

## Clinical study of Dexmedetomidine Combined with Dizosin for Postoperative Analgesia After Gynecological Laparoscopy

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**Abstract:** Objective: To observe the analgesic effect and safety of dexmedetomidine combined with dizosin after gynecological laparoscopic surgery. Methods: 68 cases of laparoscopic gynecological surgery were randomly divided into two groups: observation group (34 cases, group A) and control group (34 cases, group B). All patients were treated with combined general anesthesia. Group a received 0.5  $\mu$ g / kg dextromethoridine by intravenous micro pump and 0.1 mg / kg dizosin 20 minutes after tracheal intubation. Group B: after endotracheal intubation, fentanyl 50g was injected intravenously by micropump. Results: there was no significant difference in analgesic effect between the two groups, but the adverse reactions in group B were significantly lower than that in group A ( $P < 0.05$ ). Conclusion: Dexmedetomidine combined with dizosin is more feasible and safe in clinical application.

It has been a long century from the research and development of laparoscope to the mature technology. It was not until 1980s that the application of monitor opened the door of modern laparoscopic surgery, until 1989, with the successful implementation of hysterectomy and pelvic lymphadenectomy, it really entered the technical maturity period [1]. After more than 10 years, and through the unremitting efforts and bold practice of many endoscopic scholars, laparoscopic surgery has made today's brilliant achievements. In the past century, people's understanding of indications and contraindications of laparoscopic surgery has been constantly changing, which is closely related to specific historical conditions, the development of science and technology in the same era and people's ideas. Laparoscopic surgery is widely used in gynecological patients. It is a safe and effective method, allowing direct observation under the microscope. Although laparoscopy is mainly used for the diagnosis and treatment of gynecological diseases in critically ill patients, the invasive nature of this technology can cause side effects such as cough, dyspnea, catecholamine release, etc., which will have further adverse effects on the prognosis of patients. The American Society of gastroenterologists stressed the necessity of sedation and local anesthesia during laparoscopy [2-3]. In this process, appropriate sedation and analgesia can improve the patient's tolerance and comfort, reduce fear, anxiety and mental pressure, and improve the overall clinical results. The traditional analgesic is opioid receptor agonist, which mainly exerts its analgesic effect by activating three receptors of adrenal  $\beta$ . The side effects are respiratory inhibition, attentiveness, regional vomiting, decreased gastrointestinal peristalsis, slow heart rate and drug dependence. The  $\beta$  - adrenoceptor produces spinal analgesia, sedation and mild respiratory inhibition. The  $\beta$  - adrenoceptor is related to anxiety, cardiovascular novelty and increased smooth muscle tension. Dexmedetomidine is highly selective. Adrenergic receptor agonists have the central anti sympathetic effect, can produce the sedative effect similar to natural sleep; at the same time, they have certain analgesic, diuretic and antianxiety effects, no inhibition on respiration, but also have the characteristics of protecting the functions of heart, kidney, brain and other organs. It can be used for sedation of severe patients with endotracheal intubation during perioperative anesthesia combined with drugs and invasive examination. Dizosin is a mixed agonist of opioid receptor, opioid receptor considers discomfort. It is absorbed and distributed rapidly in human body, and its

apparent distribution volume is mixed and excited. Antagonists refer to some drugs that stimulate a certain type of opioid receptor, have long half-life and slow clearance, so dizosin has a fast and sedative effect on pain, and an antagonistic effect on another receptor. The characteristics of these drugs are long-lasting pain, while reducing the incidence of respiratory depression and addiction. The main analgesic effect is less dependence, respiratory inhibition is weaker than morphine in analgesic intensity, effective time and duration. Dizosin is absorbed and distributed rapidly in human body, and its apparent distribution volume is less addictive. The pharmacokinetics of dizosin showed that intravenous drip. The purpose of this study is to explore a safe, effective, comfortable and simple anesthesia method for female patients during laparoscopic examination. To provide the theoretical basis for the rational use of dexmedetomidine combined with dizosin in the future.

## **1. Data and Methods**

### **1.1 General information**

Choosing 68 patients who had laparoscopic examination between July 2018 and October 2019 were all female. ASA grade, II - III; age  $59.62 \pm 10.26$ . Randomly divided into two groups, namely observation group (group A, 34 cases), control group (group B, 34 cases).

## **2. Anesthesia Method**

2.1 The selected patients were given 0.5mg atropine intramuscularly 30 minutes before the microscopic examination. The routine nasal catheter was used for oxygen inhalation (oxygen flow 5 L / min), the vein was opened, and 10 ml of 2% lidocaine was used for atomization inhalation. Then, lying on the examination bed, using multi-functional monitor, routine monitoring of arterial blood pressure, ECG, pulse oxygen saturation. Patients in group A were given 0.1mg/kg of dizosin and then 0.5g/kg of dexmedetomidine. Group B was given fentanyl 50g.

2.2 Then, propofol 1-2mg / kg was given intravenously and slowly at a constant speed for 30s in both groups (the patients fell asleep, could not breathe, the eyelash reflex disappeared, until Ramsay score  $\geq 4$  points) and then laparoscopy was performed. Pump propofol at the rate of  $3\text{mg} \cdot \text{kg}^{-1} \cdot \text{h}^{-1}$  until the end of microscopy.

2.3 the observation indexes were recorded: age, BMI, ASA grade; at the end of each monitoring (T1), at the end of anesthesia induced propofol load dose injection (T2), at the time of laparoscopic tube passing through the epidermis (T3), at the time of laparoscopic tube passing through the epidermis (T4), when the laparoscope exits the epidermis (T5), the mean arterial pressure (MAP) of the patients in the two groups when they woke up and opened their eyes (T6), heart rate (HR), the value of pulse oximetry (SpO2).

At the same time, the patients were recorded: microscopic examination time, wake-up time, number of bradycardia cases, number of coughing cases, number of physical movement cases, and auxiliary respiration (when  $\text{SpO}_2 \leq 85$ , the patients were given mask assisted respiration, propofol load, and total propofol dosage).

2.4 the statistical data were analyzed by SPSS18.0 statistical software. The measurement data were expressed by means of mean  $\pm$  standard deviation ( $\bar{x} \pm s$ ). The counting data were tested by chi square test, and the data between groups were compared by one-way ANOVA.  $P < 0.05$  showed that there was statistical difference between the data.

## **2. Result**

There was no significant difference in age, BMI and ASA between the two groups; at the end of each monitoring (T1), at the end of anesthesia induced propofol load dose injection (T2), at the time of laparoscopic access to the epidermis (T3), at the time of laparoscopic access to the epidermis (T4), at the time of laparoscopic access to the epidermis (T5), when the patient woke up and opened his eyes (T6), there were six time points, the mean arterial pressure (MAP), heart rate (HR) and pulse oxygen saturation (SpO2) of the patients had no statistical difference (Table 1).

Table 1 Mean arterial pressure (MAP), heart rate (HR) and pulse oxygen saturation (SpO<sub>2</sub>) of the patients had no statistical difference

index	Group	n	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>
MAP	GroupA	34	109.4±9.8	92.6±5.6	98.6±6.8	94.6±5.5	95.3±8.7	102.8±7.5
(mmHg)	GroupB	34	107.2±8.9	93.5±7.9	118.6±7.3	108.6±8.6	99.5±6.4	100.5±8.5
HR	GroupA	34	77.8±5.9	76.2±6.5	88.5±9.6	83.6±9.8	88.7±9.5	70.5±8.9
(once/min)	GroupB	34	76.5±8.9	72.5±5.9	99.8±4.6	83.9±5.9	93.8±10.2	70.6±5.9
SPO <sub>2</sub>	GroupA	34	98.6±5.6	89.6±6.9	79.5±10.2	95.1±10.5	100.2±9.6	79.8±5.6
(%)	GroupB	34	98.6±2.1	98.6±5.3	88.6±6.5	92.6±4.5	98.6±2.1	95.8±0.9

Compared with the control group (group B): the recovery time of patients in group A was  $4.8 \pm 2.5$ , that in group B was  $15.2 \pm 5.6$ , that in group A was shorter than that in group B, that in group A was 17.6%, that in group B was 44.8, that in group a was smaller than that in group B, that in group A was 8.8%, that in group B was 25.6%, that in group A was smaller than that in group B, that in group A was less than that in group B, and that in group A was less than that in group B in propofol loading dose and total dosage ( $P < 0.05$ , table 2). There was no significant difference in the time of microscopic examination, bradycardia rate and body movement rate. Table 2).

Table 2 Comparison of microscopical examination time, anesthesia effect and propofol dosage between the two groups

Group	N	Microscopic examination time(min)	Recovery time(min)	Bradycardia [example(%)]	Cough [example(%)]	Body freeze [example(%)]	Assisted respiration [example(%)]	Propofol load dosage(mg)	Total propofol dosage(mg)
A	34	14.6±6.8	4.8±2.5	5(14.7)	6(17.6)	3(8.8)	3(8.8)	72.9±8.9	108.6±9.8
B	34	12.9±8.9	15.2±5.6*	4(11.8)	15(44.8)*	4(12.9)	9(25.6)*	98.7±15.2*	141.5±13.7*

Note: compared with group B \*  $P < 0.05$

### 3. Discussion

Compared with open surgery, laparoscopy has many advantages, including less postoperative pain, early recovery of intestinal function, short hospital stay and early recovery [4]. Despite advanced technology and improved surgical techniques and knowledge, the incidence of complications, including venous injury, is increasing. It is difficult to determine the exact incidence of complications. The definition of complication is different, and the report of complication is insufficient. The total reported incidence of complications ranged from 0.2% to 10.3% [4-6]. The main laparoscopic surgery was associated with a higher incidence of complications. Intestinal injury is a serious complication of gynecological laparoscopic surgery. The incidence depends on the pathology of the treatment and the type of surgery (diagnosis, minor surgery, active, or complex procedure) [7]. Lack of experience with surgeons and previous abdominal surgery increases the risk of intestinal injury. The incidence of intestinal injury in laparoscopic surgery was 0.13%. The most common site of intestinal disease is the small intestine. Then the large intestine and stomach. Jia et al. Showed that the incidence of midgut injury was 1 / 769.3 [8]. Papers on this topic mainly review different surgical methods, different diagnostic problems, different degrees of laparoscopic surgery,

and different definitions of intestinal injury. The indicators of laparoscopic surgery change with time, and the increased complexity is defined by the increased laparoscopic surgeon [9-10].

Ideally, the best and cheapest solution to prevent intestinal damage is to reduce adhesion formation. However, there is still a lack of strong evidence to support their universal use [11-12]. Robotic surgery allows inexperienced laparoscopic surgeons to perform more complex gynaecological operations, because it improves visual effects, and whether it can reduce intestinal pain needs further study. The purpose of three-dimensional (d) laparoscopic gynecological ecosurgery is to provide a monitoring image very similar to the actual anatomical structure. This improves the speed and accuracy of laparoscopic phantom tasks, and provides advantages in teaching laparoscopic technology [13]. However, the impact of three-dimensional laparoscopic gynecological surgery on intestinal injury needs to be evaluated. In conclusion, intestinal injury is still a potential serious complication of gynecological laparoscopic surgery [14]. Every effort should be made to prevent this. The examination of suspected missed patients includes continuous abdominal examination, measurement of inflammatory markers, and imaging examination as required. Cooperation between laparoscopic gynecologists and general surgeons is important for making the right decisions in a timely manner in difficult cases.

Dexmedetomidine (an  $\alpha_2$  adrenergic agonist) is a relatively new drug, which can also be used for procedural sedation. It has the characteristics of sedation and antianxiety, and is known as its analgesic potential due to the decrease of its sympathetic tension. Dexmedetomidine induced dose-dependent effects ranging from mild to deep sedation. In addition, in addition to the dose that causes deep sedation or general anesthesia, sedation is reversible. Patients can easily be awakened to a happy state, but when not disturbed, they will return to a state very similar to natural sleep. These are unique characteristics of commonly used sedatives. Early studies have shown that dizosin has a more effective or equipotential analgesic effect than morphine. In modern humans, primates and humans, due to its  $\alpha$  agonist activity, this evidence comes from the study of in vivo function and the research of anti-injury and discriminative stimulation of in vivo drugs. At the same time, dizosin also showed some  $\beta$  - antagonists. Dizosin had an antagonistic effect on morphine induced reflex loss [15], but did not significantly promote the arrest response. The common side effects of dizosin include careful vomiting, drowsiness and respiratory depression, but the incidence of dizosin is lower than other drugs. Adverse reactions such as hallucination, disorientation, dizziness, sweating and skin reaction at the injection site have also been reported. Fui used dizosin in healthy people to observe the ventilation function. The results showed that dizosin can produce respiratory inhibition as well as morphine, but the respiratory inhibition caused by dizosin has the greatest effect. Only when dizosin reaches 30mg/70kg, it can be completely reversed by naloxone. At present, there is no report of fatal respiratory depression, but patients with reduced respiratory reserve still need to be cautious. Dizosin is a mixed opioid receptor agonist, which has good analgesic effect. Compared with sufentanil, fentanyl, tramadol, and bupivacaine, it has a lower incidence of adverse reactions such as nausea, vomiting, respiratory inhibition, and better effect when combined with other drugs. It is also suitable for postoperative analgesia in children, the elderly and puerpera and other special groups. It has high safety and good prospect in clinical anesthesia and pain treatment.

The results of this study showed that: in the observation group (group A), at the end of all kinds of monitoring (T1), at the end of anesthesia induced propofol loading (T2), when the laparoscopic tube passes through the epidermis (T3), when the laparoscopic tube passes through the epidermis (T4), when the laparoscope exits the epidermis (T5), when the patient woke up and opened his eyes (T6), there were six time points, the mean arterial pressure (MAP), heart rate (HR) and pulse oxygen saturation (SPO2) of the patients had no statistical difference, but the patients in group B woke up faster and had fewer adverse reactions. Compared with fentanyl, dexmedetomidine combined with dizosin is a better anesthesia method.

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