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Effect Analysis of Ropivacaine Combined with Dezocine in Brachial Plexus Block Anesthesia

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Abstract

Objective: To evaluate the efficacy of ropivacaine combined with dezocine in brachial plexus block anesthesia. **Methods:** Sixty surgical patients admitted to our hospital from March 2021 to May 2023 were divided into study group and control group by random number table method, with 30 cases in each group. All patients received brachial plexus block anesthesia. The control group received ropivacaine, while the study group received ropivacaine combined with dezocine. Anesthesia, operation center rate, blood pressure level, postoperative pain and postoperative adverse reactions were evaluated and compared between the two groups. **Results:** The onset time of anesthesia in the study group was shorter than that in the control group, the duration of anesthesia block and anesthesia analgesia was longer than that in the control group, the heart rate, systolic blood pressure and diastolic blood pressure of the two groups were increased at the end of the operation, and the levels of heart rate, systolic blood pressure and diastolic blood pressure of the study group were lower than those of the control group, and the VAS scores of the study group were lower at 6h, 24h and 48h after the operation. The incidence of postoperative adverse reactions in the study group was lower than that in the control group, and the differences were statistically significant ($P < 0.05$). **Conclusion:** Ropivacaine combined with dezocine in brachial plexus block anesthesia can shorten the onset time of anesthesia, prolong the duration of postoperative anesthesia block and anesthesia analgesia, improve the stability of postoperative heart rate and blood pressure, improve the early postoperative pain, and reduce the incidence of postoperative adverse reactions.

Keywords

Brachial plexus block anesthesia, Ropivacaine, Dezocine, Heart rate, Blood pressure

Brachial plexus block anesthesia is one of the commonly used anesthesia techniques, widely used in upper limb and shoulder surgery, and can play an analgesic role by blocking the nerve conduction related to the brachial plexus trunk [1, 2]. In clinical application, it has been found that brachial plexus block anesthesia has a good analgesic effect, and the operation is relatively simple. Puncture is performed by the intermuscular sulci method, axillary method and supraclavicular method [3, 4] to achieve local analgesia in the target area. Common anesthesia drugs used in brachial plexus block anesthesia include ropivacaine, lidocaine, etc. [5, 6]. Brachial plexus block anesthesia is local anesthesia, and patients remain conscious after anesthesia. During the operation, anxiety and tension may occur, which will affect respiratory function and hemodynamic level, and even hinder the smooth process of the operation [7, 8], and even lead to various postoperative complications. To further improve the application effect and safety of brachial plexus block anesthesia, our hospital has paid attention to the adjustment of anesthetic drugs used

in brachial plexus block anesthesia in recent years, aiming at strengthening the depth of sedation and analgesia and prolonging the block time. Dezocine belongs to the opioid analgesic drug, which can play a strong analgesic effect, with ideal analgesic intensity, and a similar effect and duration of action to morphine [9]. In this study, combined with the data of patients receiving brachial plexus block anesthesia in our hospital in recent years, the application effect of ropivacaine combined with dezocine was analyzed, and some ideas were provided for the follow-up related to anesthesia work.

1. Data and methods

1.1 General information

A total of 60 surgical patients admitted to our hospital from March 2021 to May 2023 were divided into study group and control group by random number table method, with 30 cases in each group. In the study group, there were 16 males and 14 females, aged 23~65 (44.82±7.61) years old. In the control group, there were 17 males and 13 females. Patients aged 23 to 63 (45.31±7.49) years had no significant difference in general data between the two groups ($P > 0.05$). Inclusion criteria: (1) Meeting the relevant indications of brachial plexus block anesthesia; (2) In line with ropivacaine, dezocine, and other drug indications; (3) Elective surgery cases; (4) Cases with complete data; (5) Patients and their families actively cooperate with the treatment work, and all informed consent forms are fully signed. Exclusion criteria: (1) coagulation function, immune function impairment; (2) Abnormal function of important organs; (3) neurological factors related to limb dysfunction.

1.2 Method

1.2.1 Preoperative examination and preparation

After admission, all the examinations and preparation work were improved in combination with the operation and anesthesia plan in both groups. The anesthesiologist entered the ward about 1 day before surgery and explained the anesthesia plan and cooperation mode to the patients and their families, to improve the cognition level of the patients and their families on anesthesia. The patient was transferred to the operating room 30 minutes before surgery.

1.2.2 Intraoperative anesthesia

both groups of patients received brachial plexus block anesthesia. First of all, a puncture was required, and the biceps and pectoralis major muscles were located and observed under the guidance of bedside ultrasound. The puncture point was located at the junction area with the biceps and pectoralis major lateral muscles, and the needle was inserted vertically by in-plane technique. After a successful puncture, the anesthetic solution was injected. The control group received ropivacaine, a mixture of 80mg ropivacaine, 2% lidocaine (5ml), and 0.9% sodium chloride solution (15ml), a total of 20ml, and was injected into the median nerve, ulnar nerve, and radial nerve adjacent to multiple points. In the study group, Ropivacaine combined with dezocine was used, that is, 5mg of dezocine was given intravenously in addition to the control group. The operation was carried out after successful anesthesia, and the patient's condition was observed and evaluated during the operation.

1.3 Observation index

1.3.1 Records and statistics of anesthesia conditions

Anesthesia conditions in the two groups were recorded during the operation, mainly recording the onset time of anesthesia, tracking the postoperative conditions, and recording the duration of anesthesia block and anesthesia analgesia.

1.3.2 Operation center rate and blood pressure statistics

The heart rate and blood pressure (systolic and diastolic) levels of patients before anesthesia and at the end of the operation were measured in the two groups, and the hemodynamic level of patients was evaluated.

1.3.3 Evaluation of postoperative pain

A visual analog scale (VAS) was used to evaluate postoperative pain at 1h, 6h, 24h, and 48h after surgery, with a total score of 10 points. The higher the score, the more severe the pain response of the patient, and the less severe the pain response of the patient.

1.3.4 Incidence of postoperative adverse reactions

The incidence of postoperative anestheties-related adverse reactions of patients in the two groups was analyzed, including nausea, vomiting, headache, dizziness, urinary retention, etc.

1.4 Statistical methods

SPSS23.0 statistical software was used for processing, measurement data were expressed as ($\overline{x} \pm s$), a comparison was performed by t-test, count data were expressed as a percentage, a comparison was performed by χ^2 test, $P < 0.05$ was considered statistically significant.

2. Results

2.1 Comparison of anesthesia between the two groups

The onset time of anesthesia in the study group was shorter than that in the control group, and the duration of anesthesia block and anesthesia analgesia was longer than that in the control group, with statistical significance ($P < 0.05$), as shown in Table 1.

Table 1. Comparison of anesthesia between the two groups ($\overline{x} \pm s$)

Group	Time of onset of anesthesia(min)	Duration of anesthesia block(h)	Duration of anesthesia analgesia(h)
Research group/30	11.29±1.23	7.12±1.58	9.95±1.53
Control group/30	14.95±1.65	4.59±1.04	6.22±1.39
t	9.741	7.326	9.883
P	< 0.001	< 0.001	< 0.001

2.2 Comparison of operative center rate and blood pressure between the two groups

At the end of surgery, heart rate, systolic blood pressure and diastolic blood pressure of the two groups were increased, and the heart rate, systolic blood pressure and diastolic blood pressure of the study group were lower than those of the control group, with statistical significance ($P < 0.05$), as shown in Table 2.

Table 2. Comparison of operative heart rate and blood pressure between the two groups ($\overline{x} \pm s$)

Group	HR (time/min)		SBP (mmHg)		DBP (mmHg)	
	preanesthesia	At the end of the operation	preanesthesia	At the end of the operation	preanesthesia	At the end of the operation
Research group/30	79.58±5.12	85.44±4.39 *	129.58±9.42	140.23±7.66 *	88.47±6.12	94.12±3.49 *
Control group/30	79.04±4.79	92.13±6.50 *	130.12±10.51	148.31±8.12 *	87.96±5.90	99.53±4.05 *
t	0.422	4.672	0.210	3.965	0.329	5.543
P	0.675	< 0.001	0.835	< 0.001	0.744	< 0.001

Note: Compared with pre-anesthesia, * P < 0.05

2.3 Comparison of postoperative pain between the two groups

VAS scores of patients in the study group at 6h, 24h and 48h after surgery were lower than those in the control group, with statistical significance ($P < 0.05$), as shown in Table 3.

Table 3. Comparison of postoperative pain between the two groups ($\overline{x} \pm s$)

Group	Postoperation 1h (points)	Postoperation 6h (points)	Postoperation 24h (points)	Postoperation 48h (points)
Research group/30	2.09±0.77	3.10±0.69	3.31±0.66	2.13±0.57
Control group/30	2.21±0.73	3.89±0.71	4.10±0.59	2.98±0.60
t	0.619	4.370	4.888	5.626
P	0.538	< 0.001	< 0.001	< 0.001

2.4 Comparison of the incidence of postoperative adverse reactions between the two groups

The incidence of postoperative adverse reactions in the study group was lower than that in the control group, with statistical significance ($P < 0.05$), as shown in Table 4.

Table 4. Comparison of postoperative adverse reactions between the two groups(case %)

Group	Nausea and vomiting	Headache and dizziness	Urinary retention	Total incidence
Research group/30	0(0.00)	1(3.33)	0(0.00)	1(3.33)
Control group/30	2(6.67)	3(10.00)	1(3.33)	6(20.00)
χ^2				4.043
P				0.044

3. Discussion

Brachial plexus block anesthesia is one of the commonly used local anesthesia techniques in upper limb surgery. Compared with traditional blind probe operation, ultrasound guided puncture is currently performed, and ultrasonic positioning can improve the accuracy of puncture and avoid the physical and mental pressure caused by repeated puncture [10, 11]. In brachial plexus block anesthesia, the most commonly used anesthesia drugs are ropivacaine and lidocaine. In this study, both groups of patients were treated with a mixture of ropivacaine and lidocaine. Lidocaine belongs to the amide class of analgesic drugs, which can inhibit and excite the central nervous system, take effect rapidly, and play a long-term analgesic effect, but the risk of adverse drug reactions is high. When the blood concentration is low, it will lead to a decrease in myocardial automaticity, and with the increase in blood concentration, it will lead to a decrease of heart conduction velocity and affect the cardiac output [12]. However, ropivacaine has high application safety and low incidence of toxic reactions. Ropivacaine can improve vagal tone, promote the contraction of blood vessels in the body [13], and improve the stability of intraoperative hemodynamic level. Ropivacaine has a poor effect on the maintenance of the sensory block plane, so it is combined with lidocaine in this study.

On this basis, patients in the study group received dezocine intervention, which is an opioid drug, which can play a better role in inhibiting neuronal excitability and has a prominent analgesic effect. Ropivacaine combined with dezocine can also effectively improve the effect of local anesthesia and prolong anesthesia block time. The comparative results of this study showed that the onset time of anesthesia in the study group was shorter than that in the control group, the duration of anesthesia block and anesthesia analgesia was longer than that in the control group, and the heart rate, systolic blood pressure and diastolic blood pressure of patients in the two groups were increased at the end of the operation, and the heart rate, systolic blood pressure and diastolic blood pressure of the study group were lower than that in the control group. These results indicate that ropivacaine combined with dezocine can improve the anesthetic effect and stabilize the intraoperative hemodynamic level compared with ropivacaine alone. Dezocine can pass through the nerve cell membrane and blood-brain barrier to enhance the anesthetic effect. In recent years, relevant studies have found that dezocine can prolong the analgesic time, stabilize the level of respiratory circulation, and ensure smooth operation [14]. The VAS scores of patients in the study group were lower than those in the control group at 6h, 24h, and 48h after surgery, and the incidence of postoperative adverse reactions in the study group was lower than that in the control group. Ropivacaine combined with dezocine could also improve early postoperative analgesia and reduce the risk of adverse reactions. Studies related to brachial plexus block [15] found that the application of dezocine can effectively enhance the analgesic effect, improve the postoperative pain of patients, and have high safety.

In summary, the application of ropivacaine combined with dezocine in brachial plexus block anesthesia can improve the anesthetic effect, stabilize the hemodynamic level of patients, improve the postoperative analgesia effect, and reduce the risk of adverse reactions, which is worth carrying out.

References

[1] Wu YW, Li XZ, Ge YY. Effect of continuous supraclavicular brachial plexus block on analgesia and shoulder function in elderly patients after shoulder joint replacement [J]. Chinese Journal of Gerontology, 2019, 43(19):4697-4700.

[2] He Y. Effects of posterior clavicular approach brachial plexus block on anesthetic drug dosage and recovery quality of humerus fracture patients [J]. Journal of Medical Theory and Practice, 2019, 36(18):3142-3145.

[3] Wang ZG, Xu X, Pu YQ, et al. Application of ultrasound-guided brachial plexus block anesthesia in the treatment of humeral shaft fracture patients [J]. Journal of Clinical Medicine Research and Practice, 2019, 8(27):86-89.

[4] Dong FF, Yuan YQ. Effect of brachial plexus block combined with general anesthesia on upper limb function recovery and postoperative pain in children with humeral lateral condylar fracture [J]. Jilin Medical Science, 2023, 4 4(09):2490-2493.

[5] ZHANG HM, Zheng MP, Peng ZZ. Effect of intermuscular groove brachial plexus block combined with middle cervical plexus block on internal fixation of clavicular fracture [J]. Chinese and Foreign Medical Research, 2019,21(24):6-10.

[6] CHENG SQ. Effect of ultrasound-guided brachial plexus block combined with superficial laryngeal mask general anesthesia in children with upper limb fracture surgery [J]. Chinese Journal of Medical Sciences, 2019, 35(16):60-63.

[7] He Tao, Deng WY, Yin J, et al. Influence of brachial plexus block on senile patients with humerus fracture under different approaches guided by ultrasound [J]. Chinese Journal of Medicine, 2019, 58(08):866-870.

[8] JIANG JD, Wang JJ, Jin WJ, et al. Clinical effect of Ropivacaine combined with dexmedetomidine on brachial plexus block under ultrasound guidance in children [J]. Jiangsu Medicine, 2019, 49(07):685-688.

[9] Chen SY. Effect of Ropivacaine combined with dezocine on myocardial function during B-ultrasound guided brachial plexus block anesthesia [J]. Journal of Northern Medicine, 2019, 18(01):165-166.

[10] Zhang N, Rong Yu L, Liu Z, et al. Comparison of ultrasound-guided suprascapular nerve block and intermuscular groove brachial plexus block in postoperative analgesia of shoulder arthroscopy in middle-aged and elderly patients [J]. Journal of Clinical Military Medicine, 2019, 51(06):657-660.

[11] ZHU SY, Wu JG, Wang D, et al. Effect of esketamine combined with Ropivacaine on rebound pain after brachial plexus block in patients with upper limb fracture [J]. International Journal of Anesthesiology and Resuscitation, 2019, 44(05):467-472.

[12] Wen TT, Yang YL, Li XZ. Effects of esketamine assisted ropivacaine on diaphragm function and serum PPARγ and IGF-1 levels in elderly patients undergoing shoulder arthroscopic surgery under brachial plexus block [J]. Journal of Clinical and Experimental Medicine, 2019, 22(07):774-777.

[13] Feng J, Shui YH, Zhang Y, et al. Analgesic effect of Ropivacaine combined with sufentanil in patients with proximal humeral fracture after continuous brachial plexus block and its effect on serum inflammatory factors and stress response [J]. Advances in Modern Biomedicine, 2019, 23(05):940-944.

[14] Jiang Q, Yang JH, Wu BH, et al. Effect of dezocine combined with flurbiprofen axidate under brachial plexus nerve block on single dezocine venous PCA in patients undergoing upper extremity orthopedic surgery [J]. Journal of Guangzhou Medical University, 49(04):44-46.

[15] LI YH, Liu YF, Liang LJ. Effect of dezocine preemptive analgesia on brachial plexus block and its effect on postoperative pain [J]. Journal of Mathematical Medicine and Pharmacology, 2018, 33(04):586-587.