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Effect of dexmedetomidine on the postoperative cognitive function of patients undergoing radical resection of esophageal cancer.

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Abstract

Objective: To investigate the effect of dexmedetomidine on the postoperative cognitive function of patients undergoing radical resection of esophageal cancer.

Methods: A total of 76 patients undergoing radical resection of esophageal cancer were randomly and equally divided into observation and control groups. The patients in the two groups were then treated with continuous intravenous pumping of fentanyl to ease their pain. In the control group, the patients were initially treated with 0.05 mg/kg and then with 0.02-0.08 mg/kg•h^{-1} rhythim to remain anesthetized. In the observation group, the patients were intravenously infused with 1.0 μg/kg dexmedetomidine and then with 0.2-0.7 μg/kg•h^{-1} to retain their anesthetized conditions. The sedative effect and incidence of adverse reactions in these patients were compared.

Results: The sedative effects did not significantly differ between the two groups (P>0.05). The recovery time after the drug was withdrawn from the patients in the observation group was significantly shorter than that in the control group (P<0.05). The incidence of adverse reactions in the observation group was 13.16%, which was significantly lower than that in the control group (39.47%; P<0.05). The postoperative SDS and SAS scores of the patients in the two groups were significantly higher than their preoperative scores (P<0.05). The postoperative SDS and SAS scores of the patients in the observation group were also significantly higher than those in the control group (P<0.05).

Conclusion: The sedative effect of dexmedetomidine on patients subjected to general anesthesia and undergoing radical resection of esophageal cancer was good. Dexmedetomidine could improve the cognitive function of patients and reduce the incidence of adverse reactions. Therefore, this drug should be recommended for these patients.

Keywords: Radical resection of esophageal carcinoma, Patients under general anesthesia, Dexmedetomidine, Rhythim, Cognitive function.

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Introduction

Esophagogastric anastomosis is applied as a traditional treatment for middle- and lower-segment esophageal cancer [1]. However, this operation often leads to postoperative pulmonary hypofunction and complications at varying degrees, which can seriously affect prognosis. Patients undergoing radical resection of esophageal cancer under general anesthesia are characterized by poor body resistance, which can easily cause an increase in their heart rate and blood pressure during operation [2]. As such, appropriate operation methods and analgesics are required. With the use of proper methods and drugs, optimum anesthesia should be achieved quickly, postoperative analepsia should be overcome rapidly, and incidence of adverse reactions should be low. For example, rhythim is a sedative and analgesic drug commonly used in clinics, but its effect is poor. Dexmedetomidine is a new widely utilized sedative and analgesic drug that achieves good anesthetic effect [3]. To investigate the anesthetic effects of these drugs, we analysed the efficacies of these two narcotic drugs on 76 patients under general anesthesia and subjected to radical resection of esophageal cancer. The clinical data of these patients were obtained and summarized in the following sections.

Data and Methods

Clinical information

Seventy-six patients undergoing radical resection of esophageal cancer under general anesthesia in our hospital were selected from January 2015 to January 2016. The patients and their families signed the informed consent. These patients were randomly and equally divided into control and observation groups. The control group included 22 males and 16 females aged 60-85 y (average age of 68.4 ± 2.3) and with a

body weight of 57.3 ± 1.6 kg. The observation group comprised 23 males and 15 females aged 61-85 y (average age of 69.2 ± 2.4 y) and with a body weight of 58.1 ± 1.7 kg. General data, such as body weight, age, and gender, were comparable, but no significant difference (P>0.05) was found.

Method

The patients in the two groups were treated with continuous intravenous pumping of fentanyl to ease their pain. The patients in the control group were initially treated with 0.05 mg/kg rhythim (Jiangsu Nhwa Pharmaceutical Co., Ltd, Quasi-word H19990027) and then with 0.02-0.08 mg/kg•h^{-1} rhythim to remain anesthetized. The patients in the observation group were intravenously infused with 1.0 μg/kg dexmedetomidine and then with 0.2-0.7 μg/kg•h^{-1} for more than 10 min to maintain their anesthetic conditions. According to the order, patients should obtain a Ramsay sedation score of 2-3 as the standard when they were in a resting state under general anesthesia.

Observation index

Ramsay sedation scores were interpreted as follows: (1) patients were anxious and irritable; (2) patients could actively cooperate with treatment; (3) patients could follow guidelines; (4) patients could sleep and wake up appropriately; (5) patients were unresponsive to auditory stimulus; and (6) patients could not respond to the auditory stimulus and could wake up from a shallow sleep. The sedative time and recovery time of the patients in the two groups were recorded.

Statistical processing

Data were analysed using SPSS19.0. Count data were expressed in percent (%), and χ^2 test was conducted. Measurement data were examined using ($\bar{x}$ ± S). P<0.05 indicated significant differences.

Result

Sedative effects of patients in the two groups

No significant difference in the sedative effect was observed between the two groups (P>0.05), but the recovery time of patients in the observation group was significantly shorter than that of the control group (P<0.05, Table 1).

Preoperative and postoperative depression and anxiety scores of patients in the two groups

The postoperative SDS and SAS scores of the patients in the two groups were significantly higher than their preoperative scores. Moreover, the SDS and SAS scores of the patients in the observation group were significantly higher than those in the control group (P<0.05; Table 2).

Adverse reactions of patients in the two groups

The incidence of adverse reactions in the patients in the observation group was 13.16%, which was significantly lower than that in the control group (39.47%; P<0.05; Table 3).

Table 1. *Sedative effect on patients in the two groups.*

Group	n	Time reaching sedative effect (s)	Recovery time after drug withdrawal
Control group	38	56.28 ± 3.42	11.76 ± 2.14
Observation group	38	52.18 ± 2.79	6.12 ± 1.05
t		1.5026	4.1538
P		0.2473	0.0001

Table 2. *Preoperative and postoperative SDS and SAS scores of patients in the two groups ($\bar{x}$ ± S).*

Group	SDS		SAS	
	Preoperative	Postoperative	Preoperative	Postoperative
Control group (n=38)	54.05 ± 7.05	39.03 ± 6.81	54.32 ± 6.58	38.37 ± 6.65
Observation group (n=38)	53.89 ± 7.23	47.23 ± 7.25	55.12 ± 7.00	46.95 ± 7.22
T	0.05	-2.61	-0.26	-2.76
P	>0.05	<0.05	>0.05	<0.05

Table 3. *Adverse reactions of patients in the two groups (n (%)).*

Group	n	Bradycardia	Respiratory depression	Delirium	Hypotension	Sum

Control group	38	2 (5.26)	3 (7.89)	6 (15.79)	4 (10.53)	15 (39.47)
Observation group	38	1 (2.63)	1 (2.63)	1 (2.63)	2 (5.26)	5 (13.16)
χ^2						17.8496
P						0.0000

Discussion

In patients undergoing radical surgery of esophageal cancer under general anesthesia, their heart rate and blood pressure easily increase because of their resistance, poor immune functions, and negative effects. Therefore, narcotic drugs should be carefully selected to improve the prognosis of patients [4]. Insanity is also known as acute brain syndrome or acute reversible conscious disturbance, which is mainly caused by various systemic diseases or acute brain symptoms. Acute brain syndrome is an acute activity abnormality of the senior nervous center [5]. Under this condition, excitability is significantly increased, clear consciousness is decreased, and confusion, restricted consciousness, disorientation in time, place, and person orientation, and cognitive disorders occur. Patients also experience hallucinations and illusions with vivid and life-like contents [6]. Patients' psychomotor performances can be reduced or increased, they may be sleeping, their language is somehow interesting, and actions are minimized. In severe cases, patients may suffer from coma, and hallucinations and delusions are not relevant (movable). Patients become unstable, talk about nonsense topics, and undergo hallucinations and illusions. The latter more likely arouses the attention of family members and medical staff. However, patients with few activities receive poor attention [7]. As such, diagnosis and prompt treatment are delayed. Patients become suddenly excited and agitated from their sleeping state. If patients suddenly become quiet, drowsy, and delirious, the deterioration of their internal medical diseases should be monitored because this phenomenon may be a prelude to coma. Patients also manifest mild depression, anxiety, irritability, and dysphoria in the early phase. Their apathy becomes indifferent if they also experience psychomotor excitement, fear, emotional rage, or confusion [8].

The incidence of postoperative delirium is high in patients under general anesthesia possibly because of the following [9]: (1) Narcotic drugs, such as inhaled anesthetic isoflurane, analgesic opioids, and anticholinergic drugs, are administered; (2) Patients show a long-term drinking history and drinking is terminated after admission, but alcohol withdrawal syndrome should not be excluded; (3) With aging, their tolerance to operation, anesthesia, and drugs decreases. Surgical stimulation, anemia, postoperative electrolyte disturbance, and hypoxia can directly or indirectly affect blood circulation and metabolism in the brain and consequently cause delirium; (4) Psychological factors may be detected. Elderly patients' psychological endurance capacity is reduced likely because of preoperative and postoperative worries, anxiety, boredom, and depression. Patients undergoing chronic thoracic surgery are commonly anesthetized with rhythim, but the sedative effect of this drug is poor. Poor blood flow, delirium, slow heartbeat (bradycardia), low blood pressure, and other complications often occur. In contrast to rhythim, dexmedetomidine, an α2 adrenergic receptor agonist in myocardial infarction, elicits strong anxiolytic, sedative, and analgesic effects. Its main sedative characteristic is that patients are easily awakened after withdrawal [10]. Although previous studies showed that rhythim exhibits a remarkable anesthetic effect on patients with right myocardial infarction, our study revealed that the sedation time of both drugs did not significantly differ. However, the waking time after the drug withdrawal of the patients in the observation group was significantly shorter than that of the control group. The incidence of adverse reactions was also low. Delirium was observed in one patient, bradycardia was found in one patient, respiratory depression was evident in one patient, and hypotension was detected in two patients. These results are similar to those reported in literature. Therefore, the anesthetic effect of dexmedetomidine on radical resection of esophageal carcinoma is good.

Conclusion

Dexmedetomidine elicits a good anesthetic effect on patients undergoing radical resection of esophageal carcinoma. This treatment can reduce adverse reactions and provide a promising application value.

Acknowledgments

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References

1. Enzinger PC, Mayer RJ. Esophageal cancer. N Engl J Med 2003; 349: 2241-2252.
2. Wang H, Li H, Zhang Q, Zhao D, Xiao YF. Ovarian cancer treatment drug everolimus inhibits the metabolic elimination of first-line anti-colon cancer irinotecan. Lat Am J Pharm 2017; 36: 1250-1254.
3. Selvaraj V, Srinivasan P. Interaction of an EM wave with the breast tissue in a microwave imaging technique using an ultra-wideband antenna. Biomed Res India 2017; 28: 1025-1030.
4. Kadowaki T, Shiozaki H, Inoue M, Tamura S, Oka H. E-cadherin and alpha-catenin expression in human esophageal cancer. Cancer Res 1994; 54: 291-296.
5. Li H, Wang H, Yu X, Du X. Inhibition of intestinal UDP-glucuronosyltransferase (UGT) 1A7 and 1A10 by ovarian

cancer treatment drug. Lat Am J Pharm 2017; 36: 1227-1230.

6. Kurkcu R. The comparison of body composition bioelectrical impedance analysis method of primary school students who do and dont do exercise. Biomed Res India 2017; 28: 1107-1109.
7. Corley DA, Kerlikowske K, Verma R, Buffler P. Protective association of aspirin/NSAIDs and esophageal cancer: a systematic review and meta-analysis. Gastroenterology 2003; 124: 47-56.
8. Chen K, Liu JY, Lei L. Comparison of the inhibition behavior of benzbromarone on liver metabolic capability between health people and patients with liver cancers. Lat Am J Pharm 2017; 36: 1030-1034.
9. Kato J, Kuwabara Y, Mitani M, Shinoda N, Sato A. Expression of survivin in esophageal cancer: correlation with the prognosis and response to chemotherapy. Int J Cancer 2001; 95: 92-95.
10. Manikandan T, Bharathi N. Hybrid neuro-fuzzy system for prediction of stages of lung cancer based on the observed symptom values. Biomed Res India 2017; 28: 588-593.

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