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Research Article

Investigating the application value of propofol combined with sufentanil and dexmedetomidine in cosmetic anesthesia

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Abstract: ***Objective:*** To investigate the effects of propofol combined with sufentanil and dexmedetomidine in cosmetic anesthesia. ***Methods:*** The clinical data of 40 plastic surgery patients admitted to the hospital from June to November 2019 were retrospectively analyzed. According to the different anesthesia methods during surgery, they were divided into control group (propofol combined with sufentanil and normal saline, 20 cases) and was compared with the observation group (propofol combined with sufentanil and dexmedetomidine, 20 cases). The anesthetic effect, total dosage of propofol, spontaneous breathing recovery time, and adverse reactions were compared between the two groups. ***Results:*** The total dosage of propofol in the observation group was less than that in the control group, and the spontaneous breathing recovery time was shorter than that in the control group. The difference was statistically significant (P<0.05). There was no significant difference in the anesthetic effect and adverse reaction rate between the two groups (P>0.05). ***Conclusion:*** The application of propofol in combination with sufentanil and dexmedetomidine in cosmetic anesthesia can reduce the dosage of propofol, speed up the anesthesia recovery, and have better anesthetic effect and safety.

Keywords: Cosmetic anesthesia; Propofol; Sufentanil; Dexmedetomidine

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Cosmetic surgery is generally limited to the superficial tissues of the body, and the operation requirements are meticulous. Therefore, the operation time is longer and the analgesic requirement is higher. Propofol combined with sufentanil is an anesthesia method commonly used in cosmetic surgery, but as the operation time continues to increase, the medication will gradually increase, which will easily delay patient's wake-up time and irritability[1]. Dexmedetomidine is a new type of highly selective α2 adrenergic receptor agonist, which can effectively reduce the dosage of intravenous and inhaled anesthetics[2]. Based on this, the purpose of this study was to investigate the effect of propofol combined with sufentanil and dexmedetomidine in cosmetic anesthesia. It is reported as follows.

1 Materials and methods

1.1 General information

The clinical data of 40 plastic surgery patients admitted to the hospital from June to November 2019 were retrospectively analyzed. According to the different anaesthesia methods during surgery, they were divided into control group (propofol combined with sufentanil and normal saline, 20 cases) and observation group (propofol combined with sufentanil and dexmedetomidine, 20 cases). All patients were female. The control group was 19 – 40 years old, with an average age of (29.06 ± 7.71) years; body mass index (BMI) of 18.6 – 23.9 kg/m^2, and average BMI of (21.23 ± 1.07) kg/m^2. In the observation group, the age was 18-39 years, with an average age of (28.99 ± 7.67) years; BMI of 18.7 – 23.9 kg/m^2, and average BMI of (21.30 ± 1.08) kg/m^2. The general data of the two groups of patients were compared statistically, and the difference was not statistically significant (P > 0.05), which was

comparable.

1.2 Selection criteria

The inclusion criteria are I.) Those older than 18 years of age. II.) Those with complete clinical data. III.) Those who have no history of allergies to the drugs required for this study. Meanwhile, the exclusion criteria including I.) Patients with high blood pressure, heart failure, and bronchial asthma. II.) Patients with coagulopathy. III.) Patients with congenital heart disease. IV.) Those who have been taking diazepam drugs for a long time. V.) Those with expression disorders and mental illness.

2 Methods

Before anesthesia, patients were reminded to drink for 6 hours and fast for 4 hours. After the patient enters the operating room, a venous channel was established and a monitor (Jining Hongsheng Medical Equipment Co., Ltd., Model: GT6800-12) was used to monitor the electrocardiogram, heart rate, pulse oximetry, non-invasive blood pressure, EEG dual-frequency index. For observation group, 1 μg/kg dexmedetomidine (Jiangsu Enhua Pharmaceutical Co., Ltd., National Medicine Standard: H20133331) was prepared with saline solution to a concentration of 4 μg/ml and completely infused within 15 minutes, and then it was fixed at a rate of 0.5 μg/kg to maintain anesthesia. Meanwhile, for control group, the saline was pumped in the same way as the observation group. Then, both groups were induced by anesthesia. The blood concentration Cpt of propofol was 2 – 4 ng/mL, and the blood concentration Cpt of sufentanil was 2 – 4 ng/mL. The anesthetic drug was continuously pumped and the EEG dual-frequency index monitored to dynamically adjust the drug's Cpt in order to maintain the stability of the patient's vital signs. Forty minutes before the operation ended, the infusion of dexmedetomidine and saline was stopped.

2.1 Evaluation Index

The anesthesia effect was evaluated according to the standard [3], the anesthesia effect is divided into three levels: excellent, good, and poor. Among them, excellent anesthesia is defined as the patient did not have any physical activity and was in a state of falling asleep quietly during the operation. Good enesthesia is defined as the patient was in a state of falling asleep, but occasionally had simple limb movements, and the limb movements during the operation, which had no effect on the operation. Poor anesthesia is defined as the patient's limbs were disturbed during the operation, and the operation could not be performed smoothly. The total dosage of propofol and spontaneous breathing recovery time in both groups was observed and recorded. The adverse reactions were observed and recorded during and after the surgery, including nausea, vomiting, irritability, and respiratory depression.

2.2 Statistical methods

SPSS 24.0 software was used for data processing. Measurement data were expressed as $\overline{x} \pm s$, and t-test was used while count data were expressed as percentage, and χ^2 test was used. $P < 0.05$ was considered statistically significant.

3 Results

3.1 Anesthetic effect

There was no significant difference in the anesthesia effect between the two groups ($P > 0.05$). See Table 1.

Table 1. Comparison of clinical efficacy between the two groups n (%)

Groups	Excellent	Good	Poor	Good rate
Control group (n=20)	11(55.00)	8(40.00)	1(5.00)	19(95.00)
Observation group (n=20)	13(65.00)	7(35.00)	0(0.00)	20(100.00)
χ^2	-	-	-	0.000
P	-	-	-	1.000

3.2 Total propofol dosage and spontaneous breathing recovery time

The total dosage of propofol in the observation group was less than that in the control group, and spontaneous breathing recovery time was shorter than that in the control group, and the difference was statistically significant ($P < 0.05$). See Table 2.

Table 2. Comparison of total propofol dosage and spontaneous breathing recovery time between the two groups ($\overline{x} \pm s$)

Groups	Propofol dosage(mg)	Spontaneous breathing recovery time(min)
Control group(n=20)	1190.07 ± 20.31	15.46 ± 6.97
Observation group (n=20)	1019.86 ± 21.10	8.81 ± 3.70
t	25.992	3.769
P	0.000	0.001

3.3 Adverse reactions

There was no significant difference in the incidence of adverse reactions between the two groups ($P > 0.05$). See Table 3.

Table 3. Comparison of adverse reactions between the two groups n (%)

Groups	Nausea and vomiting	Irritability during awakening	Respiratory depression	Total incidence
Control group (n=20)	1 (5.00)	1 (5.00)	1 (5.00)	3 (15.00)
Observation group (n=20)	1 (5.00)	0 (0.00)	0 (0.00)	1 (5.00)
χ^2	-	-	-	0.278
P	-	-	-	0.598

4 Discussion

During surgery, general anesthesia has a good sedative effect and analgesic effect, and can be applied to any type of surgery. Non-intubated general anesthesia that retains spontaneous breathing has the advantages of less stress, rapid recovery, and low treatment costs, and has been widely used in cosmetic anesthesia. The ideal cosmetic anesthesia effect is painless, comfortable, less adverse reactions, and safe. At the same time, it has many advantages such as fast onset, stable effect, no cardiovascular depression and respiratory depression[4]. However, there is no anesthesia method can meet these requirements at present. Therefore, in order to obtain the desired anesthesia effect, a combination of multiple drugs is usually used for anesthesia in the clinic.

The most significant features of propofol are short duration of action, rapid onset of action and fast recovery, which is beneficial to patient's awake brain after recovery, and has less impact on adverse reactions such as nausea and vomiting. However, propofol has no analgesic effect and is not suitable for anesthesia if used alone[5]. Sufentanil is more fat-soluble, it is ten times more effective than that of fentanyl, and rapid onset of action. In addition, it has a mild effect on the cardiovascular system and respiratory depression, and does not release amines. Thus, it is often used for postoperative analgesia [6]. Dexmedetomidine is a new type of highly selective α2 adrenergic receptor agonist, which has the effects of sedation, analgesia, hypnosis, inhibition of sympathetic activity, reduction of anesthetic. It can inhibit sympathetic activity, prevent nausea and vomiting, avoid irritability after awakening and other effects, which are conducive to the smooth progress of anesthesia induction and reduce adverse reactions [7]. In addition, unlike traditional propofol and opioids, dexmedetomidine can act on the peripheral and central nervous system, which can effectively inhibit the release of excitatory transmitters from the locus coeruleus, and prevent the transmission of neural signals, in order to better suppress awakening and exert a sedative effect. Thus, it can effectively inhibit the transmission of spinal cord dorsal horn and stimulation signals to the central nervous system, thereby exerting analgesic effects [8]. The results of this study showed that the total dosage of propofol in the observation group was less than that in the control group, and the spontaneous breathing recovery time was shorter than that in the control group. There was no significant difference in the anesthetic effect and the incidence of adverse reactions between the two groups, suggesting that the application of propofol combined with sufentanil and dexmedetomidine in cosmetic anesthesia can effectively reduce the dosage of propofol, which is beneficial to patients' postoperative recovery, and has better anesthetic effect and safety.

In summary, the application of propofol combined with sufentanil and dexmedetomidine in cosmetic anesthesia not only has better anesthetic effect, but also can reduce the dosage of propofol, which is beneficial to the patient's recovery from anesthesia and safer.

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