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Original Article

Influences of Hiao's double-C nursing model combined with pain care on postoperative satisfaction with pain control and complications in patients with mixed hemorrhoids

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Abstract: Objective: To explore the influences of Hiao's double-C nursing model combined with pain care on postoperative satisfaction with pain control and complications in patients with mixed hemorrhoids. Methods: A total of 80 patients with mixed hemorrhoids admitted to our hospital from January 2019 to October 2020 were selected as the study subjects, and they were divided into a regular group (n = 43) and a combined group (n = 37) based on different nursing methods. The regular group was treated with routine nursing care, while the combined group was treated with Hiao's double-C nursing model combined with pain care. The degrees of pain, duration of pain, satisfaction with pain control, quality of life and complications were compared between the two groups. Results: At 6 h, 24 h and 72 h after surgery, the combined group had markedly lower visual analogue scale (VAS) scores and a noticeably shorter duration of pain than that of the regular group ($P < 0.05$). Compared with the regular group, the combined group scored significantly lower on pain experience and expectation, and influences of pain on emotions, body and life, and significantly higher on satisfactions with pain control education and pain control or relief and overall satisfaction ($P < 0.05$). After intervention, the scores of quality of life, and physical, social and psychological functions were elevated in both groups ($P < 0.05$), and the aforementioned scores in the combined group were significantly higher than those in the regular group ($P < 0.05$). The incidence rate of complications in the combined group was notably lower than that in the regular group (8.11% vs. 41.86%, $P < 0.05$). Conclusion: Hiao's double-C nursing model combined with pain care can effectively improve postoperative degrees of pain, satisfaction with pain control and complications, and duration of pain.

Keywords: Hiao's double-C nursing model, pain care, mixed hemorrhoids, pain control

Introduction

Hemorrhoids are common anorectal conditions that can form either inside the rectum or under the skin of the anus (external hemorrhoids) [1]. There are three categories of hemorrhoids, including internal (above the dentate line), external (below the dentate line), or mixed (above and below the dentate line) [2]. Studies have shown that the incidence of anorectal diseases is about 59.1%, and hemorrhoid diseases constitute 87.25% of anorectal diseases [3]. Mixed hemorrhoids are the most common hemorrhoid diseases, accounting for 65.9% of hemorrhoid diseases [4]. The clinical symptoms of mixed hemorrhoids are recurrent hematochezia, perceived loss of mass from the anus, local secretion (possibly accompanied by itching), pain, and even incarcerated hemorrhoids and anemia in severe cases, leading to reduction in quality of life. The late treatment of mixed hemorrhoids may lead to hematochezia, inflammation, pain, perianal eczema, and even rectal cancer, endangering the safety of patients. Although routine nursing can effectively improve the clinical symptoms of patients, it exerts

insignificant effects on improving their pains and psychologies. Therefore, it is necessary to seek an effective nursing model to improve postoperative pain and complications in patients with mixed hemorrhoids.

There are several conservative treatment options for mixed hemorrhoids (*e.g.*, suppositories and external application of drugs). However, for patients with severe mixed hemorrhoids whose conservative treatment is unsatisfactory, surgical treatment should be adopted. Milligan-Morgan hemorrhoidectomy is a classic option with a definite efficacy. However, due to the special tissues and structures of the anus, patients will experience pain and complications (*e.g.*, constipation and urinary retention) when they recover from anesthesia during the postoperative rehabilitation, which affect postoperative rehabilitation and quality of life of patients. Postoperative pain can induce severe stress reactions and cause tissue disintegration and expedited metabolism, which are not conducive to occlusion of wounds. In addition, it may cause physiological and pathological changes. The occurrence of respiratory and circulatory diseases (*e.g.*, pneumonia, pulmonary atelectasis and arrhythmia) may be related to postoperative pain [5]. Therefore, it is of great significance to improve the satisfaction with pain control and the incidence of complications.

Hiao's double-C nursing model can effectively improve the comfort by providing high-quality nursing care services, so that patients can reach the happiest state of mind after nursing care, so as to facilitate patients to participate in postoperative rehabilitation exercises. The purpose of pain care is to encourage patients to perform indoor exercises for the pain caused by urination and defecation through the establishment of comfortable environment, gently and rapidly changing dressing for the pain induced by incision treatment, and providing psychological counseling, so as to improve their pains, moods and incidence of complications [6]. To date, there are few studies on the implementation of Hiao's double-C nursing model combined with pain care in the treatment of mixed hemorrhoids. On this basis, this study analyzed the influences of Hiao's double-C nursing model combined with pain care on postoperative satisfaction with pain control and complications in patients with mixed hemorrhoids.

Materials and methods

General data

A total of 80 patients with mixed hemorrhoids admitted to our hospital from January 2019 to October 2020 were selected as the study subjects, and were divided into a regular group (n = 43) and a combined group (n = 37) in accordance with different nursing methods. All patients agreed to participate in the study and signed the informed consent form. This study was approved by the Medical Ethics Committee. Inclusion criteria: (1) patients who were clinically diagnosed as mixed hemorrhoids; (2) patients who were treated with Milligan-Morgan hemorrhoidectomy, and had no surgical contraindications. Exclusion criteria: (1) patients who treated with other surgeries recently; (2) those with perianal abscess, anal fissure, anal fistula and hypertrophy of anal papilla; (3) those with serious infectious and genetic diseases; (4) those with serious cardiovascular and cerebrovascular diseases and gastrointestinal disorders; (5) those with malignant tumors, hematologic diseases and diabetes; (6) those with serious arrhythmia and heart failure; (7) those with serious organic diseases (*e.g.*, renal and hepatic diseases); (8) those with mental illness or dysgnosia; (9) those with preparation for pregnancy, pregnancy or lactation.

Methods

The regular group was treated with routine nursing care, including monitoring of vital signs, observation on the conditions, administration as instructed by the physician, education on the mixed hemorrhoids and the perioperative precautions.

The combined group was treated with Hiao's double-C nursing model combined with pain care. (1) Hiao's double-C nursing model includes comfort nursing care, individualized nursing care and humanized nursing care. Specifically: a. comfort nursing care: nurses were well trained to ensure that extrinsic factors would not affect the quality of nursing care and to ensure the continuity and integrity of nursing care. The warm-toned layout was adopted in wards. Health education and safety tips were posted on the wall, and patients were allowed to decorate wards. b. individualized nursing care: the cognition of diseases, physical and

psychological conditions, self-care abilities, influencing factors of comfort and the risk of complications of patients were evaluated, and individualized health education was conducted according to the evaluation results to help patients understand the etiological factors, treatment methods, perioperative precautions and self-managed skills. The preoperative psychological state and basic conditions of patients were evaluated, knowledge on surgery and anesthesia was provided, and psychological counseling was provided. Patients were comforted and encouraged through touching and communication, private parts were covered, the postoperative guidance on diet and posture was provided, and efforts were made to prevent complications. c. humanized nursing intervention: nurses communicated with patients and their families with enthusiasm and patience, sent holiday blessings and greetings at festivals, and understood and met the reasonable needs of patients. The families, relatives, friends and colleagues of patients were encouraged to communicate with patients so that they could feel social support and care from families. On day 3 after surgery, the follow-up was performed to understand the recovery conditions of patients, and nursing care was improved according to the issues and opinions of patients. After discharge, patients received out-of-hospital nursing care via SMS, QQ and WeChat. (2) Pain care: The cheerful and relaxing music was played to relieve the moods of patients and improve their psychological and physical comfort, thus alleviating their pains. Early after surgery, patients were encouraged to conduct indoor exercises to relieve the pain induced by urination or defecation. As the anesthetic effect subsided, the incision pain occurred. The dressing was changed gently and quickly based on the actual conditions of patients, so as to alleviate the pain. Before surgery, the patients were informed of postoperative pains, and nurses communicated patiently with patients, comforted and encouraged patients to ease psychological pressure and relieve the pain of patients. In addition, pains caused by postoperative wound infection, anal hematoma and other complications were treated with antibiotics or ointment.

Observational indices

(1) At 6 h, 24 h and 72 h after surgery, the pains were evaluated by visual analogue scale (VAS) [7], with VAS scoring criteria of 0 point indicating painless and 10 points indicating the most severe pain. Patients' satisfaction with pain control was evaluated by Houston Pain Outcome Instrument (HPOI) [8], including pain experience and expectation, influences of pains on emotions, body and life, and satisfaction with pain control education and pain control or relief and overall satisfaction. There are 7 items totally. A higher score of the first four items indicates a lower satisfaction with pain control, while a higher score of the last three items indicates a higher satisfaction with pain control. The duration of pain was recorded. (2) The quality of life of patients was assessed by the General Quality of Life Inventory-74 (GQOLI-74) [9]. GQOLI-74 consists of four dimensions: quality of life (4 items), physical functions (5 items), social functions (5 items), and psychological functions (5 items). A higher score indicates a higher quality of life. (3) The complications (*e.g.*, wound infection, hemorrhage, hepatic portal hematoma, constipation and urinary retention) were recorded between the two groups.

Statistical method

All data were processed by SPSS22.0 (IBM SPSS STATISTICS 22.0, developed by International Business Machines Corporation, IBM, Armonk, USA). The enumeration data were expressed using (n, %), and were detected using χ^2 test or Fisher's exact probability method. The measurement data were expressed using ($\overline{x} \pm s$). The comparison between groups was detected using the independent sample t test, and the comparison within groups was detected using the paired t test. The comparisons at different time points were performed using analysis of variance (ANOVA) of repeatedly measured data, so as to analyze the differences between groups and the time differences of values measured at the time points. Subsequently, the least significant difference (LSD) t-test was performed. Graphpad Prism 8 was adopted to plot the graphs. $P < 0.05$ indicated a statistically significant difference.

Results

Baseline data

Patients in the combined group comprised 19 males and 20 females, aged 22-63 years, with

Table 1. Comparison of baseline data between the two groups ($\bar{x}\pm s$; *n*, %)

Baseline data		Combined group (n = 37)	Regular group (n = 43)	*t* value	*P* value
Age (year)		40.88±10.45	41.62±11.23	0.303	0.762
Gender	Male	19 (51.35)	20 (46.51)	0.186	0.666
	Female	18 (48.65)	23 (53.49)		
Course of disease (months)		4.42±0.67	4.55±0.48	1.007	0.317
Anesthesia methods	Subarachnoid anesthesia	23 (62.16)	25 (58.14)	0.134	0.714
	Epidural anesthesia	14 (37.84)	18 (41.86)		
Clinical staging of hemorrhoids	Stage III	23 (62.16)	26 (60.47)	0.024	0.877
	Stage IV	14 (37.84)	17 (39.53)		
Surgical times	1	21 (56.76)	24 (55.81)	0.013	0.910
	2	10 (27.03)	13 (30.23)		
	3 and above	6 (16.22)	6 (13.95)		
Educational level	Primary school and below	9 (24.32)	10 (23.26)	2.122	0.145
	Junior and senior high school	26 (70.27)	25 (58.14)		
	College degree and above	2 (5.41)	8 (18.60)		

Table 2. Comparison of VAS scores between the two groups at different time points ($\bar{x}\pm s$)

Groups	At 6 h after surgery	At 24 h after surgery	At 72 h after surgery	$F_{time\ points}$	$F_{between\ groups}$	$F_{interaction}$
Combined group (n = 37)	4.16±1.09	3.41±0.80	1.54±0.51	256.963	25.088	0.500
Regular group (n = 43)	5.00±1.23	4.28±0.96	2.21±0.71			
t value	3.186	4.392	4.779			
P value	0.002	< 0.001	< 0.001	< 0.001	< 0.001	0.608

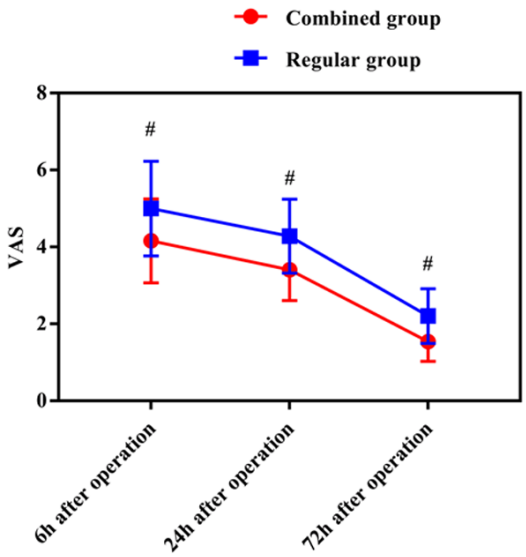

Figure 1. Comparison of VAS scores between the two groups at different time points. At 6 h, 24 h and 72 h after surgery, the VAS scores in the combined group were significantly lower than those in the regular group ($P < 0.05$). #indicates the comparison between the two groups at the same time points ($P < 0.05$).

an average age of (40.88±10.45) years; the course of disease ranged from 1 to 7 months, with an average course of (4.42±0.67) months. Patients in the regular group included 20 males and 23 females, aged 20-65 years, with an average age of (41.62±11.23) years; the course of disease ranged from 2 to 8 months, with an average course of (4.55±0.48) months. There was no remarkable difference in baseline data (*e.g.*, age, gender, course of disease, anesthesia methods, clinical staging of hemorrhoids, surgical times and educational level) between the two groups, which were comparable ($P < 0.05$) (**Table 1**).

Degrees and duration of pain

VAS scores were statistically significant at time points and between groups ($P < 0.05$). At 6 h, 24 h and 72 h after surgery, the VAS scores in the combined group were significantly lower than those in the regular group ($P < 0.05$) (**Table 2** and **Figure 1**). The duration of pain in the combined group was significantly shorter than

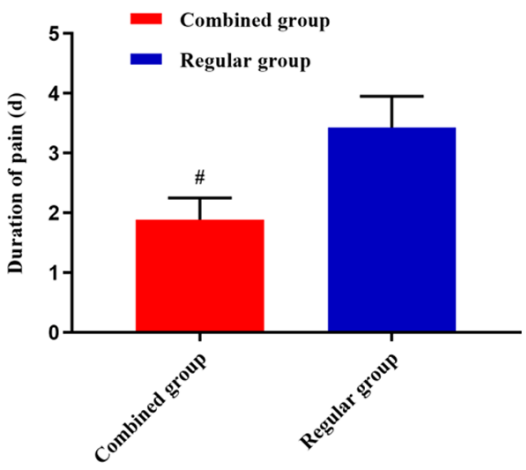

Figure 2. Comparison of duration of pain between the two groups. The duration of pain in the combined group was markedly shorter than that in the regular group ($P < 0.05$). #indicates the comparison with regular group, $P < 0.05$.

that in the regular group (1.89±0.36 d vs. 3.43±0.52 d, $t = 15.153$, $P < 0.001$) (**Figure 2**).

Satisfaction with pain control

Compared with the regular group, the combined group scored significantly lower on pain experience and expectation, and influences of pain on emotions, body and life, and significantly higher on satisfactions with pain control education and pain control or relief and overall satisfaction ($P < 0.05$) (**Table 3**).

Quality of life

Before intervention, there was no notable difference in the scores of quality of life, and physical, social and psychological functions between the two groups ($P > 0.05$). After intervention, the scores of quality of life, and physical, social and psychological functions were elevated in both groups ($P < 0.05$), and the aforementioned scores in the combined group were significantly higher than those in the regular group ($P < 0.05$) (**Table 4**).

Incidence of complications

Among patients in the combined group, there was 1 case of wound infection, 0 case of hemorrhage, 1 case of hepatic portal hematoma, 1 case of constipation, 0 case of urinary infection, whereas the above-mentioned complications in the regular group were 3, 2, 4, 3 and 6 cases, respectively. The incidence rate of complications in the combined group was markedly lower than that in the regular group (8.11% vs. 41.86%, $P < 0.05$) (**Table 5**).

Discussion

Hemorrhoids are usually caused by congestion of the anal canal and perianal venous plexus congestion at the lower rectum. However, the perianal nerves in human body are complex, and have a rich rete vasculosum, leading to a high sensitivity to pain. Therefore, surgery can exhibit a remarkable efficacy [10]. However, since surgery can induce trauma, it may damage the anorectal mucosa. Additionally, some patients have poor compliance with treatment and fail to care for the crissum as instructed by the physician, leading to postoperative pains, which is not conducive to postoperative recovery and negatively affects the quality of life of patients [11, 12]. Therefore, the reasonable and scientific nursing care is of great significance to improve postoperative pain and complications.

According to Hiao's double-C nursing model, a comfortable physical and psychological state can effectively promote patients to actively cooperate with the medical staff for treatment and nursing care, which is conducive to postoperative recovery. Hiao's double-C nursing model provides a comfortable, individualized and humanized nursing care, and provides high-quality nursing services with the principle of comprehensive comfort, so as to improve nursing quality, patients' satisfaction, and complications. Pain care can provide a scientific and reasonable nursing care for pain, and relieve the adverse psychological emotions of patients through establishment of a comfortable environment, so that they can maintain a smooth and pleasant mood, thereby effectively alleviating postoperative pains [13]. Yue [14] conducted a comparative study on the nursing effect of Hiao's double C nursing model and routine nursing model in patients with hemorrhoids, and the results showed that Hiao's double C nursing model could effectively alleviate the pain and promote the recovery process of patients. In this study, compared with the regular group, the VAS score of the combined group was significantly lower, and the pain duration was significantly shorter; the scores of pain experience and expectation, and influenc-

Table 3. Comparison of satisfaction with pain control between the two groups ($\bar{x}\pm s$)

Groups	Number of cases	Pain experience	Pain expectation	Influences of pains on emotions	Influences of pains on body and life	Satisfaction with pain control education	Satisfaction with pain control or relief	Overall satisfaction
Combined group	37	3.08±0.94	2.04±0.54	1.83±0.52	4.13±1.37	7.15±1.24	8.62±0.95	8.28±1.15
Regular group	43	3.86±1.22	2.34±0.64	2.24±0.68	4.83±1.52	6.46±1.58	8.04±1.17	7.52±1.41
t value		3.163	2.245	2.991	2.149	2.147	2.408	2.614
P value		0.002	0.028	0.004	0.035	0.035	0.018	0.011

Table 4. Comparison of quality of life between the two groups ($\bar{x}\pm s$)

Groups	Time points	Quality of life	Physical functions	Social functions	Psychological functions
Combined group (n = 37)	Before intervention	49.36±5.54	49.75±5.45	49.45±6.21	50.98±5.42
	After intervention	61.39±4.91	66.21±6.38	63.95±5.61	68.02±6.61
t_a value		9.885	11.932	10.539	12.126
P_a value		< 0.001	< 0.001	< 0.001	< 0.001
Regular group (n = 43)	Before intervention	50.25±5.83	48.46±6.52	49.63±5.37	51.48±5.35
	After intervention	55.75±6.01	55.43±6.68	55.69±7.47	58.62±6.54
t_a value		4.307	4.896	4.319	5.541
P_a value		< 0.001	< 0.001	< 0.001	< 0.001
t_b value		0.697	0.951	0.139	0.414
P_b value		0.488	0.345	0.89	0.68
t_c value		4.549	7.347	5.517	6.378
P_c value		< 0.001	< 0.001	< 0.001	< 0.001

Note: t_a and P_a indicate the comparison within groups, t_b and P_b indicate the comparison before intervention, and t_c and P_c indicate the comparison after intervention.

Table 5. Comparison of incidence of complications between the two groups (*n*, %)

Groups	Number of cases	Wound infection	Hemorrhage	Hepatic portal hematoma	Constipation	Urinary retention	Complications
Combined group	37	1 (2.70)	0 (0.00)	1 (2.70)	1 (2.70)	0 (0.00)	3 (8.11)
Regular group	43	3 (6.98)	2 (4.65)	4 (9.3)	3 (6.98)	6 (13.95)	18 (41.86)
χ^2 value		0.765	-	1.478	0.765	-	11.703
P value		0.382	0.497*	0.224	0.382	0.028*	0.001

Note: *indicates the detection of *P* value using Fisher's exact probability method.

es of pains on emotions, body and life in the combined group were remarkably lower than those in the regular group, while the satisfaction with pain control education and pain control or relief and overall satisfaction in the combined group were markedly higher than those in the regular group. The results are consistent with the above-mentioned study, suggesting that Hiao's double C nursing mode combined with pain nursing can effectively alleviate postoperative pain, shorten pain duration, and effectively improve pain control satisfaction.

The contaminated bacteria are around the anus. Surgery can damage the balance of perianal bacteria. The surgical incisions are mostly open wounds, and feces are hidden by the wrinkled perianal skin after passing through the wounds, resulting in wound infection [15]. Postoperative wound pain of patients with mixed hemorrhoids will cause patients to suppress the awareness of defecation because of fear of pain induced by defecation, leading to the long-term storage of stool mass in rectum and hardening of feces and thus causing constipation [16]. In case of dry and hardened stool, patients will forcibly defecate, and stool mass will rub against the wound and thus cause hemorrhage [17]. Intraoperative repeated tractions or clamping and postoperative constipation and pains lead to reflective contractions of the anal sphincter, resulting in dysaemia in the anal canal and causing anal hematoma [18]. However, postoperative pains stimulate the micturition center, and lead to spasm of urethral sphincter and inhibit activities of bladder detrusor muscle. In addition, the improper tractions during the surgery or during the suture of wounds result in urination disorders and even urinary retention [19, 20]. In this study, the combined group had remarkably lower incidence rates of urinary retention and complications (0.00% vs. 13.95% and 8.11% vs. 41.86%) compared with that of the regular group. This demonstrated that Hiao's double-C

nursing model combined with pain care could effectively reduce the incidence rate of complications in patients with mixed hemorrhoids surgery. This study explored the postoperative quality of life of patients. The results exhibited that the scores of quality of life, and physical, social and psychological functions were elevated in the two groups after intervention, and the aforementioned scores in the combined group were noticeably higher than those in the regular group, suggesting that Hiao's double-C nursing model combined with pain care could effectively improve the postoperative quality of life of patients.

In summary, Hiao's double-C nursing model combined with pain care can provide different nursing care services to improve pains induced by different causes, create a comfortable environment, and provide the psychological counseling based on the comfort, individualized and humanized nursing cares, so as to effectively improve postoperative pains, duration of pain, satisfaction with postoperative pain control and complications of patients undergoing surgery for mixed hemorrhoids. However, this study presented with a retrospective analysis, and the study samples were grouped in accordance with different nursing care methods rather than being randomized in accordance with random numbers generated by computers, which may lead to biased results. Additionally, there is a small sample size in this study. In the future studies, a larger sample size should be provided, and other study methods (*e.g.*, prospective methods) should be adopted for verification.

Disclosure of conflict of interest

None.

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