

## **Effects of different anesthesia and analgesia methods on postoperative T-lymphocyte, interleukin and hormone level of patients with esophageal cancer operation.**

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### **Abstract**

**Objective:** This study was aimed to explore effects of different anesthesia and analgesia methods on postoperative T lymphocyteinterleukin and hormone level of patients with esophageal cancer operation.

**Methods:** From December 2015 to December 2016, a total of 134 patients with esophageal cancer were selected from our hospital as the study objects. All patients were divided into control group (n=67) and observation group (n=67). Patients in the control group were treated with epidural block anesthesia while patients in the observation group were treated with epidural block anesthesia combined with general anesthesia. T lymphocyteinterleukin and hormone level of patients in two groups at different periods of time (C1: 30 min before anesthesia, C2: skin incision of 2 h, C3: 2 h after operation, C4: 24 h after operation, C5: 48 h after operation) were analysed and compared.

**Results:** There were more CD4<sup>+</sup> T lymphocytes in patients from observation group than those from control group at all periods (p<0.05). More CD8<sup>+</sup> lymphocytes in the control group at C3 and C4 period (p<0.05), no difference at C1, C2 and C5 (p>0.05). Interleukin level in patient from control group was significantly lower than that in patients from observation group (p<0.05). Both PRL and GH level were lower in observation group at C2-C5 period and no difference at C1 stage and no significant difference of COR level was observed between two groups at all periods.

**Conclusion:** Epidural block anesthesia combined with general anesthesia is preferable during esophageal cancer operation.

**Keywords:** Anesthesia, Analgesia, Esophageal cancer operation, T lymphocyte, Interleukin, Hormone level.

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### **Introduction**

Esophageal cancer is one of the most lethal cancers worldwide [1,2]. Esophageal cancer always starts in the inner layer of the mucosa and grows outward through the sub mucosa and the muscle layer. The lifetime risk of esophageal cancer is about 1 in 125 in men and about 1 in 454 in women. Although, with the development of medical sciences, the 5 y survival rate of esophageal cancer has improved to about 20% from 5%, it is still one of the least studied cancers [3,4]. Nowadays, surgery is pivotal in treatment of esophageal cancer. Aiming to make the esophagectomy safer and help patients recover from surgery more quickly, doctors are constantly improving the surgery techniques [5,6]. However, the methods of anesthesia used during the surgery may also influence the recovery effect. In our study, we investigated the different effect of epidural block anesthesia and epidural block anesthesia combined with general anesthesia on the recovery effect of esophagectomy which can be demonstrated by the level of T lymphocytes, interleukin and several hormones in the blood of patients. With our study, we will provide the reference for choosing

anesthesia method during esophagectomy, which can help the patients recover and survive from esophageal cancer better.

### **Materials and Methods**

#### **General data**

From December 2015 to December 2016, a total of 134 patients with esophageal cancer were selected from our hospital as the study objects and according to different methods of anesthesia were divided into control group (n=67) and observation group (n=67) in which there were 35 males and 32 females in the control group at an age of 45~89 with an average age of  $66.3.1 \pm 9.3$  and a disease course of 1~5 months,  $2.6 \pm 0.8$  months on average while 36 males and 31 females in the observation group at an age of 46~88 with an average age of  $65.3 \pm 8.8$  and a disease course of 1.5~5 months,  $2.8 \pm 0.7$  months on average. Relevant clinical data show there was no significant difference in basic information of 134 patients, P>0.05. A serial of comparisons was made based on general data conditions of patients in two groups.

### Methods of anesthesia

Before operation all patients didn't take pain relievers with a preoperative fasting time of 10 h. An injection of 0.5 mg atropine was given to the patients 30 min before the operation to establish venous channel for them [7,8]. Patients in the control group received epidural block anesthesia while patients in the observation group were treated with epidural block anesthesia combined with general anesthesia. With the location of left lateral position, epidural catheter of 3 cm was implanted into intervertebral space of the patients with an injection of 4 ml lidocaine with the concentration of 1.5%. Patients were injected once again with 3 ml lidocaine of the same concentration 5 min later and then sufentanil was injected to maintain anesthesia status. Changes of patient's conditions were observed [9,10].

### Observation index

T lymphocyte, interleukin and hormone level of patients in two groups at different periods of time (C1: 30 min before anesthesia, C2: skin incision of 2 h, C3: 2 h after operation, C4: 24 h after operation, C5: 48 h after operation) [11,12].

### Statistical approach

Measurement data (T lymphocyte, interleukin and hormone level of patients in two groups at different periods of time)

**Table 1.** T lymphocyte subsets at different periods (CD4<sup>+</sup>).

Group	C1	C2	C3	C4	C5
Control	34.21 ± 4.38	28.34 ± 5.43	23.16 ± 5.78	22.34 ± 4.89	26.34 ± 5.38
Observation	36.23 ± 6.45	34.45 ± 6.15	29.34 ± 5.18	33.21 ± 5.68	35.26 ± 5.28
t	1.198	1.574	1.037	2.255	2.162
p	0.041	0.039	0.047	0.027	0.019

**Table 2.** T lymphocyte subsets at different periods (CD8<sup>+</sup>).

Group	C1	C2	C3	C4	C5
Control	26.78 ± 4.23	28.32 ± 5.76	33.23 ± 5.34	34.78 ± 6.54	26.78 ± 6.18
Observation	26.23 ± 5.19	27.23 ± 6.35	26.26 ± 5.78	29.24 ± 5.36	28.21 ± 5.89
t	0.515	0.579	1.088	1.925	0.933
p	0.706	0.537	0.043	0.047	0.052

**Table 3.** Interleukin at different periods.

Group	C1	C2	C3	C4	C5
Control	0.67 ± 0.02	0.56 ± 0.23	0.58 ± 0.18	0.46 ± 0.39	0.67 ± 0.13
Observation	0.59 ± 0.05	0.34 ± 0.13	0.33 ± 0.01	0.26 ± 0.02	0.26 ± 0.14
t	1.215	2.017	2.159	1.983	2.685
p	0.048	0.031	0.025	0.027	0.011

**Table 4.** PRL level at different periods.

Group	C1	C2	C3	C4	C5
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were described as Mean ± S.D. T-test was applied with statistical significance of P<0.05. Statistical software: SPSS 16.0 and Microsoft office excel.

### Results

#### Comparison of T lymphocyte subsets at different periods between two groups

There were more CD4<sup>+</sup> T lymphocytes in patients from observation group than those from control group at all periods (p<0.05). Although there were more CD8<sup>+</sup> lymphocytes in the control group at C3 and C4 period (p<0.05), no difference in number of CD8<sup>+</sup> T lymphocytes was observed at C1, C2 and C5 (p>0.05) (Tables 1 and 2).

#### Comparison of interleukin at different periods between two groups

To determine the different effect of epidural block anesthesia and epidural block anesthesia combined with general anesthesia, the level of interleukin was detected in all patients and the results were compared between the control group and the observation group. We found that the level of interleukin in patient from control group was significantly lower than that in patients from observation group (p<0.05) (Table 3).

*Effects of different anesthesia and analgesia methods on postoperative T-lymphocyte, interleukin and hormone level of patients with esophageal cancer operation*

Control	15.34 ± 4.29	76.23 ± 1.34	94.32 ± 22.32	69.36 ± 14.34	36.56 ± 5.34
Observation	14.33 ± 3.32	56.44 ± 6.38	64.36 ± 1.3	43.32 ± 10.26	14.38 ± 4.45
t	1.052	2.115	2.256	1.983	2.375
p	0.051	0.039	0.025	0.041	0.027

**Table 5.** GH level at different periods.

Group	C1	C2	C3	C4	C5
Control	1.23 ± 1.43	9.23 ± 3.32	15.31 ± 3.23	13.46 ± 3.87	8.78 ± 3.24

Observation	1.56 ± 1.68	4.78 ± 2.13	5.34 ± 3.32	3.23 ± 1.23	1.98 ± 1.25
t	0.871	1.159	2.977	2.856	3.159
p	0.073	0.033	0.025	0.022	0.010

**Table 6.** COR level at different periods.

Group	C1	C2	C3	C4	C5
Control	432.73 ± 55.38	436.8 ± 61.33	592.45 ± 156.34	645.26 ± 61.44	557.37 ± 50.22
Observation	532.65 ± 34.32	433.6 ± 57.32	578.36 ± 154.36	667.23 ± 45.38	458.32 ± 49.19
t	1.002	0.932	0.957	1.013	1.210
p	0.064	0.135	0.101	0.114	0.098

**Comparison of hormone level of patients at different periods between two groups**

Because Prolactin (PRL), Growth Hormone (GH), and Cortisol (COR) are important for the health of patients after surgery, we analysed and compared the level of PRL, GH and COR between patients in two groups. The data showed that PRL level was lower in observation group at C2-C5 period and no difference at C1 stage (Table 4). The level of GH is similar with the PRL level as lower in observation group at C2-C5 period and no difference at C1 stage (Table 5). However, no significant difference of COR level was observed between two groups at all periods (Table 6).

**Discussion**

Esophageal cancer is a kind of common digestive tract tumor in our country and it is commonly treated by way of open surgery, which has certain curative effects but leads to slower recovery and more complications for patients, causing moderately huge trauma to the patients and hindering their recovery [13,14].

Epidural block anesthesia has advantages in surgical treatment of patients with esophageal cancer, which means a direct puncture in lumbar intervertebral space of the patients [15,16]. Patients can spontaneously breathe after anesthesia with self-defense capability of respiratory tract, effectively reducing the incidence of postoperative respiratory tract infection. Epidural block anesthesia combined with general anesthesia can reduce total quantities of general anesthetics drugs [17,18] and has less effects in heart rate and blood pressure, enabling patients to maintain a steady state in the process of anesthesia. Besides, patients on these conditions have a faster extubated time and wake up quickly. It better promotes the spontaneous breathing

of the patients, lowers the occurrence of complications like pulmonary infection and meanwhile makes less impacts in patients' immune function, thus further improving the therapeutic effects [19,20].

Combined with the above research, epidural block anesthesia combined with general anesthesia has moderately bigger significance in terms of patients with esophageal cancer operation, worthy of clinical trust.

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