

Effects of sufentanil and fentanyl on the recovery after laparoscopic cholecystectomy.

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Abstract

Objective: To observe the effects of sufentanil and fentanyl on the recovery quality after general anaesthesia, which was conducted on patients with Laparoscopic Cholecystectomy (LC).

Methods: 68 patients aged 45 or above, ASA grade I-II, patients underwent elective laparoscopic cholecystectomy were randomly divided into sufentanil group (group S) and fentanyl group (R group). The postoperative pain, nausea, vomiting, recovery of daily activities and the satisfaction for the hospital were recorded. Verbal Rating Scale (VRS) was used to rate every index after surgery.

Results: Compared with group S. The VRS at 10 min, 20 min, 30 min were elevated in group R ($P<0.01$). Postoperative pain, nausea and vomiting after hl VRS score two groups had no significant difference ($p>0.05$), postoperative recovery time daily activities there was no significant difference between the two groups ($p>0.05$), the patient to the hospital, the satisfaction survey in addition to the satisfaction of postoperative analgesia between the two groups have statistical difference ($p<0.05$), the other had no significant difference ($p>0.05$).

Conclusion: Sufentanil and fentanyl could be safely used for the elderly, and as for postoperative analgesia effect of sufentanil is superior to fentanyl 1 hour after LC.

Keywords: Sufentanil, Fentanyl, Laparoscopic, Cholecystectomy, Emergence agitation.

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Introduction

Laparoscopic cholecystectomy is the representative of minimally invasive surgery [1]. At present, higher requirements have been put forward in operations with the improvement of health consciousness [2]. The treatment cannot only remain in aspect of healing, but also in new requirements of damage to the body and comfort during operations. How to provide the best clinical effects with minimal impairment to patients has become the common goal of all general surgeons [3,4]. Adopting cholecystectomy to cut gallstones has definite clinical effect, but a few patients still have complications of postoperative infection, postoperative bleeding, biliary fistulae, obstructive jaundice and abdominal distension [5,6]. For this purpose, 68 postoperative patients were chose who were hospitalized in our hospital from January 2012 to January 2015 as research objects to respectively perform Laparoscopic Cholecystectomy (LC) and open cholecystectomy.

Patients and Methods

General information

68 LC patients aged 45 were conducted under general anaesthesia. No anaesthetic allergy or serious heart and lung disease history. This research was permitted by Ethics

Committee, and all patients themselves and their family agree to sign the informed consent.

Methods

Anaesthesia method [7,8]: Patients in group R adopt intravenous remifentanyl 1 $\mu\text{g}/\text{kg}$, propofol 1.5 mg/kg during anaesthesia induction. Give intravenous esmeron 0.6 mg/kg after falling asleep and begin intravenous remifentanyl 0.1 $\mu\text{g}/\text{kg}/\text{min}$ in the meantime. Begin tracheal intubation after 3 min artificial ventilation.

Patients in group S adopt intravenous sufentanil 0.35 $\mu\text{g}/\text{kg}$ and propofol 1.5 mg/kg during anaesthesia induction. Give esmeron 0.6 mg/kg after falling asleep. Begin tracheal intubation after 3 min artificial ventilation. Use Drager ZB anaesthesia machine to maintain with intravenous inhalation of propofol and isoflurane. Adjust propofol and isoflurane dosage according to patients' blood pressure and heart rate. Give intravenous morphine 0.08 mg/kg after gallbladder removal. Stop using propofol and isoflurane when begin to close the abdominal. Give neostigmine and atropine to antagonize the activity of muscle relaxants according to the situation. Conduct extubation when patients have spontaneous breathing and satisfied tidal volume after operation.

Drager ZB anaesthesia machine was used for mechanical ventilation and Datxe-Ohmdea monitor is used during

operation. Keep using remifentanyl, propofol and isoflurane for intravenous inhalational maintaining and adjust them according to the situation. Use the same method as group S at the end of operation. Indwell gastric tube to every patient after anaesthesia induction. And remove it after resorb adequately gastric juice and gas before ending the operation.

Observation indexes [9,10]: Recode operative time, extubation time and sober time. For pain, nausea and vomit require all the patients to use oral grading-score to give a mark 10, 20, 30 min and 1, 3, 6, 12, 24, 72 hours after operation. The grade is divided into 0 (no pain or vomit), -10 (exceeding pain and vomit) degrees. Take corresponding notes on other side reactions and medications.

Statistics method

Descriptive index of initial variable: mean value, median, standard deviation and variance. Optic analysis index: tendency chart and histogram. Adopt mean value and standard deviation in measurement data. Use t-test and chi-square test to compare characteristic difference between two groups. Use independent sample t-test in each period. Adopt correlation and part correlation to analyse connections between parameters.

SPSS (version 19.0) was used to calculate, consider the difference is significant when $p < 0.05$.

Results

There are no significant difference in sexuality, age and weight. Six patients in group R cannot leave hospital in 48 hours. One of them indwells abdominal drainage tube, three of them exhaust late after operation, the other seven patients ask for more hospital stays because of pain and/or nausea. Five patients in group S cannot leave hospital in 48 hours. One of them indwells abdominal drainage tube, two of them exhaust late after operation, six patients ask for more hospital stays because of pain and/or nausea, and one of them ask for more hospital stays for individual reason.

All patients are safe and sound during operation. No significant difference in average operating time between two groups. No significant difference in average extubation time and sobriety time between two groups as shown in Table 1.

Table 1. Comparison on periods of operation, postoperative extubation and recovery.

	Group R	Group S	p
Operation Time (min)	52.1	53.5	>0.05
Extubation Time (min)	12.4	13.1	>0.05
Recovery Time (min)	15.2	16.3	>0.05

The VRS score of pain in group R was obviously higher than group S in an hour after operation ($p < 0.01$). The VRS score in two groups decrease after an hour. No significant difference in

other times except that six hours later ($p < 0.05$) as shown in Table 2.

Table 2. VRS score of postoperative pain.

Postoperative time	Group	Number	Postoperative pain VRS score
10 min*	R	34	2.8
	S	34	0.6
20 min*	R	34	4.2
	S	34	0.9
30 min*	R	34	4.3
	S	34	1.2
1 h	R	34	3.5
	S	34	2.8
3 h	R	34	2.9
	S	34	2.4
6 h**	R	34	1.9
	S	34	2.6
12 h	R	34	1.4
	S	34	2.3
24 h	R	34	1.2
	S	34	1.5
48 h	R	34	0.7
	S	34	0.8
72 h	R	34	0.8
	S	34	0.9

*At 10, 20, 30 min and 1 h, $p < 0.01$, **6h, $p < 0.05$

Table 3. VRS score of postoperative nausea and its number.

Postoperative time	Group	Number	postoperative nausea VRS score	Nausea number
10 min	R	34	0.3	0
	S	34	0.2	1
20 min	R	34	0.3	2
	S	34	0.2	5
30 min	R	34	0.3	1
	S	34	0.2	3
1 h	R	34	0.4	4
	S	34	0.4	3
3 h	R	34	1.2	12
	S	34	0.6	7

6 h	R	34	1.4	12
	S	34	1.5	12
12 h	R	34	0.8	12
	S	34	0.9	10
24 h	R	34	0.5	0
	S	34	0.6	5
48 h	R	34	0	0
	S	34	0.2	1
72 h	R	34	0.2	0
	S	34	0	2

Table 4. Recovery time of postoperative functions of patients (h).

Group	post-surgery exsufflation	anal-Drink	Walking	Wear	Check out
R	13.1	6.2	11.5	16.9	39.4
S	16.2	7.3	12.7	14.2	41.8

Table 5. VRS score of patient's satisfaction.

Group	Surgery	Anaesthesia	Analgesic	Nausea	Service
R	9.2	9	8.4	8.4	9.5
S	9.5	9.5	8.7	9.2	9.4

The VRS of nausea and vomit increase after 6 and 12 hours, but no significant difference between two groups. The number of patients has relevant variations and most of patients vomit in 6 and 12 hours as shown in Table 3. No significant difference in recovery time as shown in Table 4. No significant difference in VRS satisfaction score. The other VRS scores in degree of satisfaction (operation, anaesthesia, nausea and vomit, service in hospital) have no significant difference as shown in Table 5.

Discussion

How to choose the best anaesthetic method to reduce adverse reactions and shorten old men's hospital stays are very important. This research is mainly compare the influence of medium and long term sufentanil and isodose short term remifentanil towards old man's post operation recovery [11].

Sufentanil is the N-4 derivative substitute of fentanyl, the chemical and pharmonic effects was firstly reported in 1976 [12]. As same as fentanyl, sufentanil is the excitomotor of μ opiate receptor. The lipophilicity is twice than fentanyl mainly in liver. The appetency with opiate receptor is stronger than fentanyl; the anti-inflammatory is 5-10 times than fentanyl. Sufentanil is a newly synthesized opiates analgesic. Because of its special ester structure, short elimination half-life and quick equilibrium between central compartment and peripheral compartment, this medicine takes effects rapidly and maintains shortly. Compared with the other opiates, it is more stable,

more suitable for intravenous. It does not have any cumulative effect, so it is special for short operations in the daytime.

Using laryngeal masks during anaesthesia induction may lead gas enter into enteric cavity, dilatation of intestine and flatulence may cause PONV [13]. The newest research shows, hypoxia during operation is an important factor to cause PONV. Inhalational oxygen concentration in perioperative period has significance to the change of PONV occurrence rate. Its mode of action may have relationship with reducing regional and intestinal ischemia under sufficient oxygen supply. In consideration of function decline of old people's viscera and store, also with complications, the management during post operation period may have some difficulties. It needs to properly deal with anaesthesia and closely observe respiratory cyclic change to assure the surgical effect and patients' safety. Ask in detail the medical history and do physical examination roundly to accurately assess aging degree and viscera store capacity. Adopt overall controlling measure to avoid side reaction and complication.

According to patient's condition and operation demand, choose the best anaesthetic method. It is better to choose general anaesthesia in laparoscopic cholecystectomy, but on account of old man's Central Nervous System (CNS) is sensitive to intravenous anaesthetics and may cause serious medication adverse reactions [14]. The reasons are complicated, including physiological and pathologic change, environment and heredity factors. The physiological change of old people not always decreases in parallel with age. That is to say physiological change in every system may not develop in the same speed. Therefore, there exist high individual differences in dosage. Old people should take less medicine, because of the pharmacokinetics change of old people. We should obey rules of low concentration, small dose and fractional pharmacy. Choose intravenous inhalational anaesthesia as maintenance to facilitate respiratory management and to ensure sufficient oxygen in cardiac muscle. Big changes in hemodynamics should be paid a great attention, and take care of the inter-potential inside anaesthetics to avoid an overdose. What's more, correctly master excubation index to avoid side reactions after operation.

In this research, two groups of people have no significant differences in satisfactory of other aspects (operation, anaesthesia, nausea, vomit and service in hospital), except in postoperative analgesia ($p < 0.05$). But patients in group S may feel more comfortable after operation, 70% older patients can leave hospital on the next day, and there are less adverse reactions and less analgesic they felt.

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