaker S and Menachemi N. What determines the surgical patient experience? Exploring the patient, clinical staff, and administration perspectives. J Healthc Manag 2015; 60: 332-346.

[13] Hohenberger H and Delahanty K. Patient-centered care--enhanced recovery after surgery and population health management. AORN J 2015; 102: 578-583.

[14] Spruce L. Back to basics: patient and family engagement. AORN J 2015; 102: 34-37; quiz 38-39.

[15] Shin S and Kang J. Development and validation of a person-centered perioperative nursing scale. Asian Nurs Res (Korean Soc Nurs Sci) 2019; 13: 221-227.

[16] Sharma S, Palanchoke J, Reed D and Haxby Abbott J. Translation, cross-cultural adaptation and psychometric properties of the Nepali versions of numerical pain rating scale and global rating of change. Health Qual Life Outcomes 2017; 15: 236.

[17] Yin G, Li Y, Xu W and Han N. Chart review of patients receiving valsartan-amlodipine single-pill combination versus valsartan and amlodipine combination for blood pressure goal achievement and effects on the Hamilton anxiety rating/Hamilton depression rating scales. Medicine (Baltimore) 2019; 98: e18471.

[18] Chung K, Jeon MJ, Park J, Lee S, Kim CO and Park JY. Development and evaluation of a mobile-optimized daily self-rating depression screening app: a preliminary study. PLoS One 2018; 13: e0199118.

[19] Matthews PRL, Horder J and Pearce M. Selective noradrenaline reuptake inhibitors for schizophrenia. Cochrane Database Syst Rev 2018; 1: CD010219.

[20] Barrett M, Asbun HJ, Chien HL, Brunt LM and Telem DA. Bile duct injury and morbidity following cholecystectomy: a need for improvement. Surg Endosc 2018; 32: 1683-1688.

[21] Gupta V and Jain G. Safe laparoscopic cholecystectomy: adoption of universal culture of safety in cholecystectomy. World J Gastrointest Surg 2019; 11: 62-84.

[22] Ambe PC, Plambeck J, Fernandez-Jesberg V and Zarras K. The role of indocyanine green fluoroscopy for intraoperative bile duct visualization during laparoscopic cholecystectomy: an observational cohort study in 70 patients. Patient Saf Surg 2019; 13: 2.

[23] Abbasoglu O, Tekant Y, Alper A, Aydin U, Balik A, Bostanci B, Coker A, Doganay M, Gundogdu H, Hamaloglu E, Kapan M, Karademir S, Karayalcin K, Kilicturgay S, Sare M, Tumer AR and Yagci G. Prevention and acute management of biliary injuries during laparoscopic cholecystectomy: expert consensus statement. Ulus Cerrahi Derg 2016; 32: 300-305.

[24] Blomberg AC, Bisholt B and Lindwall L. Responsibility for patient care in perioperative practice. Nurs Open 2018; 5: 414-421.

[25] Blomberg AC, Lindwall L and Bisholt B. Operating theatre nurses' self-reported clinical competence in perioperative nursing: a mixed method study. Nurs Open 2019; 6: 1510-1518.

[26] Wong H, Singh J, Go RM, Ahluwalia N and Guerrero-Go MA. The effects of mental stress on non-insulin-dependent diabetes: determining the relationship between catecholamine and adrenergic signals from stress, anxiety, and depression on the physiological changes in the pancreatic hormone secretion. Cureus 2019; 11: e5474.