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ORIGINAL ARTICLE

Application effect of dexmedetomidine combined with flurbiprofen axetil and flurbiprofen axetil monotherapy in radical operation of lung cancer and evaluation of the immune function

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Summary

Purpose: *To explore the effect of dexmedetomidine combined with flurbiprofen axetil on postoperative analgesia and immune function in patients with lung cancer after radical operation.*

Methods: *60 lung cancer patients undergoing open chest radical surgery were selected and randomly divided into D & F Group (dexmedetomidine combined with flurbiprofen axetil) and F Group (flurbiprofen axetil), with 30 cases in each group. Before induction of general anesthesia, Group F was administered intravenous flurbiprofen axetil, and in D & F group, dexmedetomidine and erfuorbiprofen axetil were injected.*

Results: *At T2 (intubation) and T3 (extubation), map and HR in D & F group were significantly lower than those in F group (p<0.05). The extubation quality score of D & F group was significantly lower than that of F group (p<0.05). At 6 h and 12 h after operation, visual analogue scale (VAS) score and Bruggrmann comfort scale (BCS) score of D & F group were significantly lower than that of F group (p<0.05). The dosage of sufentanil and the times of pressing analgesia pump in group D & F were significantly less than those in group F (p<0.05). NK cells, CD3 + T cells and CD4 + / CD8 + in the D & F group were significantly higher than those in F group at 12h, 24h, 48 h and 1 week after operation (p<0.05).*

Conclusions: *Flurbiprofen axetil can improve postoperative pain, but combined with dexmedetomidine better effect, postoperative comfort and immune function of patients were significantly improved.*

Key words: *dexmedetomidine, flurbiprofen axetil, analgesic effect, immune function, radical resection of lung cancer*

Introduction

In recent years, the incidence rate of lung cancer ranks among the forefront of various types of tumors, which seriously threatens human life, and the mortality rate ranks first among malignant tumors [1]. In recent years, new therapeutic methods such as chemoradiotherapy, stem cell therapy and immunotherapy have been developed, but their wide application is limited due to serious adverse reactions, drug tolerance, immune suppression microenvironment and high treatment cost [2]. So radical surgery is still one of the most effective treatments for lung cancer. However, the trauma of thoracotomy is very big. The trauma, anesthesia stimulation and postoperative pain produced during the operation can cause adverse stress of the body, which can aggravate the immunosuppression, reduce the immune function of patients, and eventually lead to postoperative infection and tumor metastasis [3]. Therefore, the choice of effective postoperative analgesic strategy is particularly

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important. Flurbiprofen axetil is a commonly used postoperative analgesic drug with good analgesic effect [4]. Dexmedetomidine is an α 2 receptor agonist, which has sedative and analgesic effects and has protective effect on lung cancer patients undergoing radical operation [5].

This study intends to pre-inject dexmedetomidine combined with flurbiprofen axetil in patients undergoing radical resection of lung cancer, to explore its analgesic effect and the impact on immune function of patients, so as to provide reference for clinical intraoperative management.

Methods

Clinical data

Sixty lung cancer patients with ASA grade I-II and undergoing open chest radical surgery in our hospital were selected from January 2017 to November 2019. There were 37 males and 23 females, aged 39-65 years, weighing 60-72 kg and the operating time was 172-195 min. All patients were given general anesthesia under intravenous drip combined with inhalation.

Inclusion criteria

(1) Patients aged 20-80 years were scheduled to undergo thoracotomy for lung cancer; (2) According to the clinical diagnostic criteria of UICC and AJCC for lung cancer staging; (3) Conformed to international ethical standards and requirements; (4) Fully aware of the treatment plan of this study, and the informed consent was signed before operation; (5) Patients willing to accept patient-controlled intravenous analgesia (PCIA) and pain score, and actively cooperated with the whole treatment process.

Exclusion criteria

(1) Difficulty to insert double lumen endotracheal tube; (2) Patients that had taken analgesic and sedative drugs before, and were allergic to α2 receptor agonists and non steroidal anti-inflammatory drugs; (3) Administration of preoperative chemotherapy, radiotherapy or immunotherapy; (4) The tumor cells had spread or metastasized or other malignant tumors occurred at the same time; (5) Patients with chronic pain history, nervous system disease history, puncture site infection, autoimmune system disease, respiratory or circulatory diseases; (6) Who had history of alcohol and drug abuse, abnormal coagulation function and local anesthetic allergy by laboratory examination; (7) Patients with abnormal levels of inflammatory factors; (8) Patients with severe heart, brain, kidney and liver dysfunction; (9) Patients with mental illness or cognitive dysfunction.

Experimental grouping basis

The patients were randomly divided into two groups, 30 cases in each group. Group F was given flurbiprofen axetil alone, group D & F was given dexmedetomidine combined with flurbiprofen axetil, In the F group, there were 18 male patients and 12 female, aged 39-64 yearss (mean 52.8 ± 9.4), weighing 61-72 kg (mean 68.0 ± 5.11), the operation time was 175-191 min (mean 186.8 ± 13.41). In the D & F group, there were 19 male and 11 female patients, aged 39-65 years (mean 51.3 ± 9.2), weighing 60-70 kg (mean 68.5 ± 5.36), the operation time was 172-195 min (mean 187.3 ± 14.35). There was no significant difference in gender, age, body weight and operation time between the two groups (p>0.05).

Anesthesia method

Atropine 0.5 mg and phenobarbital 0.1 g were injected intramuscularly 30 min before operation. After entering the operating room, noninvasive arterial blood pressure (NIBP), heart rate (HR), and pulse oxygen saturation (SpO_2) were monitored, under local anesthesia the right internal jugular vein and left radial artery were indwelled. Anesthesia induction: midazolam 0.06 mg/kg, etomidate 0.3 mg/kg, sufentanil 0.3 μg/kg, rocuronium 0.6mg/kg, and then 1 min later double lumen endobronchial tube was inserted, and mechanical ventilation was performed after localization by fiberoptic bronchoscope. Anesthesia maintenance: propofol 4-6 mg/kg/h, sevoflurane 1-3%, remifentanil 0.15-0.3 μg/kg/min, were then injected intermittently vecuronium 0.05mg/kg. During the operation, PetCO2 was maintained at 35-45 mmHg and bispectral index (BIS) was 40-50. If the mean arterial pressure (map) decreased more than 25% of the baseline value or increased more than 30% of the baseline value, intravenous injection of ephedrine 5-10 mg or urapidil 10-15 mg were administered. If HR was less than 60 times/min or more than 120 times/min, intravenous atropine 0.25-0.5 mg or esmolol 10-30 mg was needed. Postoperative analgesia: sufentanil was used for patient-controlled intravenous analgesia after operation and the specific method was: sufentanil 2 μg/kg and tropisetron 10 mg, normal saline diluted to 100 ml. The loading dose of sufentanil was 0.1 μg/kg, the additional dose was 1 ml, the maintenance dose was 2 ml/h, and the locking time was 15 min. In the F group, on the basis of the above anesthesia method, flurbiprofen axetil 1 mg/kg was injected intravenously 10 min before induction. In the D & F group, on the basis of the above anesthesia method, dexmedetomidine 0.5 μg/kg (diluted with normal saline to 20 ml) was injected 25 min before induction, and the infusion was completed within 10 min, and flurbiprofen axetil 1 mg/kg was injected intravenously 5 min later.

Observation indexes

We observed the mean arterial pressure (MAP) and heart rate (HR) before induction (T1), immediately after intubation (T2), immediately after extubation (T3) and 5 min after extubation (T4). We compared the recovery time (the time from the end of operation to the time of breathing), the time of extubation (the time from the end of operation to the removal of double lumen bronchial tube) and the extubation quality score between the two groups. We recorded the visual analogue scale (VAS score) and BCS score at 6 h, 12 h and 24 h after operation. We compared the dosage of sufentanil and the times of pressing analgesia pump. We then compared the levels of immune cells in the blood, including NK cells, CD3 + T cells and CD4 + / CD8 +, and the levels of immune factors

in serum, including TNF-α, IL-6 and IL-10 before operation, 12h, 24h, 48 h and 1 week after operation. Finally, we compared the incidence of adverse reactions within 48 h after operation between the two groups, mainly including bradycardia, nausea and vomiting, dizziness, hypotension, etc.

Scoring criteria of each index

(1) VAS score [6]: 0 marks as be painless, 10 marks as twinge; 1 to 3 marks as mild pain, 4 to 6 marks as moderate pain, 7 to 10 severe pain, and the higher the score, the more severe the postoperative pain. (2) BCS score [7]: 0 marks persistent pain; 1 marks no pain at rest. Deep breathing, cough and severe pains 1 marks no pain in a resting state, severe pain when deep breathing and coughing; 2 marks no pain in a resting state, slight pain when deep breathing and coughing 3 marks no pain in deep breathing, 4 marks no pain when coughing. Extubation quality score [8]: 1 marks no cough; 2 marks mild cough, 1-2 times; 3 marks moderate cough, 3-4 times; 4 marks severe cough, 5-10 times or breath holding; 5 marks severe cough, more than 10 times or laryngospasm.

Immune cells detection process

Immunocytes were detected by flow cytometry (Produced by Beckman Coulter Co., Ltd., USA, model: gallios fl1-fl6), measured the numbers of NK cells, CD3 +, CD4 +, CD8 + T cells and calculated the ratio of CD4 + / CD8 + before operation, 12, 24, 48 h and 1 week after operation. The lower the levels of NK cells, CD3 + T cells and the ratio of CD4 + / CD8 +, the stronger the immunosuppression. Before operation, and 12 h, 24 h, 48 h and 1 week after operation, 3 ml peripheral blood was collected in EDTA anticoagulant tube for detection. Taken were 0.1 ml of blood sample for each test, and added 0.02 ml of cd4-fitc / cd8-pe flow cytometry, incubated for 1 h in the dark and normal temperature, and detected it by flow cytometry, then set the detection wavelength at 488 nm and finally analyzed the data by connecting with expo3.2 ADC immunofluorescence analysis software.

Immune factor detection process

The levels of tumor necrosis factor-α (TNF-α), interleukin-6 (IL-6) and interleukin-10 (IL-10) were detected by enzyme-linked immunosorbent assay (ELISA) before operation, and 12, 24, 48 h and 1 week after operation. Collected were 3 ml peripheral blood samples before operation, and 12, 24, 48 h and 1 week after operation, centrifuged at 3.500 rounds/min at room temperature for 5 min, discarded the lower red blood cells and retained the upper serum. Detection of the serum levels of TNF-α, IL-6 and IL-10 was carried out by automatic quantitative mapping enzyme marker (Thermo Fisher Technology Co., Ltd, USA, model: Varioskan LUX) and ELISA Kit (Merck biopharmaceutical Co., Ltd, USA). All detection operations were carried out in strict accordance with the instructions of each kit, and each test was repeated 3 times.

Statistics

SPSS 23.0 software (IBM Corp.) was used for the statistical analyses of the data. The measurement data were expressed as mean±standard deviation, repeated measurement analysis of ANOVA was used to compare the indexes, T-test was used to compare the two groups; The count data were expressed in cases (%), and x^2 test was used to compare the two groups. $P<0.05$ was considered to indicate statistically significant difference.

Results

Results of MAP and HR of the two groups

The MAP and HR of the two groups were compared before induction (T1), intubation (T2), extubation (T3) and 5 min after extubation (T4). We found that at T2 and T3 times, MAP and HR in D & F group were significantly lower than those in F group ($p<0.05$). At the T1 and T4 time, there was no significant difference in MAP and HR between the two groups ($p>0.05$) (Table 1).

Table 1. Comparison of MAP and HR at different time points

Groups	*n*	*MAP (mmHg)*				*HR (times / min)*			
		T1	*T2*	*T3*	*T4*	*T1*	*T2*	*T3*	*T4*
D&F group	30	80.1±11.4	86.2±14.1	82.9±11.7	83.4±11.5	78.3±10.5	84.1±11.4	81.2±10.2	79.3±11.4
F group	30	79.6±11.9	90.52±14.6	87.8±11.3	82.6±12.4	79.4±11.2	87.3±11.7	84.4±11.6	80.5±11.5
t		0.209	4.025	4.936	0.321	0.214	3.249	3.135	0.376
p		0.752	0.026	0.021	0.537	0.694	0.034	0.037	0.051

Table 2. Comparison of recovery time, extubation time and extubation quality score

Group	*n*	*Recovery time (min)*	*Extubation time (min)*	*Extubation quality score (points)*
D&F group	30	13.9±5.3	16.1±5.9	2.8±0.8
F group	30	14.1±4.9	15.9±5.4	3.1±0.7
t		0.361	0.354	2.773
p		0.637	0.714	0.031

Results of recovery time, pulling time and quality score

The recovery time, pulling time and quality score of the two groups were compared. We found that there was no significant difference in recovery time and extubation time between the two groups (p>0.05). The extubation quality score of D & F group was significantly lower than that of F group (p<0.05) (Table 2).

Results of VAS and BCS scores at each time point after operation

The VAS and BCS scores at 6 h, 12 h and 24 h after operation were compared and we found that the VAS score of D & F group was significantly lower than that of F group at the above three time points after operation (p<0.05); and the BCS score of D & F group was significantly higher than that of F group at the above three time points after operation (p<0.05) (Table 3).

Results of the application of analgesia pump in 24 hours after operation

By comparing the usage of sufentanil and the pressing times of analgesia pump between the two groups we found that the dosage of sufentanil in group D & F was significantly less than that in group F (p<0.05), and the number of times of pressing the analgesia pump in group D & F was significantly less than that in group F (p<0.05) (Table 4).

Results of the levels of immune cells during the perioperative period

By comparing the levels of immune cells in the blood of the two groups during the perioperative period, we found that there was no significant difference in the levels of immune cells between the two groups before operation (p>0.05). NK cells, CD3 + T cells and CD4 + / CD8 + in the D & F group were significantly higher than those in F group at 12, 24, 48 h and 1 week after operation (p<0.05). In addition, NK cells and CD3 + T cells in the blood of F group and D & F group decreased first and then increased within 1 week after operation. The ratio of CD4 + / CD8 + in D & F group was basically stable within 1 week after operation, while that in F group decreased first and then increased (Figure 1).

Results of the levels of immune factors during the perioperative period

By comparing the levels of immune factors in the serum of the two groups during the perioperative period, we found that there was no significant difference in serum levels of immune factors between the two groups before operation (p>0.05). At 12, 24, 48 h and 1 week after operation, compared with group F, the levels of IL-6 and TNF-α in the D & F group were significantly lower (p<0.05), while the level of IL-10 was significantly higher (p<0.05). In addition, the levels of IL-6, IL-10 and TNF-α in the serum of F group and D & F group decreased first and then increased within 1 week after operation (Figure 2).

Results of adverse reactions

By comparing the incidence of adverse reactions between the two groups, we found that in the D & F group, 5 patients had adverse reactions, accounting for 16.7% of the total; in the D & F group,

Table 3. Comparison of VAS and BCS scores at each time point after operation

Group	*n*	*VAS (points)*			*BCS (points)*		
		6 hours after operation	*12 hours after operation*	*24 hours after operation*	*6 hours after operation*	*12 hours after operation*	*24 hours after operation*
D&F group	30	3.11±0.31	3.31±0.25	3.26±0.27	2.16±0.28	2.63±0.24	2.81±0.20
F group	30	3.52±0.20	3.58±0.32	3.39±0.30	1.92±0.21	2.31±0.21	2.77±0.26
t		14.241	13.855	12.473	22.032	19.341	9.459
p		0.000	0.000	0.000	0.000	0.000	0.000

Table 4. Comparison of application of postoperative 24 h analgesia pump

Group	*n*	*Sufentanil dosage (μg)*	*Times of pressing the pump (times)*
D&F group	30	64.21±5.81	2.31±0.22
F group	30	67.10±6.15	3.62±0.29
t		6.315	4.293
p		0.027	0.031

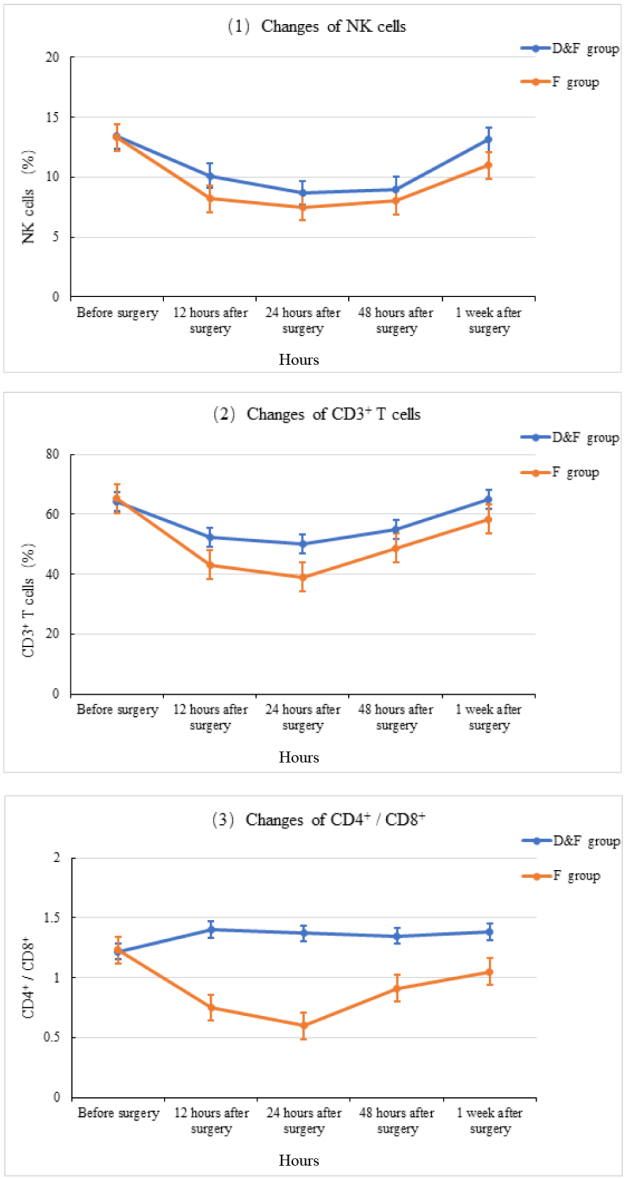

Figure 1. Changes of immune cell level in 2 groups during perioperative period. (1) t before surgery=0.351, t12 h=6.003, t24 h=5.751, t48 h=3.874, t1 w=4.135; p before surgery>0.05, 12 h, 24 h , 48 h and 1 w after surgery were all p< 0.05. (2) t before surgery=0.207, t12 h=5.698, t24 h=8.374, t48 h=4.073, t1 w=4.335; p before surgery>0.05, 12 h, 24 h , 48 h and 1 w after surgery were all p< 0.05. (3) t before surgery=0.293, t12 h=19.389, t24 h=23.554, t48 h=10.242, t1 w=7.251; p before surgery>0.05, 12 h, 24 h , 48 h and 1 w after surgery were all p< 0.05.

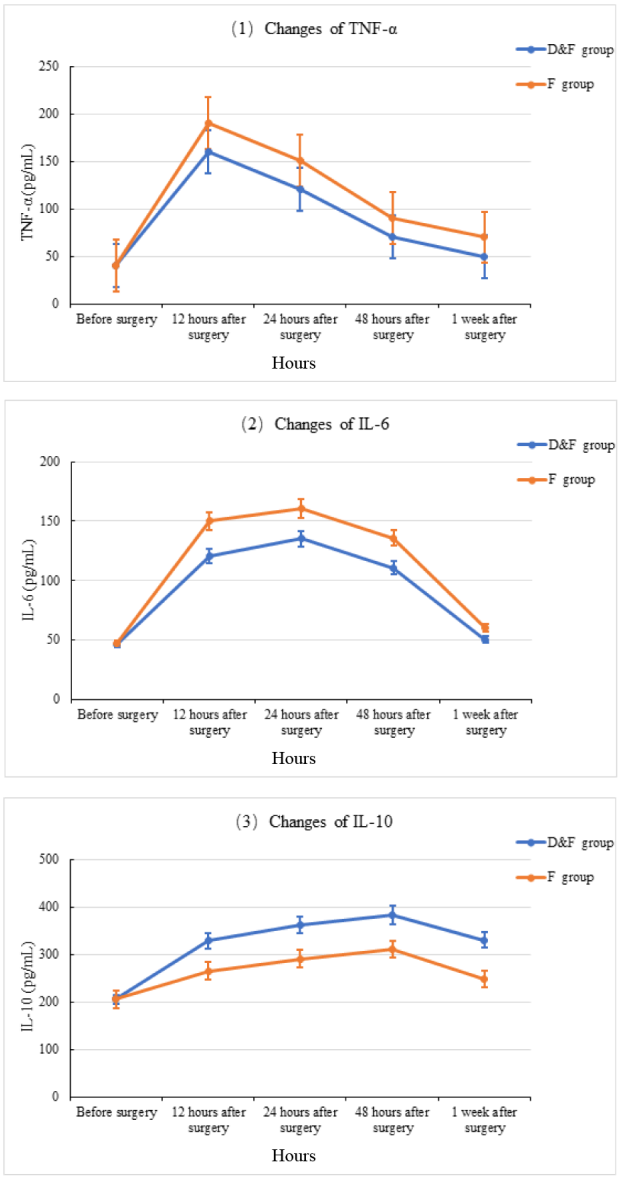

Figure 2. Changes of immune factors in the two groups during perioperative period. (1) t before surgery=0.197, t12 h=5.196, t24 h=5.077, t48 h=3.282, t1 w=3.091; p before surgery>0.05, 12 h, 24 h , 48 h and 1 w after surgery were all p< 0.05. (2) t before surgery=0.292, t12 h=7.139, t24 h=6.425, t48 h=5.971, t1 w=1.309; p before surgery>0.05, 12 h, 24 h and 48 h after surgery were all p< 0.05, p1 w>0.05. (3) t before surgery=0.186, t12 h=9.193, t24 h=9.614, t48 h=11.642, t1 w=15.291; p before surgery>0.05, 12 h, 24 h , 48 h and 1 w after surgery were all p< 0.05.

Table 5. Comparison of adverse reactions

Group	*n*	*Adverse reactions*				*Total (ratio)*
		Bradycardia	*Nausea and vomiting*	*Dizziness*	*Hypotension*	
D&F group	30	1	2	1	1	5 (16.7%)
F group	30	0	1	2	1	4 (13.3%)
x^2						2.174
p						0.151

4 patients had adverse reactions, accounting for 13.3% of the total. There was no significant difference in the total incidence of bradycardia, nausea and vomiting, dizziness, hypotension and other adverse reactions between the two groups (p>0.05) (Table 5).

Discussion

During radical resection of lung cancer, patients often suffer from severe postoperative pain due to the injury of tissues and organs. If the body's stress state caused by this kind of pain stimulation is not effectively controlled and prolonged for a long time, it will gradually evolve into chronic pain with serious consequences, such as easy to induce lung infection and inflammation, and even lead to serious cardiovascular complications [9]. The mechanism of chronic pain evolution after thoracic surgery may be related to intercostal nerve injury, inflammatory reaction and nerve sensitization, which is also related to tumor recurrence and incision type [10]. Effective perioperative analgesia can cut off the chronic pain pathway, reduce surgical trauma and neuroendocrine response, improve humoral immune function, which is very important for postoperative rehabilitation and quality of life of patients. At present, general anesthesia is commonly used in radical resection of lung cancer, while PCIA is the main postoperative analgesia. In PCIA, due to the high-dose use of opioid analgesics, some adverse reactions and insufficient analgesia are often caused [11]. Recently, it has been reported in the literature that the abuse of opioids may cause cell and tissue damage, leading to tumor recurrence and metastasis [12].

Dexmedetomidine is an α 2-adrenergic receptor agonist. Its sympathetic inhibition can be used to reduce the stress response of patients. The central sedative site of dexmedetomidine is the locus coeruleus near the fourth ventricle. However, the mechanism of dexmedetomidine in peripheral regional block is still unclear [13]. Previous studies have confirmed that dexmedetomidine can regulate the second messenger system and ion channels by acting on various subtypes of α 2-AR and coupling G protein in the brain, spinal cord and peripheral nerve, so as to achieve the biological effects of sedation, analgesia and inhibition of sympathetic activity [14]. Some authors have put forward the following views that dexmedetomidine mixed with long-acting amide local anesthetics can slow down the absorption of local anesthetics and prolong their action time [15]. Flurbiprofen axetil is a non steroidal analgesic and anti-inflammatory drug, which reduces prostaglandin synthesis by inhibiting cyclooxygenase (COX) in the spinal cord and peripheral and reduce the hyperalgesia caused by surgical trauma. Flurbiprofen axetil has strong efficacy, rapid onset, long duration and few adverse reactions [16]; it has no central inhibitory effect on postoperative analgesia and does not affect the recovery of patients under anesthesia [4].

In this study, dexmedetomidine combined with flurbiprofen axetil was used before anesthesia induction. The results showed that the MAP and HR levels of D & F group with 0.5 μg/kg dexmedetomidine + 1 mg/kg flurbiprofen axetil were lower than those of group F with only flurbiprofen axetil, and the hemodynamics during operation were more stable. Dexmedetomidine combined with flurbiprofen axetil can enhance the anesthetic and analgesic effects, inhibit the stress response during tracheal intubation and extubation and improve the quality of extubation. D & F group had higher hemodynamic stability during tracheal intubation, which confirmed that dexmedetomidine had little effect on hemodynamic indexes and respiratory function, while flurbiprofen axetil alone did not have similar effect. This may be related to the fact that dexmedetomidine slowly enters the blood and plays an anti-sympathetic role by antagonizing the activation of hyperpolarized cation current (ZD-7288) [5]. This study also found that dexmedetomidine combined with flurbiprofen axetil can improve the postoperative analgesic effect. At 6, 12 and 24 h after operation, VAS score of group D & F was significantly lower than that of group F (p<0.05), and BCS score was significantly higher than that of group F (p<0.05); Therefore, it can be confirmed that dexmedetomidine can increase the local nerve block effect due to the anti-sympathetic and analgesic effects of dexmedetomidine. There was no significant difference in recovery time and extubation time between the two groups, and the extubation quality score of D & F group was significantly lower than that of F group, so it can be concluded that dexmedetomidine has certain sedative and hypnotic effects, but it does not affect anesthesia recovery. The dosage of sufentanil and the pressing times of analgesia pump in group D & F were significantly less than those in group F, and the additional analgesics further proved that flurbiprofen axetil alone had no better effect than dexmedetomidine combined with flurbiprofen axetil in enhancing the analgesic effect and prolonging the action time, which may be related to the synergistic analgesic effect of the two drugs. Adverse reactions after

administration are important events in clinical treatment. There was no significant difference in the incidence of nausea, vomiting, hypotension or bradycardia between D & F and F groups, in other words, the use of dexmedetomidine did not increase the postoperative adverse reactions. It is speculated that the reason may be that the infusion dose of dexmedetomidine is small, and the adverse reaction caused by low dose dexmedetomidine is lighter.

The pain and pressure produced by surgery often destroy the immune function of patients after operation, resulting in low immunity and inflammatory reaction. Immune cells and immune factors play an important role in the regulation of immune homeostasis. As the first natural defense line, NK cells can directly and non specifically kill invasive cells [17]; CD3 + is a common marker on the surface of mature T cells, which can further differentiate into CD4 + and CD8 + T cells during maturation [18]. CD4 + T cells can directly participate in cellular immune response and play an auxiliary immune role; CD8 + T cells can only be activated and immunosuppressive when stimulated by helper T cells. Therefore, the decreased levels of NK cells, CD3 + T cells and CD4 + / CD8 + may indicate that the body is in a state of immunosuppression [19]. The results showed that both groups had immune imbalance for a period of time after surgery, but the change of the levels of NK cells and CD3 + T cells in group D & F were lower than those in group F within one week after operation, and the level of CD4 + / CD8 + in group D & F remained stable, while that in group F changed significantly. These results suggest that dexmedetomidine can inhibit the immune system to a certain extent to a balanced state, and avoid the harm of the immune system. The reason for this phenomenon may be that dexmedetomidine can effectively inhibit the sympathetic nerve, reduce the production of oxygen free radicals and the release of catechins, thus effectively alleviating the catechol mediated immunosuppression. In addition, dexmedetomidine can also play an anti-inflammatory role by regulating the NF-κB [20]. When the body is in a state of excessive stress, inflammatory response factors such as IL-6, IL-10 and TNF-α are produced in large quantities [21-23]. Imbalance of inflammatory response is one of the important factors that lead to various surgical complications and affect the prognosis of patients. In recent years, many studies have confirmed the anti-inflammatory effect of dexmedetomidine. In animal model experiments, dexmedetomidine plays an anti-inflammatory role by downregulating or inhibiting the release of inflammatory factors [24]. According to Hanan et al [25], the mechanism of dexmedetomidine in reducing inflammatory reaction may be related to inhibition of NLRP3 inflammatory body activity and reduction of myeloperoxidase activity. Yugeesh et al [26] showed that dexmedetomidine can play an anti-inflammatory effect by inhibiting sympathetic nerve activity and inhibiting oxidative stress. Kamdar et al [27] found that dexmedetomidine can inhibit the production of TNF-α under inflammatory conditions, and the latter is the key mediator leading to inflammatory reaction and neuropathic pain. In this study, the serum inflammatory factors of the two groups were detected. Compared with group F, the levels of IL-6 and TNF-α in D & F group were lower than those in group F ($p<0.05$), and the level of IL-10 was higher ($p<0.05$). These results indicate that dexmedetomidine combined with flurbiprofen axetil can effectively inhibit the inflammatory level of the body, reduce the expression of serum inflammatory factors IL-6 and TNF-α in acute phase, increase the expression of IL-10, reduce the degree of acute inflammation, reduce inhibition of cellular immune function to a certain extent, and then play a role in organ protection.

Although flurbiprofen axetil can improve postoperative pain, the combination of dexmedetomidine had better effect. The combined use of the two drugs can significantly improve the postoperative comfort and immune function of patients. This study showed that the combination of dexmedetomidine and flurbiprofen axetil can make hemodynamics more stable before anesthesia induction, inhibit the stress response during tracheal intubation and extubation effectively, improve the quality of extubation and it is conducive to the improvement of postoperative analgesia, but does not affect the recovery of anesthesia. It still can inhibit the immune system to a balanced state, inhibit the level of inflammation, reduce the degree of acute inflammatory reaction, and then play the role of organ protection. In addition, the reasonable dosage of dexmedetomidine can cause less adverse reactions.

In conclusion, dexmedetomidine combined with flurbiprofen axetil has good analgesic effect and can improve the immune function, which is worthy of application in thoracic surgery.

Conflict of interests

The authors declare no conflict of interests.

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