

## **Research on dexmedetomidine and propofol for the treatment of postoperative delirium.**

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### **Abstract**

**Objective:** To explore the curative effect of dexmedetomidine and propofol on the treatment of postoperative delirium.

**Methods:** A total of 60 patients with postoperative delirium were collected by our hospital from March 2015 to March 2016 and divided into treatment group and control group with different therapeutic drug for 30 cases in each group. The patients in control group were treated by propofol. And the patients in treatment group were treated with dexmedetomidine. The therapeutic effect, number of days in hospital, incidence of adverse events and recurrence rate were compared between two groups to investigate the difference of these two drugs.

**Results:** The cure rate, total effective rate and recurrence rate in treatment group were 80%, 93.33% and 3.34%, respectively. However, the cure rate, total effective rate and recurrence rate in control group were 53.33%, 53.33%, and 20%, respectively. Compared with the control group, the number of hospitalization days and incidence of adverse events in treatment group were lower with statistical significance ( $P < 0.05$ ).

**Conclusion:** Dexmedetomidine and propofol are effective in patients with postoperative delirium, but dexmedetomidine was used in patients with less adverse reaction in terms of drug adverse reactions. Thus, dexmedetomidine is the first choice for treatment of patients with postoperative delirium. It deserves wide use in clinical application.

**Keywords:** Postoperative delirium, Dexmedetomidine, Propofol, Treatment effect.

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### **Introduction**

Delirium refers to the cerebral cortex function obstacle, which belongs to consciousness disturbance. The main outcomes of delirium include confusion, brain function in disorientation, motion excited accompanied by high spirits often, hallucinations or delusions [1]. Main symptoms in clinic include attention defect, decreased consciousness, imperceptions, sleep disorders, and so forth. The postoperative delirium results from multiple factors. With the increasing level of medical treatment and the gradually elongation of people's life, the incidence of disease become increasingly higher [2,3]. A total of 60 patients with postoperative delirium were collected in our hospital from March 2015 to March 2016 and divided into treatment group and control group with different therapeutic drug. The content of research is reported as following.

### **Materials and Methods**

A total of 60 patients with postoperative delirium excluding allergy were collected in our hospital (Qilu Hospital of Shandong University) from March 2015 to March 2016 and divided into treatment group and control group with different therapeutic drug for 30 cases each. 20 cases of male and 10 cases of female were collected in control group. The age range, average age, average duration of disease, weight range and the average weight in control group were 52~68 y old,  $56.2 \pm 48.1$  y,  $1.6 \pm 4.2$  y, 45~76 kg and  $64.6 \pm 36.2$  kg, respectively. 16 cases of male and 14 cases of female were collected in treatment group. The age range, average age, average duration of disease, weight range and the average weight in control group were 53~66 y old,  $56.2 \pm 45.8$  y,  $1.8 \pm 4.1$  y, 43~74 kg and  $62.6 \pm 34.2$  kg, respectively. The difference of age, gender, duration, weight in the two groups was not significant ( $P > 0.05$ ).

### Treatment methods

All patients were conducted regular inspection before drug treatment including biochemical items, blood routine, blood gas analysis and so on. Control group were treated by propofol. The general dosage of adults was 40 mg/10 s. Adult patients no more than 55 y were injected with 2.0~2.5 mg/kg propofol in a single drug repeated with dosage of 25~50 mg [4,5]. Treatment group were treated by dexmedetomidine. 2 ml of Dexmedetomidine was diluted with 48 ml of 0.9% sodium chloride solution before medication. The intravenous drip dosage of adult was 1 µg/kg. The drip speed should not be too fast and drip time should be more than 10 min. Treatment course was in accord with hospitalization days in ICU [6,7].

### Curative standard

The treatment effect, hospitalization days, the incidence of adverse events and the recurrence rate were compared between the two groups of patients. Curative effect was divided into healing, effectivity and invalid. The patients with normal memory and self-care ability were deemed to healing. The patients with memory restored gradually and self-care ability recovered gradually were deemed to effectivity. The patients without improvement and with worse condition were deemed to invalid. Total effective rate=cure rate+efficient rate [8,9]. Adverse events contained hypotension, bradycardia and endotracheal intubation.

### Statistical analysis

SPSS 11.0 software was used for statistics and analysis. Hospitalization days as the measurement data were shown as mean ± SD. The independent samples t test was used for comparing. One-way ANOVA analysis was used to compare measurement data including treatment effect, the incidence of adverse events and the recurrence rate. The difference is regarded as statistically significant when P<0.05.

## Results

### Comparison on the therapeutic effect of two groups of patients

The cure rate and total effective rate in control group were 53.33% and 73.4% with 16 cases recovered, 6 cases effective and 8 cases ineffective. The cure rate and total effective rate in treatment group were 80% and 93.33% with 24 cases recovered, 4 cases effective and 2 cases ineffective (Table 1).

**Table 1.** The curative effect of two groups.

Group	Cases	Healing	Effectivity	Invalid	Total effective rate
Treatment group	30	24 (80.00)	4 (13.33)	2 (0.60)	28 (93.33)
Control group	30	16 (53.33)	6 (20.00)	8 (26.70)	22 (73.40)

t	-	14.1901	3.4524	8.9486	8.9486
P	-	<0.05	<0.05	<0.05	<0.05

Note: the effect of treatment group is better than the control group. Significant difference was found in two groups (P<0.05) with statistical significance.

### Comparison on hospitalization days of two groups of patients

Hospitalization days of two groups in the ICU were mainly compared. Hospitalization days of treatment group were obviously less than control group (Table 2).

**Table 2.** Comparison on hospitalization days of two groups in the ICU.

Group	Cases	Hospitalization days	Average hospitalization days
Control group	30	3~8	4.5 ± 1.3
Treatment group	30	2~4	2.8 ± 1.2
t	-	-	8.9402
P	-	-	<0.05

Note: The average hospitalization days of treatment group in ICU were less than the control group. The significant difference was found in two groups (P<0.05) with statistical significance.

### Comparison on the incidence of adverse events of patients in two groups

Two groups of patients were appeared in adverse events including the inhibition of respiratory, cardiovascular hypotension, bradycardia, endotracheal intubation and so on (Table 3).

**Table 3.** Comparison on the incidence of adverse events of patients in two groups.

Group	Cases	Hypotension	Bradycardia	Trachea cannula
Control group	30	20 (66.67)	12 (40.00)	5 (16.67)
Treatment group	30	5 (16.67)	4 (13.34)	3 (10.00)
t	-	4.25	3.94	1.72
P	-	<0.05	<0.05	<0.05

Note: The hypotension, bradycardia and incidence of endotracheal intubation of patients in the treatment group were lower than the control group. The significant difference was found in two groups (P<0.05) with statistical significance.

### Comparison on recurrence of patients in two groups

6 cases of recurrence were appeared in control group. The recurrence rate was 20%. 1 cases of recurrence were appeared in treatment group. The recurrence rate was 3.34%. Above all, the recurrence rate in control group was higher than the

treatment group. The significant difference was found in two groups ( $P < 0.05$ ) with statistical significance.

## Discussion

Postoperative delirium was relatively common postoperative complications [10]. The complication was caused by usual risk factors including high age of patients, operation way, emotional state before surgery, anesthesia, postoperative status, sleep quality, history of smoking preoperatively, excessive drinking and so on [11,12]. The disease often leads to all kinds of unfavorable recovery behavior in patient, such as mental abnormality, drawing tube random, self-injury, improving the fatality rate, causing bigger effect to patients with ward, causing severe damage to families, hospitalization prolonged, treatment costs increasing and so on. It caused serious economic burden and more social harm [13-15].

Instrument testing was applied to treat patients with postoperative delirium including the balance of water and electrolyte, nutritional support and so on. Patients tested with instrument were treated by drug. Drug therapy had a good effect, and it could alleviate patient's mental state effectively and improve patient's sleep [16,17]. Propofol was a kind of effective and rapid systemic intravenous anesthetics. It could quickly be metabolized with inhibiting respiration and circulation as well as improving sleep quality in patients [18].

Dexmedetomidine was a selective agonist with good interaction in the central nervous, stronger stimulating effect, better improvement of the sleep quality, diuretic effect, alleviating nervous anxiety effectively, protecting the patient's heart, brain, kidney, tissues and other organs as well as adjusting the neurotransmitters hurted of patients. Compared with propofol, dexmedetomidine had fewer side effects and was more significant for the prognosis of patients with recovery [19,20].

A total of 60 patients with postoperative delirium were selected by our hospital in March 2015 to March 2016 and were treated with dexmedetomidine and propofol. Compared with the control group, the cure rate and total effective rate in treatment group were 80% and 93.33% with significant difference ( $P < 0.05$ ). Meanwhile, compared with the control group, the number of hospitalization days and incidence of adverse events in treatment group were lower with statistical significance ( $P < 0.05$ ). Compared with the control group, the recurrence rate in treatment group were 3.34% with significant difference ( $P < 0.05$ ).

Compared with propofol, dexmedetomidine with less side effects of treatment should be widely used clinically for patients with postoperative delirium.

## Conclusion

Dexmedetomidine and propofol are effective in patients with postoperative delirium, but dexmedetomidine was used in patients with less adverse reaction in terms of drug adverse reactions. Thus, dexmedetomidine is the first choice for

treatment of patients with postoperative delirium. It deserves wide use in clinical application.

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