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Research Article

Analysis of the Effect of Anesthetics Comprising of Remifentanil Combined with Propofol During Thyroidectomy

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Abstract: ***Objective:*** To analyze the anesthetic effect of remifentanil combined with propofol during thyroidectomy. ***Methods:*** A total of 70 patients who underwent thyroidectomy during November 2018 to November 2019 in Chongqing Eleventh People's Hospital were selected and recruited. These patients were divided into control group and observation group by random number table method. Each group consisted of 35 patients. The patients in the control group was given intravenous anesthesia comprising of propofol combined with intermittent fentanyl anesthesia, whereas the patients in the observation group was given intravenous anesthesia comprising of remifentanil combined with propofol. ***Results:*** The heart rate and mean arterial pressure of the observation group after anesthesia for 30 minutes were lower than those of the control group, and the differences were statistically significant ($P < 0.05$). The total incidence of adverse reactions in the observation group was lower than that of the control group, and the differences were statistically significant ($P < 0.05$). ***Conclusion:*** Remifentanil combined with propofol is effective in thyroidectomy. This combination can reduce the risk of adverse reactions and maintain stable hemodynamic parameters.

Keywords: Thyroidectomy; Remifentanil; Propofol; Effect of anesthetics

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At present, patients with clinically targeted thyroidectomy often use cervical plexus block or anesthesia. However, this type of anesthesia will increase the risk of adverse reactions such as tracheal compression and stretch reaction, and increase the degree of pain of the patient[1]. In recent years, patients are more and more inclined to the use of general anesthesia, and the anesthetic effect of different anesthetic drugs in general anesthesia is also greatly different. Therefore, this study aimed to investigate the effect of anesthetics comprising of remifentanil combined with propofol during thyroidectomy. The research methods and findings are as follows:

1 Materials and methods

1.1 General Information

70 patients who underwent thyroidectomy during November 2018 to November 2019 in Chongqing Eleventh People's Hospital were selected and recruited. These patients were divided into two groups, namely the control group and observation group by random number table method. Each group consisted of 35 patients. The control group consisted of 15 male patients and 20 female patients who were aged 34 – 70 years, with an average age of 52.26 ± 4.55 years. The control group consisted of 20 cases of thyroid nodules and 15 cases of thyroid adenomas. On the other hand, there were 14 male patients and 21 female patients in the observation group who were aged 35 – 70 years, with an average age of 52.73 ± 4.48 years. The observation group consisted of 22 cases of thyroid nodules and 13 cases of thyroid adenomas. The general data of the two groups of patients were compared statistically. The differences in the baseline characteristics were not statistically

significant (P>0.05).

1.2 Method

The patients in both control group and observation group were fasted eight hours before the surgery and restricted from drinking water for six hours. Venous channels were established. 0.5 mg of atropine (Jiangsu Langou Pharmaceutical Co., Ltd., National Pharmaceutical Reference No. H32021060) and 0.1 g of phenobarbital sodium (Sucheng Pharmaceutical Co., Ltd., National Pharmaceutical Reference No. H41025613) were injected via intramuscular route 30 minutes before surgery. Tracheal intubation was performed under general anesthesia. Anesthesia induction was performed using 0.1 mg/kg of vecuronium bromide (Yichang Renfu Pharmaceutical Co., Ltd., National Pharmaceutical Reference No. H20133079), 0.08mg/kg of Mida Zolun (Yichang Renfu Pharmaceutical Co., Ltd., Chinese Medicine Reference No. H20067041), 2mg/kg of propofol (Guangdong Jiabo Pharmaceutical Co., Ltd., National Pharmaceutical Reference No. H20143369). During the operation, the patient's vital signs such as heart rate, blood pressure, *etc.* should be closely monitored.

1.2.1 Control group

The patients in the control group underwent continuous intravenous administration of propofol combined with intermittent bolus fentanyl to maintain the effect of anesthesia, and 4 μg/kg of fentanyl (Yichang Renfu Pharmaceutical Co., Ltd., National Pharmaceutical Reference No. H42022076) was given via intravenous route each minute for induction of anesthesia. After the completion of tracheal intubation, 8 – 10 μg/kg of propofol was continuously administered per minute to maintain the effect of anesthesia, and 50 – 100 μg of fentanyl was intermittently injected depending on the depth of anesthesia.

1.2.2 Observation group

The patients in the observation group underwent continuous intravenous administration of remifentanil combined with propofol to achieve anesthesia. Intravenous administration of 1 μg/kg of remifentanil (Yichang Renfu Pharmaceutical Co., Ltd., National Pharmaceutical Reference No. H20030199) was used for the induction of anesthesia, and 100 – 200 μg/kg of remifentanil as well as 8 – 10 μg/kg of isopropyl phenol were continuously given per minute after tracheal intubation.

1.3 Evaluation indicators

The changes in heart rate and mean arterial pressure before anesthesia, 30 minutes after anesthesia, and at the time of surgery were compared. In addition, the incidence of adverse reactions such as nausea, vomiting, cough and hypotension) was also compared between the control group and observation group.

1.4 Statistical analysis

Statistical Package for Social Sciences (SPSS), version 22, was used for data processing and analysis. The quantitative data were expressed in $\overline{x} \pm s$, and the comparison of data between groups were analyzed using independent sample t test. The categorical data were expressed in percentage, and analyzed using Chi-squared (χ^2) test. $P < 0.05$ was considered statistically significant.

2 Results

2.1 Comparison of heart rate and mean arterial pressure at different time periods in the patients of control and observation groups

The heart rate and mean arterial pressure at 30 minutes after anesthesia in the observation group were lower than those in the control group, and the differences were statistically significant (P<0.05). See Table 1.

Table 1. Comparison of heart rate and mean arterial pressure in patients of control and observation groups at different time periods ($\overline{x} \pm s$)

Time	Group	Heart rate (beat/min)	Mean arterial pressure(mmHg)
Before anesthesia	Control group (n=35)	85.76±4.31	83.46±9.28
	Observation group (n=35)	86.07±4.19	82.87±9.34
	t	0.305	0.265
	P	0.761	0.792
30 minutes after anesthesia	Control group (n=35)	76.18±3.12	75.47±9.86
	Observation group (n=35)	72.17±4.83	69.98±8.21
	t	4.126	2.531
	P	0.000	0.014

Continued table 1

Time	Group	Heart rate (beat/min)	Mean arterial pressure(mmHg)
During surgery	Control group (n=35)	108.34±2.35	104.77±9.76
	Observation group (n=35)	87.83±2.15	85.33±8.22
	t	38.096	9.013
	P	0.000	0.000

2.2 Comparison of the incidence of adverse reactions between the control group and observation group

The total incidence of adverse reactions in the observation group was lower than that in the control group, and the difference was statistically significant ($P<0.05$). See Table 2.

Table 2. Comparison of the incidence of adverse reactions between the control group and observation group n(%)

Group	Hypotension	Cough	Nausea and vomiting	Total incidence
Control group(n=35)	3(8.57)	2(5.71)	3(8.57)	8(22.86)
Observation group(n=35)	1(2.86)	0(0.00)	1(2.86)	2(5.71)
χ^2				4.200
P				0.040

3 Discussion

During thyroidectomy, thyroxine will be secreted excessively due to squeezing of thyroid. In addition, the application of anesthetic drugs during the surgical operation will cause patients with stress reactions in the cardiovascular system (tachycardia, elevated blood pressure, etc.), affecting the patient's life and health[2]. Therefore, the search for efficient and safe anesthetics has important clinical significance for patients and the quality of surgical treatment.

Fentanyl is characterized by immediate onset and good effect of anesthesia. Its analgesic effect is about 80 times that of morphine. However, fentanyl elicits inhibitory effect on the respiratory system and increases the risk of adverse reactions such as nausea and vomiting. Propofol is a short-acting intravenous anesthetic of the alkyl acid type, which produces rapid anesthetic state in patients after application. It has inhibitory effects on the respiratory and circulatory systems. The action of remifentanil is quick, and its metabolism is not affected by plasma cholinesterase and anti-cholinesterase drugs. Remifentanil is mainly metabolized in hydrolysis catalyzed by non-specific esterase in plasma and tissues. Compared with fentanyl, remifentanil induces a weaker respiratory suppression effect on patients, and it does not accumulate in the body during long-term infusion or repeated application. When combined with propofol, it can effectively maintain the stability of hemodynamic parameters and reduce the risk of adverse reactions[3]. The results of this study showed that the heart rate and mean arterial pressure of the observation group after anesthesia for 30 minutes were lower than those of the control group, and the total incidence of adverse reactions was lower than that of the control group. This indicates that the application of propofol during thyroidectomy has a better effect on anesthesia, has less effect on heart rate and mean arterial pressure, and can reduce the occurrence of adverse reactions.

In sumamry, the clinical application of remifentanil combined with propofol in patients undergoing thyroidectomy has a better effect, which can effectively stabilize the hemodynamic parameters and reduce the incidence of adverse reactions.

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