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Effect of anesthesia combined with intercostal nerve block on analgesia for esophageal cancer after operation

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Abstract. – OBJECTIVE: To discuss the effect of combined with intercostal nerve block on analgesia for esophageal cacer after operation.

PATIENTS AND METHODS: The total of 80 patients with esophageal cancer as the research object in our hospital from June 2012 to June 2013 were randomly grouped as epidural anesthesia (control group) and general anesthesia and intercostal nerve block combined with application (observation group), whose prognoses were compared.

RESULTS: We compared the control group at each time point and the observation group at time T1-T4 with T0. Mean arterial pressure (MAP) had significantly lower performance (mean $p < 0.05$); at T4, central venus pressure (CVP) of the control group improved significantly (mean $p < 0.05$), MAP value of the observation group at T3, T4 was significantly lowerthan the control group (mean $p < 0.05$). The degree of pain 24-48 h after operation of the observation group was lower than the control group, and the difference was statistically significant ($p < 0.05$).

CONCLUSIONS: Application of general anesthesia combined with intercostal nerve block analgesia in esophageal surgery can obtain satisfactory postoperative analgesia.

Key Words:
General anesthesia, Composite, Paravertebral block operation, Esophageal cancer, Perioperative circulation, Postoperative analgesia, Influence.

Introduction

Among common types of Chinese clinical gastrointestinal tumors, incidence rate of esophageal cancer accounts for the higher, operation is one of the main means of treatment, but by the impact of invasive operation, patients easily have adverse reaction to stress. According to the study, with the implementation of operation in general anesthesia, blood plasma norepinephrine and epinephrine concentrations after operation have a significantly higher performance, combined with intubation, extubation and sputum suction and stimulation, easy to cause cardiovascular violent reaction[1]. The use of general anesthesia and intercostal nerve block combined with application can reduce the stress reaction degree to ensure the smooth implementation of operation, and reduce the suffering of patients[2,3]. In this article, the relevant cases are selected and studied, study about the influence of the circulatory system of perioperative and postoperative analgesia effect of this solution, and the present review is summarized as follows.

Patients and Methods

Patients

A total of 80 subjects were selected, male 48 cases, female 32 cases, age 32-78, with the average age of 57.2 ± 2.4. On the basis of the classification standards of American Society of Anesthesiologists (ASA), 22 cases of grade I, 58 cases of grade II, the average weight 61.9 ± 9.2 kg, and the average height 162.2 ± 8.2 cm were considered to be analyzed. They all agreed to sign the informed consent of the experiment with the exclusion of patients with other serious diseases of body system. Digital table extraction method was used to divide them randomly into the observation group and the control group with 40 cases each and group generally comparable without significant difference ($p > 0.05$).

Methods

In two groups, incisions were both selected at the fourth and fifth intercostal; at seventh and eighth, intercostal chest tube was placed. The control group received epidural anesthesia, first

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took 5 ml of 0.25% bupivacaine added in epidural operation. In the process of operation, every 1 h, additional 5 ml was added. The observation group by the induction of general anesthesia, at postoperative side T3-T9 took 0.5% ropivacaine for intercostal nerve block. The patients were assisted lying on the side, the spinous process of thoracic vertebra rear position next to the open 2.5-3.0 cm was selected with No. 7 needle along the vertical skin in the spinous process of the highest point, into the depth of 2-4 cm, the parapophysis is palpable, tip in contact to the transverse process, over the superior margin 1.0-1.5 cm modified to the transverse cephalad, and 0.5% ropivacaine 3 ml single injection was taken. Application of controlled intravenous analgesia pump was taken on the two groups for postoperative suture of skin. Sufentanil 0.1 mg, tramadol 500 mg, and granisetron 9 mg were diluted to 150 ml, set to 2 ml/h infusion rate, on the basis of analgesia and pressed by patients themselves[1,2].

Observation Index[3]

(1) Perioperative circulation: Observation of two groups of T0: operation room rest: T1: After general anesthesia induction and tracheal intubation; T2: after assist to lateral position; T3: after thoracic paravertebral block background for 5 min or epidural dosing; T4: 20 min after single lung ventilation of thoracic; T5: before extubation at the end of the operation, monitoring the heart rate (HR), central venous pressure (CVP), mean arterial pressure (MAP). (2) Analgesia score: by the visual analogue scale (VAS) evaluate postoperative analgesic effect of resting state, according to no pain, mild, moderate, severe and extreme fractionation, followed by 0-4 points.

Statistical Analysis

SPSS 18.0 version (SPSS Inc., Chicago, IL, USA) was used, measurement data was showed by ($x \pm s$) with t-test. Count data was tested by χ^2 test, $p < 0.05$ was the significant difference.

Results

Changes of Perioperative Circulating

Control group at each time point and the observation group at time T1-T4 with T0 were compared. MAP had significantly lower performance (mean $p < 0.05$); at T4, CVP of the control group improved significantly (mean $p < 0.05$). MAP value of the observation group at T3, T4 was significantly lower than the control group (mean $p < 0.05$, Table I).

The Analgesic Effect

The degree of pain 24-48 h after operation of the observation group was lower than the control group, and the difference was statistically significant ($p < 0.05$). No disease complications were reported (Table II).

Table I. Comparison of perioperative hemodynamics of two groups (x ± s)

Group	HR (times/min)	MAP (mmHg)	CVP (cm H_2O)
Control group			
T0	78.6 ± 9.8	106.1 ± 16.5	6.2 ± 2.2
T1	78.8 ± 14.3	87.2 ± 16.2*	5.2 ± 2.3
T2	76.7 ± 10.1	84.2 ± 3.2*	5.3 ± 2.1
T3	72.6 ± 7.2	91.4 ± 12.3*	6.6 ± 2.8
T4	77.5 ± 12.3	90.7 ± 13.2*	7.1 ± 3.8
T5	73.1 ± 10.9	86.5 ± 9.7*	6.3 ± 2.3
Observation group			
T0	83.4 ± 10.3	101.2 ± 11.4	6.5 ± 2.9
T1	81.3 ± 10.6	80.8 ± 7.5*	6.1 ± 2.4
T2	78.5 ± 10.5	82.8 ± 16.2*	6.5 ± 2.7
T3	71.2 ± 11.4	81.3 ± 13.2*#	6.9 ± 2.8
T4	76.2 ± 14.3	77.8 ± 12.4*#	6.5 ± 2.8*
T5	77.5 ± 12.2	92.5 ± 10.2	6.5 ± 3.1

Note: Compared with the same group T0, *(t means = 8.413, $p < 0.05$);
Compared with the control group at the same time point, #(t mean = 7.192, $p < 0.05$).

Table II. VAS score comparison of the two groups in different periods after the operation (x ± s, score).

Group	N	Postoperative 1 h	Postoperative 24 h	Postoperative 48 h
Control group	40	3.1 ± 0.3	2.9 ± 0.2	2.5 ± 0.4
Observation group	40	3.2 ± 0.3	2.2 ± 0.3	1.7 ± 0.3
T	–	3.718	13.887	13.748
p	–	> 0.05	< 0.05	< 0.05

Discussion

In recent years, with the deepening of the knowledge, regional block as multimodal analgesia treatment, important composition has been widely accepted[4,5]. Thoracic paravertebral is a potential anatomic space like wedge corresponding vertebral body adjacent cross-section. The inside of that through the intervertebral foramen connected with epidural space and outside of that is connected with the intercostal space. The injection of local anesthetic can block feeling, movement and sympathetic nerve through the gap, so as to achieve the same side body analgesia and anesthesia[6-8]. At the same time, injecting can diffuse along the gap upward and downward, so by an injection point the anesthesia of segments range can be generate[9].

After thoracotomy, many patients have severe pain, if the poor postoperative analgesia, that is still easy to produce stress response aggravating, with depression on deep breathing and sputum of patients, induce a dangerous situation[10]. Thoracic paravertebral as a gap wedge in thoracic paravertebral location, whose nerves include intercostal nerve and its dorsal branch of spinal nerve, the sympathetic chain, and a total of its branch structure, so the local anesthetics is injected on the chest thoracic paravertebral, block the sympathetic nerve and intercostal nerve at the same time, so that after thoracotomy visceral pain and pain of the chest wall alleviate[11-13]. Local anesthetic concentration, capacity, puncture section, and type are related to the depth and scope of paravertebral block. The application of a multipoint injection can avoid the error caused by accidents of catheter displacement, abscission, etc.[14,15]. This group of intercostal nerve block should be completed with 0.5% ropivacaine that can alleviate the chest wall incision pain for a long time, and that may be associated with multiple point injection and liquid diffusion uniform. Demonstrated according to the related research, in dynamic state, analgesic effect is the same as spinal anesthesia. In this study, there is no significant disease that may be related to the small sample and intercostal nerve block operation can be carried out under the B ultrasound guide to prevent adverse reaction. Perioperative circulation of this observation group is better than that of the control group[16,17]. The study shows: (1) Compare the control group at each time point and the observation group at time T1-T4 with T0. MAP had significantly lower performance; (2) At T4, CVP of the control group improved significantly. MAP value of the observation group at T3, T4 was significantly lower than the control group. (3) The degree of pain 24-48 h after operation of the observation group was lower than the control group, and the difference was statistically significant. Thoracic paravertebral intercostal nerve block can provide considerable as epidural block analgesia effect, and it also can maintain better oxygenation and reduce the ventilation index, hypotension, retention of urine and other related complications. Effect of thoracic paravertebral intercostal nerve block makes the technique more and more applied to perioperative anesthesia and analgesia of chest, breast, abdominal operation, and the pain clinic in chest area[18].

Conclusions

The application of general anesthesia combined with intercostal nerve block analgesia in esophageal surgery can obtain satisfactory postoperative analgesia.

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