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Comparison of Effects of Propofol or Sevoflurane Combined with Remifentanil on Stress Response, Inflammatory Factors and Cerebral Oxygen Metabolism in Patients Undergoing Radical Esophagectomy

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Abstract: Clinical studies have shown that reducing the stress response and catabolism in the perioperative period and strengthening perioperative nutritional support can help to improve the surgical outcome and promote postoperative recovery. However, there are few studies on the effects of general anesthesia maintenance drugs on the catabolism and nutritional status of patients undergoing surgery. Based on the above background, the purpose of this paper is to compare the effects of propofol or sevoflurane combined with remifentanil on stress response, inflammatory factors and cerebral oxygen metabolism in patients undergoing radical resection of esophageal cancer. 120 patients with elective esophageal cancer who underwent radical surgery from September 2016 to September 9, 2018 were randomly divided into group A and group B, with 60 cases in each group. Group A was given anesthesia with propofol and remifentanil, and group B was given anesthesia with sevoflurane plus remifentanil. Peripheral blood was measured before and after induction of anesthesia (T0), immediately after surgery (T1), and 12 hours after surgery (T2). Comparison of stress response indicators (cortisol (COR), adrenaline (NE), adrenaline (NA)), inflammatory factors [IL-8 (priming), interleukin-6 (IL-6), tumor necrosis (TNF) -α)]) and cerebral oxygen metabolism index [(intracervical venous blood oxygen saturation ($SjvO_2$), internal jugular venous oxygen partial pressure ($PjvO_2$), arterial oxygen saturation (SaO_2), arterial oxygen partial pressure (PaO_2))] difference. The levels of COR, NE, NA, IL-8, IL-6 and TNF-α in T1 and T2 peripheral blood were higher than those in T0, but in group A, COR, NE, NA, IL-8, IL-6 and TNF were observed. -α was significantly lower than group B ($P < 0.05$). The $SjvO_2$, $PjvO_2$, SaO_2 and PaO_2 of T1 and T2 in the two groups were lower than T0, but the $SjvO_2$, $PjvO_2$, SaO_2 and PaO_2 in group A were significantly lower than those in group B (P < 0.05). Compared with sevoflurane combined with remifentanil anesthesia, propofol combined with remifentanil anesthesia is more conducive to the stress response, reduction of inflammatory factors and improvement of cerebral oxygen metabolism in patients with radical esophageal cancer.

1. Introduction

With the development of the economy and the improvement of people's living standards, people's eating habits and structure have also changed with the aging of the population. The prevalence and mortality of cancer in China has increased year by year [1]. Surgery is still one of the best ways to cure tumors. However, the metastasis and recurrence of tumors after surgery still affect the prognosis of patients and even increase the mortality of the disease. Foreign studies have evaluated the suppression of immune function in patients with surgical tumors from the aspects of surgery, anesthesia, anesthetics, immune function, cytokines, etc., and believe that each anesthesia can make patients immunosuppressive. Studies have shown that postoperative recurrence of tumor patients is affected by postoperative immune function and even affects the survival of patients [2-3]. Surgery itself is a kind of trauma that causes the body's stress response, and the body's stress response to surgery is greater. The greater the chance of cancer metastasis and dissemination in the body. The immune function of tumor patients, the recurrence and metastasis of postoperative cancer are affected by the anesthetic and analgesic drugs used in the perioperative period. Some anesthetics have the potential to induce variability and promote growth in tumors, and promote the carcinogenic effects of tumors through metastasis and immortalization. Even the relevant trials did not fully confirm the mechanism by which these drugs are involved in tumor growth. Therefore, perioperative medication is very important for cancer patients [4].

All along, people's understanding of brain protection only stays in the maintenance of normal blood pressure, heart rate and other basic vital signs, and often focus on pathological changes caused by cerebral hypoperfusion, since the discovery of barbiturates can reduce cerebral oxygen metabolism since the rate and role of brain protection, whether or not anesthetics have brain protection has received increasing clinical attention [5-7]. Many studies have shown that sevoflurane has a certain brain protection. Anesthesia is an indispensable part of cancer surgery. Both anesthesia and anesthesia affect tumor immunity or cell activity, which affects the treatment and prognosis of the tumor. Hypoxia-inducible factor is a hypoxia response regulator widely present in humans and mammals. It has extensive clinical evidence for participating in cancer and promoting the growth of tumor cells. Studies have shown that by establishing a mouse tumor surgery model, hef-1 inhibitors can be used for perioperative adjuvant therapy in tumors, confirming that inhibition of hif-1 levels can inhibit malignant proliferation and invasion and metastasis of tumors [8]. Propofol and sevoflurane are the two most commonly used general anesthetics, and their effects on hif-1 in patients with radical esophageal cancer have rarely been reported. In summary, this article reviews the effects of propofol and sevoflurane on stress response, inflammatory factors and cerebral oxygen metabolism in patients undergoing radical resection of colorectal cancer.

Joaqu ń compared the effects of propofol and sevoflurane combined with remifentanil on transcranial motor evoked potentials (tcemeps) and somatosensory evoked potentials in brainstem surgery at comparable bispectral index levels. A total of 40 consecutive patients undergoing brainstem surgery (20 in each group) were randomized to receive either 0.5 MAC sevoflurane or propofol at a concentration of 2.5 μg / mL to maintain anesthesia. TceMEP recordings were performed in short abductors, abduction hallucinations, and tibialis anterior muscles, while cortical SSEPs were measured by posterior tibial nerve stimulation. The amplitude and latency of TceMEP and SSEP were recorded at 1, 2, 3 and 4 hours after induction of anesthesia. The amplitude of TceMEPs in the propofol group was significantly higher than that in the sevoflurane group. When brainstem surgery requires monitoring of TceMEP and SSEP, low doses of sevoflurane and propofol combined with remifentanil may be used with comparable BIS values and partial muscle relaxation [9]. An studied and analyzed the effects of propofol and sevoflurane combined with remifentanil on pain index, inflammatory factors and postoperative cognitive function in patients with spinal fractures. The p group was anesthetized with propofol and the intravenous remifentanil was maintained. In the s group, sevoflurane was used to induce anesthesia, and remifentanil maintained anesthesia. Compared with sevoflurane anesthesia, propofol combined with remifentanil anesthesia can significantly reduce the pain index and inflammatory response in patients with spinal fractures, shortening the postoperative recovery time [10]. Wang's study evaluated the safety and efficacy of dextrozine in preschool children under sevoflurane-remifentanil anesthesia for irritable mood. A total of 100 preschool children who underwent laparoscopic hernia repair under high-ligature sac anesthesia under sevoflurane-remifentanil were randomized into two groups: Group C received Ringer's lactic acid 10 mL, Group D received 10 ml of Ringer's lactic acid after surgery, containing 0.1 mg / kg of dextrozine. The average child and infant postoperative pain scale (CHIPPS) scores in group D were significantly lower than those in group C (1.2% $\pm$0.5% vs. 5.2% $\pm$0.6%; $P < 0.05$). The need for rescue of fentanyl or propofol was significantly increased in group C compared with group D. Other relative aspects after surgery did not differ significantly between groups. Under sevoflurane-remifentanil anesthesia, a pre-school child who underwent laparoscopic ligation of the inguinal hernia by ligation of the hernia sac was given a dose of 0.1 mg / kg of dextrozine to reduce the incidence and severity of EA [11]. Tissue oxygen tension is an important parameter for the survival of brain tissue, and it has a high clinical significance for non-invasive intraoperative monitoring of the whole brain. The purpose of the Stadlbauer study was to introduce a multiparameter quantitative blood oxygenation dependent magnetic resonance imaging (MRI) method to examine oxygen metabolism during intraoperative brain lesions. Sixteen patients with brain lesions were examined intraoperatively (before and after total craniotomy) by quantitative oxygen-dependent techniques and a 1.5-Tesla MRI scanner installed in the operating room. Data analysis was performed using custom internal MATLAB software to calculate the oxygen extraction fraction (OEF) and oxygen brain metabolic rate (CMRO2) as well as graphs of cerebral blood volume and cerebral blood flow. After resection of the lesion, peripheral edema showed a significant increase in perfusion (cerebral blood volume + 21%, cerebral blood flow + 13%) and oxygen metabolism (OEF + 32%, CMRO2 + 16%). However, oxygen metabolism (OEF + 19%, CMRO2 + 11%) was significantly increased, but not perfused, in non-edema tissue surrounding the lesion. This intraoperative examination of whole brain oxygen metabolism is a new application of intraoperative MRI in addition to excision control (residual tumor detection) and neuronavigation update (brain shift detection) [12]. Due to the availability of genomic resources and the development of robust methods of genetic manipulation, the molecular characteristics of genes and pathways involved in stress response and signal transduction in these fungi have increased rapidly over the past five years. Ortiz-Urquiza research is primarily carried out by characterization of gene deletion/knockout mutants and includes targeting general proteins involved in stress responses and/or virulence, such as catalase, superoxide dismutase and infiltration pressure-maintaining enzymes, membrane proteins and signaling pathways include gpi-anchored proteins and g-protein-coupled membrane receptors. Here, they will discuss current research, strongly recommending these biochemical and signaling pathways for abiotic stress responses and virulence extensive potential contribution [13].

In this paper, 120 patients with elective esophageal cancer who underwent radical esophageal cancer surgery from September 2016 to September 2018 were randomly divided into two groups, A and B, with 60 patients in each group. Group A was anesthetized with propofol and remifentanil, and group B was anesthetized with sevoflurane and remifentanil. Peripheral blood was measured before and after induction of anesthesia (T0), immediately after surgery (T1), and 12 hours after surgery (T2). Comparison of stress response indicators cortisol (COR), adrenaline (NE), adrenaline (NA), inflammatory factors (IL-8 (priming), interleukin-6 (IL-6), tumor necrosis factor- α (TNF-α) and cerebral oxygen metabolism indicators (intracranial venous oxygen saturation, internal jugular vein oxygen partial pressure, arterial oxygen saturation, arterial oxygen partial pressure)).

2. Proposed Method

2.1. Stress Response

Stress response refers to a series of neuroendocrine reactions that cause sympathetic excitation and increased secretion of pituitary adrenocortical. When the body is damaged, it will cause various functional and metabolic changes in the body. In recent years, the role of the immune system in stress response has gradually gained attention. Perioperative stress in cancer patients can affect the body's immune function, immune function determines and affects patients' life after surgery. A good immune system helps promote recovery. Therefore, reducing the perioperative stress response can alleviate the body's immune suppression and improve the patient's postoperative recovery. Stress response sometimes manifests itself in limitations, such as inflammation, and the occurrence of inflammatory reactions is associated with tissue damage and changes in vital signs. This process is mostly mediated by inflammatory factors such as TNF-α, IL-8, and CRP.

Stress response refers to a non-specific defense response produced by the body's intense stimulation of sympathetic excitation and anterior pituitary function. Any physiological or psychological stimuli, such as hypothermia, high temperature, surgery, anesthesia, poisoning, inflammation, and terrible conditions, can act as stressors to cause stress.

There are three main physiological changes caused by stress during surgery: they play a role in initiating, strengthening, sustaining and improving the body's response to surgical injury. Among them, ascending nerve stimulation and humoral stimulation may be the two most important factors in various mechanisms, and the former is the main one.

(1) Blue spot-sympathetic-exciting of the adrenal medullary system. The excitability of the adrenal medulla system releases norepinephrine and adrenaline from the peripheral sympathetic nerve endings. Elevated levels of plasma catecholamines mediate a range of metabolic and cardiovascular compensatory mechanisms to overcome the threats of exogenous organisms to the body or internal environment and to respond to changing environments. The degree of rise in norepinephrine and adrenaline in the blood was positively correlated with the intensity of surgical stimulation.

(2) Hypothalamic-pituitary-adrenal cortical system is excited. The secretion of corticotropin releasing factor (CI) is increased in the lower part of the thalamus. CRF is transported to the anterior pituitary gland through the anterior pituitary system of the hypothalamus, and the anterior pituitary gland releases opiate dermatulin, which is decomposed into adrenal cortex hormone. Two series of products, hormone release (ACTH) and D-lipotropin. ACTH stimulates adrenal synthesis and release of glucocorticoids. Under the condition of surgical trauma, intraoperative plasma adrenocorticotropic hormone (ACTH) and cortisol (COR) levels were significantly increased, and the degree of elevation increased with the increase of surgical stimulation intensity. The determination of cortisol content in blood has become an important indicator for judging the degree

of stress response in perioperative period.

(3) Mass release of cytokines. Cytokines are information molecules that have been found to mediate immune inflammatory responses in recent years. They play an important role in acute reactions such as surgical trauma and stress. They attempt to limit the spread of inflammation and inflammation through local or systemic effects. Organizational remedies provide the right environment. In particular, macrophages and lymphocyte-derived interleukins (IL) and tumor necrosis factor (TNF) are affected by in vivo surgery. The affected part is induced to exert various physiological functions. In major surgery and infection, changes in humoral factors can affect and alter the body's physiological functions. The stress response mainly causes the excitement of the above three systems, and these systems also have very close links.

The stress response itself plays an extremely important role in the body's resistance to harmful stimuli. However, long-term sustained stress stimuli can have many adverse effects on the body: a large amount of secreted vasopressin causes the body to produce dilute high-sodium blood disease. The insulin resistance is significantly increased, the glucose metabolism is disordered, the body's energy utilization is impaired, and pancreatic hyperglycemia is caused at the same time. Reduce the body's immunity, activate the body's latent virus, increase the incidence of tumors and metastasis, and increase the chance of infection during surgery. Activation of the in vivo coagulation system and fibrinolysis system leads to a wide tendency of the body to bleed. Long-lasting stress stimuli can also unbalance the neuroendocrine response, leading to disorders in the body's environment.

Under normal circumstances, the physiological changes caused by stress response do not have serious adverse effects on most elective surgery patients, but in elderly patients, the serious complications of the surgery caused by this change are becoming more and more prominent. Important cardiovascular complications include hypertension, tachyarrhythmia, myocardial ischemia, and infarction, especially myocardial infarction, which has been the leading cause of perioperative death. A growing body of literature indicates that sympathetic nervous system excitability, resulting in increased myocardial oxygen consumption is the cause of myocardial ischemia and infarction in most cases. Several studies have also established a correlation between increased heart rate and myocardial ischemia. Another possible cause of myocardial infarction during surgery is plaque rupture or acute embolism in atherosclerotic foci. These intravascular changes may be related to hemodynamic changes caused by stress hormones during the surgical period. Complications of thromboembolism caused by hypercoagulable state caused by surgery have also received extensive attention.

It can be seen that maintaining proper stress during the operation period and maintaining the stability of the internal environment of the machine will play an important role in the postoperative period, especially the major surgery patients, critically ill patients, postoperative outcomes and postoperative recovery. The effect of anesthesia on the perioperative stress response is important. The patient can be considered a "black box" and the output (clinical signs) is a function of input (external stimuli). Anesthesia acts as a suppressor to weaken the patient's response. If the concentration of anesthetic is too low, it will cause obvious physiological stress reaction. If the concentration is too high, it will cause excessive inhibition of organ function. Whether it is a change in the intensity of surgery or an increase or decrease in the concentration of an anesthetic, the degree of intraoperative stress response can be changed.

The measurement of cortisol in blood has become an important index of stress response in perioperative period. During the operation, although the blood pressure and heart rate were stable during the operation and the patient complained of no pain after the operation, the cor concentration of the patient was still significantly increased, which indicated that cortisol was a sensitive index of the operation stress compared with the fluctuation and subjective feeling of blood pressure and heart rate.

2.2. Sevoflurane, Propofol and Remifentanil

The chemical name of sevoflurane is fluoromethyl isopropyl ether. It is a fluorinated ether containing 7 fluorine atoms. This product is a colorless, transparent, aromatic, non-irritating volatile liquid with a molecular weight of 200.05 and a boiling point of 58.6 °C. It does not burn or blast in air or oxygen. When the oxygen concentration reaches 1 %, it is flammable (this concentration is much higher than the anesthetic concentration, and has no clinical significance). The blood/gas partition coefficient is 0.63, which is more desirable than the existing inhalation general anesthesia. The oil and gas partition coefficient is 42, which is the lowest of its kind. After contact with quicklime, five decomposition products (p1, p5) can be produced: p1 is fluoromethyldifluoroethyl ether; p2 is fluoromethoxydifluoroethyl ether; p3 is fluoromethyltrifluoroethyl ether; p4 is the same HP5 the same structure. When oxygen was used as the carrier gas, the MAC was 1.71% and the 1.3 MAC concentration was 2.07%. When oxygen and nitrous oxide (1:1) act, the MAC is reduced to 0.66%. Sevoflurane is stable, easy to store, and stored in amber bottles with polyethylene caps for one year with constant performance. Traditionally, the use of nitroglycerin and sodium nitroprusside for blood pressure reduction has found many unfavorable aspects, and controlled depressurization in the combined intravenous anesthesia with sevoflurane and isoflurane is increasingly used in clinical practice. The patients who underwent elective surgery were studied with sevoflurane and propofol, and the antihypertensive effect of sevoflurane was found to be effective and recovery, when the mean arterial pressure (MAP) decreased to the baseline value. When 50%-60% was maintained for 40 minutes, the cerebral oxygen uptake rate and arteriovenous oxygen content were significantly lower, and significantly lower than the control group and the sodium nitroprusside group. This indicates that when sevoflurane is used for controlled hypotension, it can reduce brain metabolism, improve oxygen supply and perfusion of brain tissue, maintain good brain energy metabolism, not accumulate lactic acid, and normalize oxygen metabolism in the brain. It is safer than the antihypertensive effect of sodium nitroprusside. The clinical application of sevoflurane has gradually shown its superiority.

Propofol and remifentanil are two intravenous drugs commonly used in clinical anesthesia to maintain intraoperative sedation and analgesia. In particular, it is important to shorten the postoperative resuscitation and extubation time. In particular, propofol, an intravenous sedative drug, can basically be said to be an irreplaceable king in total intravenous anesthesia and intravenous inhalation combined anesthesia, but the impact on the microcirculation and its mechanism are increasingly being valued by clinical first-line anesthesia workers. Propofol is a fast, short-acting alkaloid general anesthetic. It is rapidly distributed throughout the body after intravenous injection. It allows the patient to fall asleep within 30 seconds. Anesthesia induction is rapid and stable, and patients can have a good dream during anesthesia. The patient is very satisfied with the anesthesia. Its analgesic effect is weak, which can reduce intracranial pressure, cerebral blood flow and brain oxygen consumption. It inhibits the respiratory system, causing temporary respiratory arrest and inhibiting the circulatory system, causing blood pressure to drop. The effect of propofol on platelets is mainly reflected in the inhibition of platelet activating factor, lysophosphatidic acid and thromboxane A on the activation of receptors on platelet cell membranes. It has been studied that blood viscosity is also reduced by propofol, which may be achieved mainly by peripheral vasodilation, reduced circulation resistance and antioxidation of propofol. Remifentanil is a novel opioid receptor agonist with strong analgesic effect, fast onset, large safe dose range, fast metabolism and no accumulation. It is a derivative of pethidine, which contains only one lipid structure and can be rapidly hydrolyzed by esterase in vivo without affecting the decomposition of other drugs by esterase. The effects on the respiratory, circulatory, and nervous systems are dose-dependent and do not increase the burden on patients with liver and kidney dysfunction. For pregnant women, remifentanil can pass through the placental barrier, but will rapidly hydrolyze after entering the fetus, which has no effect on the post-partum score. Today, anesthesiologists not only pay attention to the maintenance of vital signs during surgery, but also pay more attention to the perioperative management of patients, especially the prognosis of patients. During anesthesia, sedation and mechanical ventilation improve microcirculation and tissue hypoxia. However, how to make patients recover faster and better, reduce patient mortality, reduce perioperative complications, shorten hospital stay, and reduce medical expenses have become hot and difficult points in clinical anesthesia. Microcirculatory disorders are a key link in the pathophysiological processes of many diseases. Whether it can reduce the production of microthrombus in the microcirculation and improve the microcirculation state of patients can be used as an important index to evaluate a certain drug or therapeutic effect.

3. Experiments

3.1. Experimental Materials and Methods

This study included 120 patients with elective esophageal cancer radical surgery admitted to our hospital from September 2016 to September 2018. Preoperative examination showed no obvious organ dysfunction, electrolyte imbalance, immune, endocrine diseases, hypertension, blood diseases, etc. All subjects had no recent history of anticoagulation and glucocorticoids.

Scopolamine was administered intravenously 30 minutes before surgery. Routine monitoring of non-invasive blood pressure, heart rate, electrocardiogram, pulse oximetry. Before the start of anesthesia, 500 ml of lactated Ringer's solution was instilled intravenously, and pure oxygen was inhaled under the mask. Midazolam 0.03 mg/kg was administered intravenously 5 minutes before induction. Anesthesia induced propofol 2mg/kg, fentanyl 4 $\mu g/kg$, atracurium 0.6mg/kg, skolin 100mg, mechanical ventilation after anesthesia machine tracheal intubation, tidal volume 6-8ml/kg, respiratory rate 10-12 Times / min, breathing ratio 1:2. Maintain moisture partial pressure of carbon dioxide at 4.65-5.33 kPa (35.03 ~ 37.97 mm Hg). The anesthesia was maintained with propofol 100 $\mu g \cdot kg^{-1} \cdot \min^{-1}$, and 100 mg of atlacamide was diluted with 20 ml of physiological saline. The depth of anesthesia was monitored by the EEG bispectral index, and the BIS value was maintained at 40-50.

3.2. Experimental Grouping and Step-Down Method

They were randomly divided into two groups, A and B, with 60 cases in each group. Group A was anesthetized with propofol and remifentanil, and group A was treated with remifentanil (diluted to 1 ml with 1 mg of physiological saline). The 0.1-0.5 $\mu g \cdot kg^{-1} \cdot \min^{-1}$ micropump was continuously infused while inhaling 2%-5% propofol, and the mean arterial pressure (MAP) was gradually decreased to 7.33-6.66 kPa (54.97-64.95 mmHg). Then, according to the fluctuation of blood pressure, the inhalation concentration of propofol and the speed of remifentanil were adjusted to maintain blood pressure stability: group B anesthesia was treated with sevoflurane and remifentanil. The sevoflurane and remifentanil were adjusted according to the depth of anesthesia. When the patient's heart rate was >100 beats/min or <55 beats/min, it was confirmed that the antihypertensive drugs caused tachycardia or slowness, and were given esmolol and atropine control respectively.

3.3. Observation of Experimental Indicators

Peripheral blood was measured before and after induction of anesthesia (T0), immediately after surgery (T1), and 12 hours after surgery (T2). The stress response indicators were compared [cortisol (COR), adrenaline (NE), Adrenalin (NA)), inflammatory factors [(interleukin-8 (IL-8), interleukin-6 (IL-6), tumor necrosis factor-α (TNF-α)]) and cerebral oxygen metabolism index [(intracervical venous blood oxygen saturation ($SjvO_2$), internal jugular venous oxygen partial pressure ($PjvO_2$), arterial oxygen saturation (SaO_2), arterial oxygen partial pressure (PaO_2))] The special person recorded the operation time, the amount of bleeding, the amount of fluid infusion, the presence or absence of reflex tachycardia or the occurrence of slowness, and the time when the blood pressure returned to the basal level after stopping the antihypertensive drug. The arrhythmia was observed during the operation. After the operation, the secretions of the respiratory tract were eliminated, and the swallowing and cough reflexes were recovered. After deoxygenation for 5 minutes, the extubation (SpO_2) was >95%.

3.4. Statistical Methods

Statistical analysis was performed using SPSS 17.0 statistical software. The measurement data indicated $\bar{x} \pm s$, and the measurement data indicated that the paired t test was used for comparison within the group, and the inter-group t test was used for comparison between groups. $P < 0.05$ was considered statistically significant.

4. Discussion

4.1. Comparison of General Conditions and Surgical Conditions of Patients

4.1.1. Comparison of General Information

There was no significant difference in gender, age, weight, operation time, intraoperative blood loss and infusion volume (P>0.05). There were 3 cases of bradycardia in group A, 1 case of reflex tachycardia in group B, and 2 cases of bradycardia in atropine and esmolol. The difference between the two groups was statistically significant (P<0.01). The specific data is shown in Table 1 and Figure 1.

Table 1. Comparison of general data balance between the two groups of patients($\bar{x} \pm s$)

Group	Age	Weight(kg)	Blood loss(ml)
Group A	42.11 ± 14.25	68.88 ± 8.31	34.85 ± 14.54
Group B	38.00 ± 13.00	65.70 ± 9.93	29.12 ± 9.55
t	0.952	0.770	1.784
P	0.354	0.443	0.086

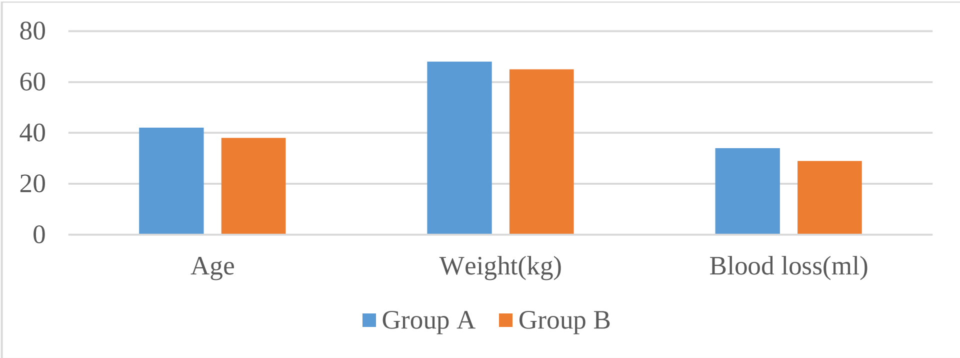


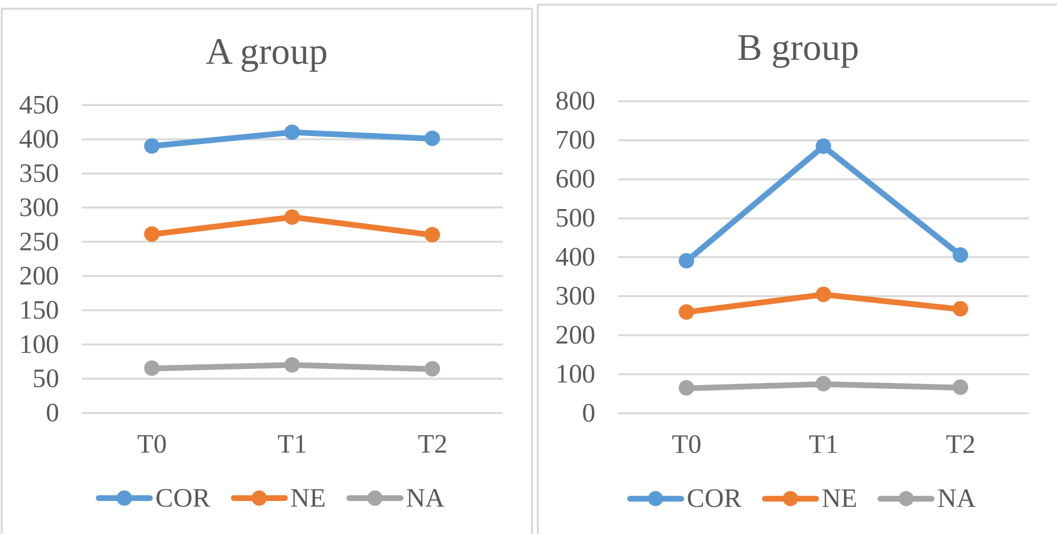
Figure 1. Comparison of general data balance between the two groups of patients

4.1.2. Observing the Stress Response Indicators of the Two Groups of Patients

At T0, there was no significant difference in mean arterial pressure, heart rate, blood glucose, cortisol, adrenaline and norepinephrine between the two groups (P>0.05). When T1 and T2 were used, the indexes of the control group were higher than those of T0. The index was also higher than that of the control group (P<0.05). There was no significant difference between the observation group and T1 and T2 (P>0.05). The specific data is shown in Table 2 and Figure 2.

Table 2. Comparison of stress response indicators between the two groups($\bar{x} \pm s$)

Group	Time	COR/ $nmol \cdot L^{-1}$	NE/ $nmol \cdot L^{-1}$	NA/ $nmol \cdot L^{-1}$
A group	T0	390.5 ± 48.3	261.2 ± 38.7	65.1 ± 8.9
	T1	410.6 ± 39.8	286.9 ± 42.1	70.6 ± 6.8
	T2	401.0 ± 40.2	260.1 ± 37.2	64.8 ± 6.4
B group	T0	390.8 ± 45.5	259.6 ± 40.1	64.9 ± 7.0
	T1	684.1 ± 48.5	304.8 ± 36.8	75.6 ± 9.1
	T2	405.2 ± 38.3	267.3 ± 37.7	66.2 ± 7.7



(Group A)　　(Group B)

Figure 2. Number of COR, NE, and NA indicators in Group A and Group B

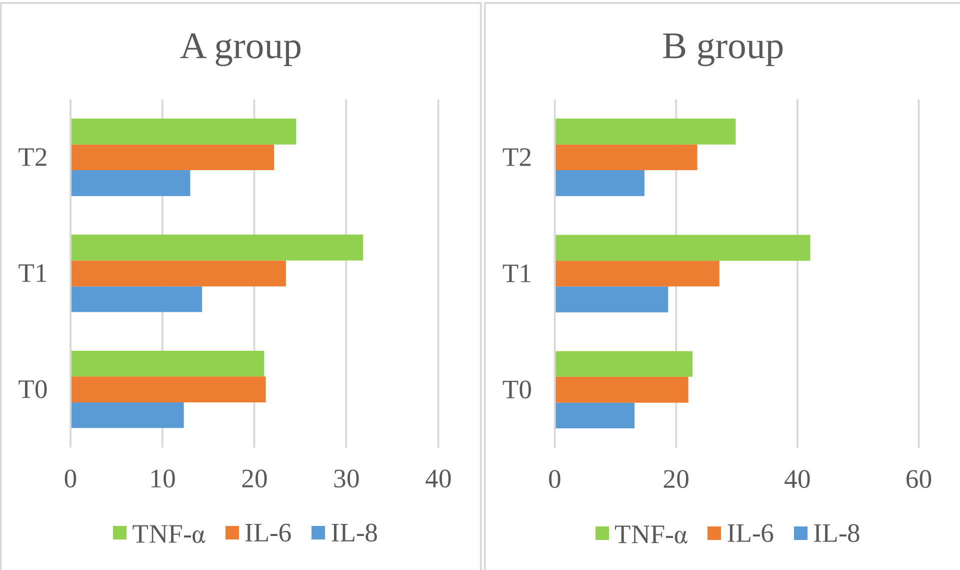
4.2. Comparison of Various Indicators before and after Surgery

4.2.1. Observing the Inflammatory Factor Index of the Two Groups of Patients

The concentration of 3 TNF-α points was compared between the two groups. There was no significant difference between the two groups at T0 time point (P>0.05). The serum TNF-α concentration in the observation group was significantly lower than that in the T1 ~ T2 time point. The difference was statistically significant (P<0.05). Compared with T0, tumor necrosis TNF-α increased in T1 ~ T2 phase, the difference was statistically significant (P < 0.05). IL-8 concentrations were compared at three time points between the two groups. There was no significant difference between the two groups at T0 time point (P>0.05). At two time points from T1 to T2, the blood COR concentration in the observation group was significantly lower than that in the control group. The difference was statistically significant (P<0.05). The IL-8 concentrations in the T1~T2 phase of the two groups were higher than those in the T0 phase, and the difference was statistically significant (P<0.05). The IL-6 concentrations at 3 time points between the two groups were compared. There was no significant difference between the two groups at T0 time point (P>0.05). The serum IL-6 concentration in the observation group was significantly lower than that in the T1~T2 time point. The difference was statistically significant (P<0.05). Compared with T0, the concentrations of COR in both groups increased from T1 to T2, and the difference was statistically significant (P<0.05). The specific data is shown in Table 3 and Figure 3.

Table 3. Changes of IL-6, IL-8 and TNF-α at different time points in the two groups($\bar{x} \pm s$)

Group	IL-8			IL-6			TNF-α		
	T0	T1	T2	T0	T1	T2	T0	T1	T2
Group A	12.35 ±4.15	14.32 ±5.25	13.04 ±4.36	21.26 ±5.26	23.43 ±6.36	22.15 ±5.47	21.08 ±4.36	31.83 ±6.58	24.56 ±5.07
Group B	13.14 ±4.06	18.69 ±4.32	14.78 ±4.65	22.05 ±5.17	27.16 ±4.14	23.51 ±4.78	22.73 ±3.79	42.14 ±5.43	29.86 ±4.21



(Group A) (Group B)

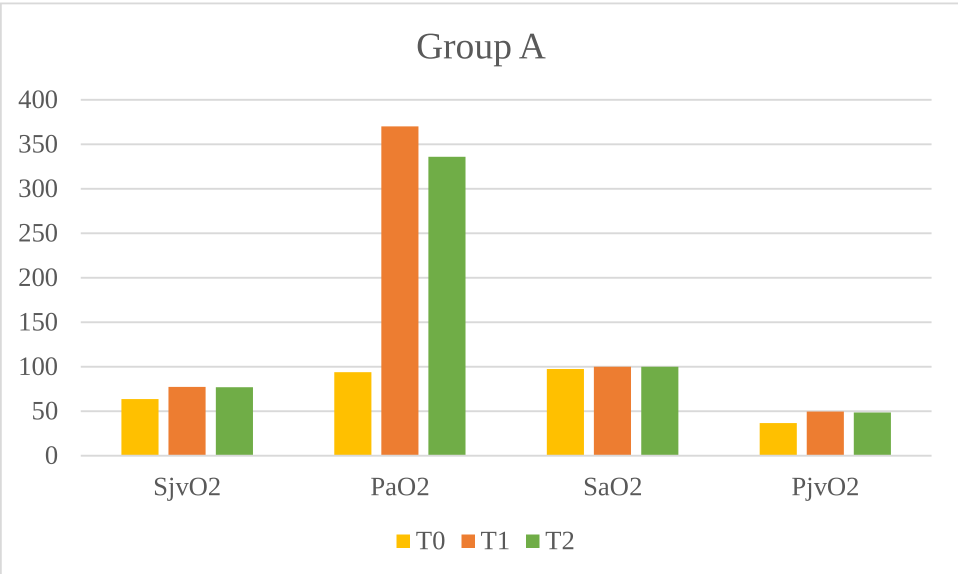
Figure 3. Exponential changes of IL-8, IL-6 and TNF-α at each time point in group A and group B

4.2.2. Observing Cerebral Oxygen Metabolism Index in Two Groups of Patients

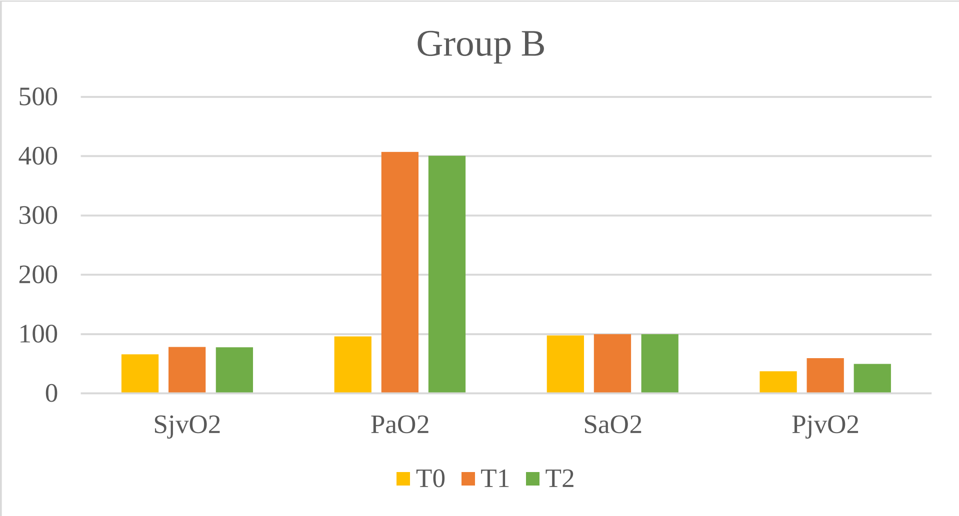
Compared with T0 in the two groups, the absolute value of $SjvO_2$ increased in T2 compared with T0, the difference was statistically significant ($P<0.05$); $SjvO_2$ decreased in T1 and T2, and decreased in T2. The significance of learning ($P<0.01$); the absolute value of PaO_2 was T1 when T2 was elevated, and T1 was significantly increased, the difference was statistically significant ($P<0.05$). Compared with T1 group, the absolute value of $PjvO_2$ decreased at T2, and T2 decreased significantly, the difference was statistically significant ($T<0.01$). There was no significant difference between $SjvO_2$, PaO_2, SaO_2 and $PjvO_2$ at the same time point ($P> 0.05$). The specific data is shown in Table 4 and Figure 4.

Table 4. Changes in cerebral oxygen metabolism index in two groups of patients($\bar{x} \pm s$)

Index	Group	T0	T1	T2
$SjvO_2$	Group A	63.4±5.4	77.3±9.2	76.9±4.4
	Group B	65.6±5.0	78.2±5.9	77.8±4.9
PaO_2	Group A	93.8±9.4	370.2±123.6	336.0±125.5
	Group B	95.8±10.9	407.0±112.3	400.8±115.4
SaO_2	Group A	97.2±1.5	100±0.0	100±0.0
	Group B	97.6±1.4	100±0.0	100±0.0
$PjvO_2$	Group A	36.6±3.8	49.6±10.4	48.5±5.3
	Group B	37.4±3.6	59.3±6.9	49.5±5.0



(Group A)



(Group B)

Figure 4. Cerebral oxygen metabolism index in two groups of patients

Through the above experimental data analysis, it can be concluded that propofol combined with remifentanil anesthesia is more conducive to reduce inflammation, patients with esophageal cancer radical surgery compared with sevoflurane combined with remifentanil anesthesia, inflammatory factor levels and cerebral oxygen metabolism improve.

5. Conclusion

Perioperative enhanced antigen stimulation induces activation of the body's inflammatory cytokines and immunoglobulin systems. The study found that the enhancement of antigen stimulation is derived from surgical traumatic stimulation, different anesthesia and drug stress, transfusion and infusion reactions, the application of hormones and immunological agents, as well as intraoperative hypotension and hypoperfusion. The inflammatory response is a protective response of the body to infection and trauma. A moderate inflammatory response limits the damage to the damaged site and mediates the apoptosis of the damaged cells. Too strong inflammatory reaction will amplify the "waterfall effect". When the body's compensatory anti-inflammatory ability declines and metabolic dysfunction, it is easy to exceed the body's compensatory ability, causing systemic tissue damage, systemic inflammatory response syndrome and even multiple organ dysfunction syndrome.

Previous studies of IL-6 and IL-8 have suggested that infusion of blood can cause harmful immunosuppressive effects. In this study, IL-6 and IL-8 increased after transfusion in the two groups, but at the time of T1 and T2, the IL-6 of the autologous blood group was significantly higher than that of the Kuxue group ($P<0.01$), and the T2 was autologous. The IL-8 level in the blood group was significantly higher than that in the blood group ($P<0.01$). TNF-α is the earliest inflammatory mediator in the process of inflammatory reaction, which can induce the production of cytokines such as IL-1, IL-6, IL-8, TGF-13 and PDGF. The concentration of TNF-α is closely related to brain edema. In this experiment, there was no significant difference in TNF-α levels between the two groups ($p > 0.05$); differences between the two groups were compared at each time point. The difference was not statistically significant ($P>0.05$). In the experiment, the two groups of $SjvO_2$, $PjvO_2$, SaO_2 and PaO_2 were compared at each time point, and the difference was not statistically significant ($P>0.05$). $SjvO_2$ in the autologous blood group decreased significantly at 4 h after transfusion, and the difference was statistically significant ($P<0.05$). The normal value of

$SjvO_2$ is 55%~75%. When $SjvO_2$<50% and lasts for more than 15 minutes, the neurological prognosis may be poor. When $SjvO_2$<40%, there may be global cerebral ischemia and hypoxia. Although the $SjvO_2$ decreased in the autologous blood group at 4 hours after transfusion (59.64+4.60%), it indicated that the oxygen consumption of the autologous blood group increased, but it was still within the normal range of the body's compensability, and did not cause serious postoperative prognosis.

This study found that the dual role of inflammatory factors on the body, so that it can not only localize and repair local tissue damage, but also induce systemic inflammatory response syndrome due to excessive activation. Therefore, when we need to face the occurrence of inflammatory reaction in the perioperative period, we can selectively use the most suitable drugs and operation techniques to achieve the protection of the body. Perioperative period to improve the level of surgical operations, improve anesthesia operation techniques, and standardize the use of anesthetic drugs, and rationally take neuroprotective measures, etc., is a common way to avoid harm. Careful and in-depth study of the above clinical diagnosis and treatment methods has important clinical significance.

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Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

Conflict of Interest

The author states that this article has no conflict of interest.

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