

Preoperative and intraoperative continuous use of dexmedetomidine on hyperalgesia after patients' remifentanil anesthesia

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Abstract

Objective: Analyze clinical use of dexmedetomidine to relieve prognosis of remifentanil anesthesia recovery and analyze intervention effect.

Materials and Methods: Choose 3600 cases of cerebral functional area operation patients treated in different hospitals during June 2011 and December 2015 for general analysis, group the patients by considering relevant parting of anesthesia recovery by American Society of Anesthesiologists, and divide the patients into dexmedetomidine group and control group according to different use of drugs. The two groups of patients are anesthetized, patients' anesthesia wake-up time and wake-up success rate are recorded, and effect of two types of anesthesia wake-up way are compared.

Results: There exists no significant statistical difference in wake-up success rate of the two groups of patients, wake-up time has small difference, but anesthesia recovery quality of dexmedetomidine group is higher, which is conducive to physical rehabilitation of patients and minimize the effects of anesthetics on patients.

Conclusion: In clinical surgery, after use of remifentanil anesthesia on patients, use of dexmedetomidine for anesthesia recovery can minimize adverse effects of drugs on patients and thus is worthy to be effectively promoted in clinics.

Key words: Anesthesia, dexmedetomidine, effect, intervention, preoperative, recovery, remifentanil

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Introduction

Remifentanil is a common clinical anesthetic drug which belongs to μ -type opioid receptor agonist. Onset time of the anesthetic drug is relatively fast and significant anesthesia effect can be achieved.^[1] In clinics, in the implementation process of anesthesia, use of remifentanil can achieve general anesthesia induction, as well as effect of general

anesthesia analgesic, which reduces analespia quality of anesthesia patients to a certain extent. Therefore, other drugs are often used in clinical practice to improve recovery quality of patients after anesthesia.^[2] Dexmedetomidine, as a novel α adrenergic receptor agonist, has significant analgesic and anxiolytic effects, can effectively inhibit patients' leg nerve and protect patients' brain. The medicinal property is a common feature of wake-up drugs and the drug is an anesthesia wake-up drug with significant curative effect. Remifentanil is often used in operation of brain damaged patients, and it is very common and necessary in clinics to improve patient safety and effectiveness with

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dexmedetomidine. The author selects information of 3600 cerebral functional area operation patients treated in different hospitals during June 2011 and December 2015 as general data for necessary study, reports the corresponding research results, and thus provides strong guidance for future research work.

Materials and Methods

Information of 3600 patients with brain functional area surgery treated in different hospitals from June 2011 to December 2015 is selected for study. All selected patients have no contraindications to awake anesthesia. According to types of used arousal drug, patients are randomly divided, namely dexmedetomidine group and control group, each with 1800 patients. In dexmedetomidine group, there are 960 male patients, 840 female patients, the oldest patient is 68 years old, while the youngest is 19 years old, with average age at (32.1 ± 6.2) years old. In control group, there are 1000 male patients, 800 female patients, aged between 21 and 66 years old, with average age at (32.4 ± 5.9) years old. After comparing general data of the two groups of patients, the author finds no statistical difference, which means that general information of the two groups is comparable.

Anesthesia method

Before surgery, the two groups of patients received preoperative visit and were informed of relevant issues demanding attention in operation process. Importance of wake-up work was explained, and the patients were asked to cooperate with doctors' work as far as possible. All patients need fasting and water deprivation before surgery, and avoid use of medication before surgery. During operation, patients need to wear oxygen masks, with heart rate, blood oxygen saturation degree, and mean arterial pressure detected. Through left brain artery puncture cathetering, arterial pressure measurement was done for patients. The two groups were treated with remifentanil anesthesia. $0.2 \mu\text{g}$ (kg-h) of dexmedetomidine was continuously pumped into body of dexmedetomidine group patients, and a certain amount of saline was injected into control group patients. In the course of surgery, balance of bispectral index should be maintained, about 40 to 60. Before skin incision, use 50 ml of 0.2% ropivacaine drug for effective block along with surrounding area of scalp [Figures 1 and 2]. respectively show molecular structure of dexmedetomidine and remifentanil.

Wake-up method

A total of 20 minutes before wake-up of the two groups of patients, usage of cisatracurium should be stopped, and 15 minutes before wake up, usage of remifentanil should be stopped. After patients are able to breathe independently, provide patients with intravenous injection of 0.5 mg atropine, and 2 mg neostigmine, in order to reach

effective antiresidual muscle relaxant effect. Medical staff call patients' name every half a minute and let patients clench fist [Figure 3]. If patients can make specified action correctly, then wake-up is successful. Otherwise, wake-up fails and reawaking is needed.^[3] At the same time, nursing staff should also record the time from drug withdrawal to successful wake-up. After patients are awoken, provide intravenous injection of 2 mg of midazolam [Figure 4], adopt remifentanil for maintenance of anesthesia, and maintain the effect of mechanical ventilation.^[4] Wake-up on this basis can effectively improve wake-up success rate without serious damage to patients' body and promote effective recovery of patients' body.

Statistical method

Clinical data of diabetic patients in experimental study are tested with software package SPSS 15.0 (Statistical Package for Social Sciences). Wherein, clinical count data are denoted with $(n, \%)$ and tested with χ^2 ; measurement data obtained in diabetes treatment are denoted with $(\bar{x} \pm s)$ and tested with t value. The two groups of experimental data are statistically $P < 0.05$, which shows that there is significant difference in effect after grouping treatment.

Results

Anesthesia arousal of observation group

Anesthesia arousal of the two groups of patients is observed: Wake-up success rate of dexmedetomidine group is 92.9%, while that of control group is 94.7%, statistical difference $P > 0.05$, so there exists no significant statistical difference in wake-up success rate of the two groups of patients. The comparison of success rate of anesthesia arousal of the two groups is shown in [Table 1].

Anesthesia recovery time

During surgery, withdrawal time of anesthesia drug and patients' recovery time are recorded, finding that there exists relatively small difference in recovery time of the two groups of patients, without no significant difference, $P > 0.05$, which indicates that there exists no statistically significant difference and that the two wake-up method can receive significant anesthesia arousal effect. The comparison of anesthetic time between both groups is shown in [Table 2].

Observation of adverse reactions

After necessary observation of adverse reactions of the two groups of patients after anesthesia, it is found that there are fewer patients with adverse reactions in dexmedetomidine group, far less than such patients in the control group. Frequency of adverse reactions of the two groups of patients is compared, $P < 0.05$, statistical difference is significant, indicating that use of dexmedetomidine on patients for anesthesia arousal will not cause serious injury to the patients and is conducive to patients' health. The

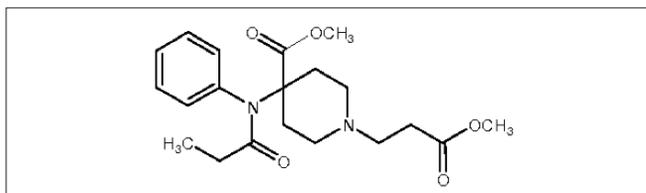


Figure 1: Molecular structure of dexmedetomidine

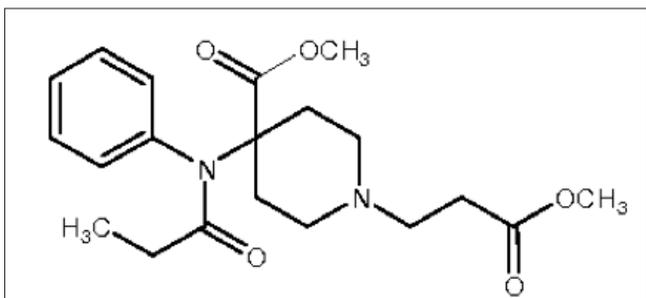


Figure 2: Molecular structure of remifentanyl

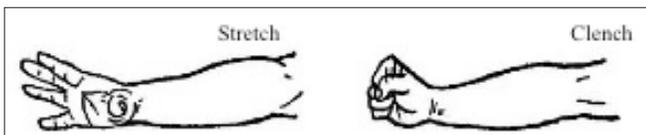


Figure 3: Picture of clench movement

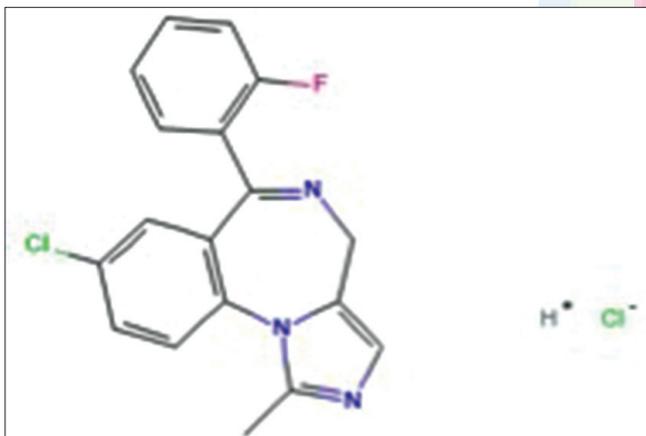


Figure 4: Molecular structure of midazolam

comparison of adverse reaction between both groups is shown in [Table 3].

During anesthesia arousal of patients with dexmedetomidine, attention should be paid to dosage of the drug as dexmedetomidine dose should be controlled in 0.4 µg/kg. Vein pump injection should be taken to inhibit cardiovascular responses during anesthesia induction, so as to effectively reduce emergency in surgery and effectively maintain anesthesia stability.^[5] Intravenous injection of dexmedetomidine can result in obvious sedative effect without serious adverse reactions. Remifentanyl anesthesia

Table 1: Comparison of success rate of anesthesia arousal of the two groups (n,%)

Group	Total cases	Success	Failure
Dexmedetomidine group	1800	1672 (92.9)	128 (7.1)
Control group	1800	1705 (94.7)	95 (5.3)
P value		>0.05	

Table 2: Comparison of anesthetic time between both groups ($\bar{x} \pm s$)

Group	Total cases	Recovery time (min)
Dexmedetomidine	1800	12.1±3.1
Control	1800	12.9±2.9
P value	P > 0.05	

Table 3: Comparison of adverse reaction between both groups ($\bar{x} \pm s$)

Group	Total cases	Adverse reactions	No adverse reactions occurred
Dexmedetomidine	1800	95 (5.3)	1705 (94.7)
Control	1800	300 (16.7)	1500 (83.3)
P value	<0.05		

will lead to postoperative pain in patients and severe agitation after surgery, while dexmedetomidine can sedate and reduce agitation reaction after surgery.^[6]

Discussion

All in all, not only remifentanyl is a common surgical anesthetic, but also brings serious adverse reactions to patients after surgery.^[7] Mixed use of it with dexmedetomidine drug can reduce patients' body damage.^[8] In early stage after surgery, anesthesia recovery will aggravate patients' sensation of pain, make patients' respiratory and circulatory and endocrine system undergo serious change, cause patients to have relatively serious mental injury, and lead to serious fears and insomnia, which causes very adverse effects on patients' physical health and mental state. Dexmedetomidine, a receptor agonist drug with strong selectivity, has a significant analgesic effect.^[9] At present, this drug has been widely used in surgical anesthesia, becoming main auxiliary drug for surgery anaesthesia. Dexmedetomidine can maintain patients' brain at a normal level and exert sedative and hypnotic effects on patients.^[10] At the same time, suitable for mixed use with remifentanyl, it can reduce adverse effects of remifentanyl and thus effectively enhances patients' health without adverse effects on patients' body.

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- [4] Foundation of Science and Technology Department of Guizhou Province (Qiankehe J zi[2013]2179).

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Conflicts of interest

There are no conflicts of interest.

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