Study on Prevention and Treatment Strategies for Pressure Injury in Operating Room

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Abstract: Objective: To study the prevention and treatment strategies for pressure injury in the operating room. Methods: 116 patients who underwent surgery in our hospital from January 2016 to May 2023 were selected as research subjects by random number method, and were randomly divided into the research group (n=58) and the control group (n=58). The control group was treated with conventional interventions, and the research group was treated with interventions in the operating room. The incidence of pressure injuries, pressure injury recovery scoring, SAS, and SDS scores were compared between the two groups. Results: After the intervention, the incidence of pressure injuries in the research group was lower than that in the control group, and the postoperative mobility and perception were better than those in the control group. In addition, the negative emotions such as anxiety and depression produced during the treatment of the patients in the research group were more effectively alleviated under intervention. The results of this study are statistically significant, with $P < 0.05$. Conclusion: Intervention measures can effectively alleviate the negative emotions produced during the treatment of patients, reduce the incidence of postoperative pressure injuries, alleviate the patient's pain and financial pressure, shorten the recovery time of patients, and improve the mobility and perception ability of patients after the occurrence of compression injuries.
***Keywords*:** pressure injury, in operating room, prevention and treatment, strategy study

1. Introduction

Pressure injury is a condition in which the local skin tissue of the body is subjected to long-term pressure, causing local tissue dampness, limited blood circulation and tissue nutrient supply, resulting in damage to the skin surface and, in severe cases, local tissue necrosis[1]. With the continuous development of science and technology, the utilization rate of minimally invasive surgery and related medical equipment has increased, making the complexity, difficulty, and time of surgical operations increase[2]. In particular, cranial surgery usually needs to be performed for more than 8 hours, and patients need to maintain the same position during surgery, which can easily cause severe pressure injuries[3-4]. Pressure injuries can prolong the hospital stay of patients, not only increasing the financial burden of patients but also occupying more medical resources. The increased probability of infection from pressure injuries significantly affects the prognosis, thereby increasing doctor-patient conflicts and patient dissatisfaction[5]. Positive and effective intraoperative interventions and strengthening the treatment of intraoperative pressure injuries require correct methods. This paper aims to study the prevention and treatment strategies for pressure injuries in the operating room, which are reported in detail below.

2. Materials and Methods

2.1 General Information

116 patients who underwent surgical operations in our hospital from January 2016 to May 2023 were selected as research subjects by random number method, and were randomly divided into the research group (n=58) and the control group (n=58). In order to ensure the scientific impact of the grouping on the research results, the general information such as age, marital status, educational level, and gender of the subjects in the two groups was statistically analyzed, and there was no statistically significant difference between the groups ($P > 0.05$). Comparative experiments could be carried out, see Table 1 for details.

Table 1. Comparison of General Information of Research Subjects (n, %)

Scoring Dimension		Research Group/58	Control Group/58	x^2	P
Age (years)	18-60 years old	58.62 (34/58)	51.72 (30/58)	0.558	0.455
	>60 years old	41.38 (24/58)	48.28 (28/58)		
Marital Status	Married	70.69 (41/58)	74.14 (43/58)	0.173	0.678
	Unmarried	29.31 (17/58)	25.86 (15/58)		
Education Level	Junior High School and Below	44.83 (26/58)	39.66 (23/58)	0.318	0.573
	High School and Above	55.17 (32/58)	60.34 (35/58)		
Gender	Male	43.1 (25/58)	46.55 (27/58)	0.139	0.709
	Female	56.90 (33/58)	53.45 (31/58)		

Inclusion Criteria: (1) Conform to the diagnosis criteria for postoperative pressure injury in the "Clinical Disease Diagnosis and Therapeutic Effect Judgment Standards"; (2) No coagulation dysfunction or metabolic disease; (3) All receiving surgical treatment in our hospital; (4) After admission, treatment details are agreed upon by family members, and informed consent is signed; Exclusion Criteria: (1) Cognitive impairment or mental illness; (2) Suffering from malignant tumors or serious abnormalities in heart, liver, or kidney function; (3) Clinical data is incomplete or patient withdraws mid-study[6].

2.2 Prevention and Treatment Methods

The control group was treated with routine interventions, while the research group was treated with intraoperative interventions. The specific plan includes: (1) Carry out risk assessment of pressure injury based on the patient's skin status, and understand the risk factors for the occurrence of the patient's disease. (2) Strengthen the training and assessment related to pressure injury for medical staff in the operating room, enhance the knowledge reserve of medical staff, and make a certain evaluation of the risk of pressure injury in patients in actual work. (3) Regular visits are required for elderly patients, those with long surgery time, and those with thin body shape. Inform patients of the posture they need to maintain during surgery, introduce the surgical environment to patients in advance, and grasp necessary factors such as the patient's preoperative physical condition. (4) If the operation time is long, medical staff need to change the patient's posture according to actual needs with the agreement of the main surgeon, simply adjust the angle of the operating table, and choose suitable pressure-relief foam pads, water belts, etc. By increasing the area under pressure to reduce local pressure, the pressure-bearing parts of the patient are protected, or ointment is applied to the pressure-bearing parts of the patient to maintain the moisture of the skin. (5) Provide patients with soft and smooth sheets, avoid dragging as much as possible when moving and placing the patient's posture, prevent skin friction injuries, and massage the patient's pressure-bearing parts regularly, especially within the first 3 days after surgery, which is the high-incidence period of pressure injuries, intensify the care of the patient's pressure-bearing parts during this period. (6) Increase the intake of high-quality protein nutrition for patients after surgery, moderately supplement vitamins to increase the patient's postoperative nutrition, massage the pressure-bearing parts regularly to promote body blood circulation, so as to achieve the goal of improving immunity and reducing the incidence of pressure injuries. (7) Remind patients to quit smoking and alcohol during treatment, closely observe patients' vital signs, and their physical activity and perception ability before and after surgery.

2.3 Evaluation Standards for Observation Indicators

(1) The total incidence of pressure injuries from the pressure injury site is calculated for both groups. The higher the proportion of total incidence indicates the worse the intervention effect.

(2) Analyze postoperative mobility and postoperative perception ability before and after intervention, and score them. The higher the score indicates the better the recovery effect.

(3) According to the common touch results in China, the SAS, SDS standard score boundary value is 50 points. Scores of 50-59 are considered mild anxiety, 60-69 are moderate anxiety, and scores above 70 are severe anxiety.

2.4 Statistical Methods

After entering the research data into an Excel spreadsheet, the measurement data was organized using ($\bar{x}\pm s$) to represent continuous variable data, which was subject to a t-test if it conformed to a normal distribution; (n,%) was used to represent qualitative data, which underwent a x^2 test. The analysis of the differences in the research data was completed using the SPSS 25.0 statistical software. If the result was $P < 0.05$, the difference was statistically significant.

3. Results

3.1 Comparison of IAPU Occurrence in Both Groups

After intervention, the incidence of pressure injuries in the research group (8.62%) was lower than that in the control group (22.41%). The difference between the groups was statistically significant, $P < 0.05$, see Table 2 for details.

Table 2. Comparison of IAPU Occurrence in Both Groups (n,%)

Injury Site	Research Group/58	Control Group/58	x^2	P
Back	3.45 (2/58)	5.17 (3/58)	0.209	0.648
Chest	1.72 (0/58)	0.00 (1/58)	1.009	0.315
Lower Limbs	1.72 (1/58)	5.17 (3/58)	1.036	0.309
Face	0.00 (0/58)	1.72 (0/58)	1.009	0.315
Abdomen	1.72 (1/58)	3.45 (2/58)	0.342	0.559
Buttocks	1.72 (1/58)	5.17 (3/58)	1.036	0.309
Total	8.62 (5/58)	22.41 (13/58)	4.209	0.040

3.2 Comparison of Pressure Injury Recovery Between Two Groups

Before the intervention, the postoperative activity and perception ability recovery of the two groups were relatively low. After the intervention, the postoperative activity ability (85.56±3.68) and postoperative perception ability (90.42±3.21) in the research group were significantly superior to those in the control group. The difference between the two groups was statistically significant, $P<0.05$, as detailed in Table 3.

Table 3. Comparison of Pressure Injuries Between Two Groups ($\bar{x}$±s)

Group	n	Postoperative Activity (Score)		Postoperative Perception (Score)	
		Pre-intervention	Post-intervention	Pre-intervention	Post-intervention
Research Group	58	42.56±2.23	85.56±3.68	52.23±2.69	90.42±3.21
Control Group	58	41.34±3.31	83.41±3.23	53.48±2.21	84.36±3.74
t		2.328	3.344	2.734	9.364
P		0.022	0.001	0.007	0.000

3.3 Comparison of SAS and SDS Scores between the Two Groups

After the intervention, the SAS and SDS scores of both groups were lower than before the intervention, and the SAS (33.82±3.78) and SDS (30.42±3.21) scores of the research group after intervention were significantly lower than those of the control group. The difference between the groups was statistically significant, $P < 0.05$. See Table 4 for details.

Table 4. Comparison of SAS and SDS Scores between the Two Groups ($\bar{x}$±s)

Group	n	SAS (Score)		SDS (Score)	
		Pre-intervention	Post-intervention	Pre-intervention	Post-intervention
Research Group	58	52.86±2.23	33.82±3.78	53.23±2.69	30.42±3.21
Control Group	58	52.34±2.31	45.75±3.46	53.48±2.21	42.36±3.74
t		1.233	17.730	0.547	18.450
P		0.220	0.000	0.586	0.000

4. Discussion

There are certain differences between domestic and international reports regarding the causes of pressure injuries in the operating room. International reports indicate that the longer the operation time for adults, the higher the incidence of pressure injuries [7-8]. Scholars in our country have conducted statistical studies on patients with different types of surgery. The statistical results show that preoperative pressure skin condition, fasting time, and other factors can increase the color and shape changes of the patient's skin, causing varying degrees of pressure injuries [9], which bring more negative emotions and financial pressure to patients [10]. With the advancement of medical technology, the mode of intervention has undergone new changes, and the prevention and treatment of pressure injuries have received attention from clinical medical staff.

This study took 116 patients who underwent surgical operations in our hospital from January 2016 to May 2023 as research subjects, among whom 18 patients suffered from pressure injuries at different parts, with an incidence rate of

0.16%. The results of this study showed that the incidence of pressure injuries in the research group was lower than that in the control group. The SAS and SDS scores of the two groups recovered to normal levels, and the recovery of pressure injuries in the research group after intervention was significantly better than that in the control group. The difference between the groups was statistically significant, $P < 0.05$. It can be seen that by improving the intervention ability of medical staff and starting from the cause of pressure injuries, combined with the actual surgical situation of patients, formulating targeted intervention measures for patients, and popularizing the need for changes in diet and lifestyle after the occurrence of pressure injuries, can effectively alleviate the negative emotions of patients during treatment, reduce the incidence of postoperative pressure injuries, relieve patient pain and financial pressure, shorten patient recovery time, and improve patient's activity and perception ability after the occurrence of pressure injuries.The probability of pressure injuries caused by surgical operations is high. If intervention is not timely, it will not only increase the incidence of intraoperative pressure injuries, but also exacerbate the area and severity of pressure injuries, increase the difficulty of treatment and patient suffering. In clinical treatment of surgical operations, it is important to pay attention to the problems of pressure injuries in elderly patients, those with abnormal BMI, and patients undergoing general anesthesia for a long time. Effective intervention and treatment can reduce the incidence of pressure injuries during surgical operations, decrease the impact of pressure injuries on patient safety, and reduce patient suffering by addressing pressure injuries during surgery.

5. Conclusion

In conclusion, intervention and treatment for pressure injuries in surgical patients can effectively alleviate the negative emotions generated by patients during treatment, reduce the incidence of pressure injuries after surgery, alleviate patient's pain and financial pressure, shorten the recovery time, and improve the patient's activity and perception ability after the occurrence of compressive injuries. It is worthy of promotion and application in clinical treatment.

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