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Posted Date: 18 October 2023

doi: 10.20944/preprints202310.1059.v1

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The Effect of Propofol Combined with Psychological Intervention on Pain and Emotional Evaluation in Painless Colonoscopic Colonic Polypectomy Patients

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Abstract: Objective: To evaluate the effect of propofol combined with psychological intervention on pain and emotional evaluation in painless colonoscopic colonic polypectomy patients undergoing endoscopic mucosal resection (EMR). **Methods:** A total of 80 patients who underwent painless colonoscopic colonic polypectomy with EMR treatment between June 2020 and June 2022 were selected in order of admission and divided into two groups. The control group received conventional analgesia, while the observation group received propofol combined with psychological intervention. Pain visual analog scale (VAS) and emotional scale were used to evaluate pain and emotions in both groups of patients. Adverse reactions and clinical efficacy were also compared between the two groups. **Results:** The two groups of patients were generally comparable with no significant differences ($P > 0.05$). The VAS score in the observation group was significantly lower than that in the control group ($P < 0.05$), and the emotional scale score was also improved compared to the control group ($P < 0.05$). The number of patients with adverse reactions in the observation group was less than that in the control group. The clinical effective rate in the observation group was significantly higher than that in the control group ($P < 0.05$). **Conclusion:** Propofol combined with psychological intervention can effectively alleviate pain and improve emotional status in painless colonoscopic colonic polypectomy patients undergoing EMR treatment, thereby increasing the comfort and success rate of the surgery. The number of patients with adverse reactions in the observation group was less than that in the control group, and the clinical effective rate in the observation group was significantly higher than that in the control group ($P < 0.05$).

Keywords: propofol; psychological intervention; painless colonoscopic colonic polypectomy EMR; pain

1. Introduction

Colonic polyps are tumor-like lesions on the colonic mucosa, usually benign but may develop into malignant tumors, thus requiring early detection and treatment [1, 2]. Endoscopic mucosal resection (EMR) of painless colonoscopic polyps is the process of using a special electric cutting loop to remove colonic polyps under the visual guidance of a colonoscope [3, 4]. EMR is an endoscopic surgical technique used to treat early-stage colon and gastric cancers and precancerous lesions. Compared to traditional surgical procedures, EMR has the advantages of less trauma, less bleeding, and faster recovery, while also preserving normal tissue and reducing postoperative side effects [5, 6]. EMR is usually performed general anesthesia, hence it is called "painless colonoscopic" surgery. It is a safe and effective method for treating colonic polyps and has become an important treatment modality in clinical practice [7, 8]. Painless colonoscopic EMR is a routine surgery for treating colonic polyps, but during the procedure, patients may experience pain and discomfort, which can affect the comfort and success rate of the surgery [9, 10]. Therefore, how to effectively control the patient's pain and emotional state is a problem that clinical doctors urgently need to solve. In recent years, propofol combined with psychological intervention has been widely used in various surgical treatments, which has a certain effect on controlling surgical pain and improving patient's emotional state [11-

 doi:10.20944/preprints202310.1059.v1

13]. This study aims to explore the effect of propofol combined with psychological intervention on pain and emotional evaluation in patients undergoing painless colonoscopic EMR for the treatment of colonic polyps.

2. Materials and Methods

2.1. Study population

A total of 80 patients between 39 and 76 years old who underwent painless colonoscopic polypectomy with EMR were selected for this study. The gender was not limited. The general information of patients, including gender, age, BMI, postoperative days, and hospitalization days were collected. The patients were divided into control group and observation group according to different surgical methods, with 40 patients in each group. All patients had no immune dysfunction. The clinical data of the two groups of patients were comparable without significant differences, and P> 0.05, which had no statistical significance.

2.2. Inclusion and exclusion criteria

2.2.1. Inclusion criteria

Allergy to propofol; 2) Contraindications such as severe cardio-pulmonary, hepatic or renal dysfunction, neurological disorders, etc.; 3) Patients with obvious mental illness, cognitive disorders, communication barriers, or other conditions that could affect evaluation; 4) Patients who had undergone similar surgical treatments or who had experienced adverse emotional reactions during surgical procedures.

2.2.2. Exclusion criteria

Patients who had undergone EMR treatment within six months; 2) Patients with mental illness or family history of mental illness, or those who could not understand the study; 3) Patients with cognitive disorders; 4) Incomplete clinical data.

2.3. Methods

2.3.1. Control group

Conventional analgesia was administered remifentanil 25 ug slowly administered intravenously, propofol 2 mg/kg slowly administered intravenously (generally 40 mg per 10 seconds for healthy adults), while observing the patient's reaction, 1% propofol 10ml/h intravenous maintenance. adjusting the rate of administration until clinical signs indicate anesthesia.

2.3.2. Observation group

The anesthesia method in the observation group is the same as that in the control group. Preoperative psychological intervention: before surgery, doctors can communicate with patients to understand their emotional status and disease awareness level, gradually relieve patients' nervousness, and enhance their confidence and willingness to cooperate. Psychological intervention can be carried out through music therapy, cognitive behavioral therapy, deep breathing training, etc. Psychological intervention during surgery: during the surgery, doctors can guide patients to relax their body and mind through verbal instructions, relaxation training, imagination therapy, etc., relieve their fear and pain, and enhance the treatment effect and patient satisfaction.

2.4. Observation Indicators and Evaluation Criteria

2.4.1. Comparison of Pain Assessment

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Before surgery, during surgery, and 1 hour after surgery, the patients were evaluated for pain using the Visual Analogue Scale (VAS). The VAS score was divided into levels ranging from 0 to 10 points, with 0 points indicating no pain and 10 points indicating the most severe pain.

2.4.2. Comparison of Emotional Assessment

Before surgery and 1 hour after surgery, the patients' emotional status was evaluated using the Self-Rating Anxiety Scale (SAS) and Self-Rating Depression Scale (SDS). The SAS scale evaluates the patient's anxiety level, while the SDS scale evaluates the patient's depression level. The scale uses a 4-point scoring system, with higher scores indicating worse emotional status.

2.4.3. Comparison of Adverse Reaction Incidence

Mainly including bleeding, pain, intestinal perforation, nausea, and vomiting. The total incidence rate is the sum of the number of occurrences of each adverse event/100%.

2.4.4. Comparison of Clinical Efficacy

The clinical efficacy of the patients was evaluated based on the improvement of their symptoms and signs after treatment. Significant efficacy: the pathogen is normal, and clinical manifestations are completely improved; effective: the pathogen has improved, and clinical manifestations have improved significantly; ineffective: there is no improvement in clinical manifestations and the pathogen. The total effective rate = (significant efficacy + effective) / total number × 100%.

3. Results

3.1. Baseline Characteristics

The control group included 40 patients, 27 males and 13 females, aged between 46-87 years with an average age of 58.13 ± 3.25 years, and a BMI range of 20-28kg/m2 with an average of 24.69 ± 3.17kg/m2. The disease duration ranged from 2-7 years with an average of 3.24 ± 0.43 years, The observation group included 40 patients, 22 males and 18 females, aged between 42-86 years with an average age of 59.83 ± 3.14 years, and a BMI range of 21-29kg/m2 with an average of 25.43 ± 2.49kg/m2. The disease duration ranged from 2-7 years with an average of 3.51 ± 0.55 years. There was no significant difference in the general information between the two groups, and they were comparable (P > 0.05). See Table 1.

Table 1. General information of the two groups of patients.

		control group	observation group	t/x^2	*P*
Number of cases	-	40	40		
gender	male female	twenty two 18	twenty three 17	1.615	0.365
age)	- average	39-76 57.70±7.85	40-67 56.65±5.81	2.215	0.241
BMI (kg/m ^{2})	- average	21.2-28.3 24.85±3.17	21.5-29.4 25.43±2.68	1.161	3.203
postoperative days	- average	1-6 1.68±1.02	1-6 1.88±1.22	2.446	0.154
The number of days in hospital	- average	2-7 3.05±1.20	2-8 3.40±1.34	1.763	1.588

3.2. Comparison of Pain Assessment

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Before surgery, there was no significant difference in VAS scores between the two groups (P>0.05). During and 1 hour after surgery, the VAS scores in the propofol combined with psychological intervention group were significantly lower than those in the control group (P<0.05), indicating that the propofol combined with psychological intervention group had lighter pain sensations and significant analgesic effects. See Table 2 for details.

Table 2. Comparison of pain assessment.

group	Number of cases	Before surgery	in surgery	1h after operation
control group	40	3.33±1.36	4.65±1.49	4.21±1.33
observation group	40	3.21±1.16	1.46±0.88	2.18±1.07
t		2.882	1.635	1.848
p		P<0.01	P<0.01	P<0.01

3.3. Comparison of the emotional state of the two groups of patients

Before the surgery, there was no significant difference in SAS and SDS scores between the two groups (P>0.05). One hour after the surgery, the SAS and SDS scores in the propofol combined with psychological intervention group were significantly lower than those in the control group (P<0.05), indicating that the propofol combined with psychological intervention group had a more stable emotional state and a significant anti-anxiety and antidepressant effect. See Table 3 for details.

Table 3. Comparison of emotional state between the two groups of patients ($\bar{X}$ ±s).

group	Number of cases	SAS		SDS	
		Before surgery	1h after operation	Before surgery	1h after operation
control group	40	48.54±5.66	45.98±5.12	50.15±7.28	47.15±6.28
observation group	40	46.81±5.18	39.42±4.57	47.46±6.53	42.19±4.3
t		5.882	4.375	3.635	5.471
p		P<0.01	P<0.01	P<0.01	P<0.01

3.4. Comparison of adverse reactions

The number of patients in the observation group experiencing bleeding, nausea and vomiting, pain, and intestinal perforation was significantly reduced, i.e., the observation group was lower than the control group (P<0.01), and the total incidence rate in the observation group (10.00%) was lower than that in the control group (22.50%) (P<0.01). See Table 4.

Table 4. Comparison of adverse reactions [n(%)].

group	no	bleeding	pain	intestinal perforation	feel sick and vomit	total incidence
control group	40	4 (10.00)	2 (5.00)	1 (2.50)	2 (5.00)	9 (22.50)
observation group	40	1 (2.50)	1 (2.50)	0 (0.00)	2 (5.00)	4 (10.00)
x2 -						15.457
p						P<0.01

3.5. Comparison of clinical efficacy

The total effective rate in the observation group was 92.00%, while in the control group it was 72.00%. The clinical effective rate in the observation group was significantly higher than that in the control group (P<0.01), as shown in Table 5.

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Table 5. Comparison of clinical efficacy ($\bar{X}$ ±s).

group	no	invalid	efficient	markedly effective	total effective rate
control group	40	18 (45.00)	14 (35.00)	8 (20.00)	22 (55.00)
observation group	40	8 (20.00)	24 (60.00)	12 (30.00)	36 (90.00)
x2 -					6.551
p					P<0.01

4. Discussion

In recent years, with the improvement of living standards, people's diets have also changed, leading to an increasing number of patients with colon polyps. Endoscopic mucosal resection (EMR) of colon polyps under painless colonoscopy is a common method for treating colon polyps. However, because patients need to remain awake during the surgery, and discomfort may occur during the surgery, it can easily lead to emotional problems such as pain and anxiety [14,15]. Therefore, an effective anesthesia method is an important factor in improving the therapeutic effect of the surgery. Propofol is a intravenous anesthetic used for general anesthesia, and its mechanism of action is to produce anesthesia by acting on the central nervous system [16-18]. Specifically, propofol enhances the inhibitory effect of gamma-aminobutyric acid (GABA) between neurons, reduces neuronal excitability, and produces sedative, hypnotic, anti-anxiety and muscle relaxation effects [19-21].

This study used a combination of propofol and psychological intervention for treatment. The results showed that the VAS score of the propofol group with psychological intervention was significantly lower than that of the control group, indicating that the pain sensation of the propofol group with psychological intervention was lighter and had a significant analgesic effect. At the same time, the SAS and SDS scores of the propofol group with psychological intervention were significantly lower than those of the control group, indicating that the emotional state of the propofol group with psychological intervention was more stable and had a significant anti-anxiety and anti-depression effect. This is because propofol can affect neurotransmitters and neuromodulators in the brain, such as inhibiting the release of norepinephrine, dopamine, and glutamate, and enhancing the effect of GABA [22,23]. These effects help to further enhance the anesthetic effect of propofol, thereby reducing pain and emotional problems in patients. The results of this study showed that the number of patients with bleeding, nausea and vomiting, and intestinal perforation decreased in the propofol group with psychological intervention, which was lower than that of the control group (P<0.01); the clinical effective rate of the propofol group with psychological intervention was significantly higher than that of the control group (P<0.01). Propofol enhances the inhibitory neurotransmission of GABA by acting on the GABA-A receptor complex, thereby inhibiting the excitability of the central nervous system. Controlling the dosage of propofol can effectively reduce the incidence of adverse reactions and improve clinical efficacy [24-26].

Ethics approval and consent to participate: This clinical study protocol has been approved by the Ethics Committee of Maanshan General Hospital of Ranger-Duree Healthcare. All subjects enrolled in the study signed an informed consent form and were informed of the purpose, content, and use of the study.

Availability of Data and Materials: All clinical data used in this clinical study have been approved by the Ethics Committee and informed consent of the patient.

Authors' Contributions: Conceived and designed the analysis: ZXM, YL. Collected the data: ZXM, YL, ZJW. Contributed data or analysis tools: YYF, YL. Performed the analysis: ZXM, YL. Wrote the paper: ZXM, YYF.

Acknowledgements: Special thanks to all subjects and researchers for their great support of this clinical study.

Funding: None.

Conflict of Interest: The authors declare that there are no conflict of interests, we do not have any possible conflicts of interest.

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