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Clinical research of two anaesthesia methods in gynaecologic laparoscopic surgery.

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Abstract

Objective: To compare the clinical efficacy and complications between epidural block combined with intravenous general anaesthesia and laryngeal mask combined with spinal epidural anaesthesia.
Methods: 70 cases of patients with Gynaecologic Laparoscopic Surgery from February 2013 to February 2015 were grouped randomly to two groups, including epidural group (Group I) and laryngeal mask (Group II), each group enrolled 35 patients. Group I utilized epidural block combined with intravenous general anaesthesia, Group II used laryngeal mask combined with spinal epidural anaesthesia. The data of HR, SpO_2, PET CO_2 and MAP were recorded and compared before anaesthesia and at the 5 min, 20 min, and 45 min after pneumoperitoneum and 10 min after bleeding. Anaesthesia complications were also observed, to compare the effect of pneumoperitoneum on the respiratory function, circulatory function and complications in between the two groups.
Results: The interference after pneumoperitoneum in Group II was bigger than that in Group I, SpO_2 decreased, Pet-CO_2 increased. In group I, the HR was significantly accelerated, BP was significantly increased ($p<0.05$), and was significantly higher than group II ($p<0.05$) at the time of intubation, extubation and 5 min after extubation.
Conclusion: Due to epidural block combined with intravenous general anaesthesia could significantly reduce the stress reaction induced by pneumoperitoneum, less anaesthesia complications, smooth intraoperative blood flow. However, the laryngeal mask with combined spinal epidural anaesthesia for gynaecological laparoscopic surgery was also a safe and feasible method, because the general anaesthesia therapy dose are few than that in epidural group.

Keywords: Epidural anaesthesia, Intubation, Intravenous anaesthesia, Laryngeal mask, Spinal epidural anaesthesia, Laparoscopic surgery.

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Introduction

In 1980s, the Laparoscopic surgery was begun with the advantage of fewer traumas, safety, less complications, shorter recovery period. It has been developed rapidly [1,2]. In order to meet the requirements of the operation and to eliminate the anxiety and fear, so that patients could stay in good condition, endotracheal intubation general anaesthesia were the traditional anaesthesia methods [3,4]. A safety, steady and rapid recovery was the key to the process of anaesthesia in operation. In our hospital, since the development of gynaecological laparoscopic surgery, 70 cases of such patients were treated with epidural block combined with tracheal intubation intravenous general anaesthesia and laryngeal mask combined with spinal epidural anaesthesia for laparoscopic surgery. In this research, the clinical efficacy and the complications of the two groups were compared in detail.

Patients and Methods

70 cases of patients undergoing the selective laparoscopic surgery were ASA I ~ II grade female patients, aged in 22 ~ 55, with a weight of 41 ~ 65 kg. Diseases include ovarian neoplasm, ectopic pregnancy, pelvic adhesion, uterine fibroid and infertility. 70 cases of patients were randomly divided into Group I (epidural block composite endotracheal intubation with intravenous general anaesthesia) and Group II (laryngeal mask airway (IMA) and combined spinal and epidural analgesia (CSEA)), each group had 35 cases.

Anaesthesia method [5-8]

Two groups of patients were intramuscular injected with 0.5 mg atropine and 0.1 g luminal at 30 min before the operation, the monitoring on HR, SpO_2, PET CO_2 and MAP began before the operation. (1) GroupI: T12 ~ L1 clearance puncture was

operated for all 35 cases, the trachea was placed to the head side, 3 ml 2% lidocaine was used for testing, the subarachnoid block was removed, added with 8 ~ 10 ml supernatant, and the level was controlled below T6. Before the skin incision on pneumoperitoneum, 2 ~ 4 μg/kg fentanyl and 0.05 ~ 0.1 mg/kg droperidol were intravenous dripped, 1 ~ 2 mg/kg propofol was intravenous injected, 2 ~ 4 mg/kgh^{-1} propofol was continuously intravenous injected during the operation using a micro-pump, the spontaneous breath was held, and the high-flow oxygen mask was used throughout the process. (2) Group II: L2-3 clearance CSEA was selected for all 35 cases, the level of anaesthesia was regulated at T6-8, fentanyl (2 ~ 4 μgkg^{-1}), propofol (2 ~ 2.5 μgkg^{-1}) were intravenous injected and LMA with the corresponding specification was inserted until the disappearance of eyelash reflex and jaw relaxation, then fixed when no leakage was confirmed and the double-lung breath was clearly heard, maintained using 5 ~ 10 $\mu gkg^{-1}h^{-1}$ remifentanil and 4 ~ 6 mg/kgh^{-1} propofol, but no muscle relaxant was used, and the spontaneous breath was held during the operation.

Observation index

The pneumoperitoneum pressure of two groups was kept at 12 mmHg during the operation, T0 (before pneumoperitoneum)T1 (5 min after pneumoperitoneum)T2 (20 min after pneumoperitoneum), T3 (45 min after pneumoperitoneum), T4 (5 min after deflation), mean arterial pressure (MAP), saturation of pulse oximetry (SpO_2), heart rate (HR) and partial pressure of carbon dioxide in endexpiratory gas (PET CO_2) were continuously monitored before, during and after the operation; and the awakening time and flatus recovery time after the operation were recorded. The difference of the effect of adverse reactions such as nausea, vomiting and muscular relaxation on surgical operation and other factors were compared before and after the anaesthesia and awakening.

Statistical method

SPSS was used, the measurement data was denoted by mean ± standard deviation (x ± s), t-test was used for significance analysis, $p<0.05$ was considered to be statistically significant.

Results and Conclusion

Results

The comparison of general data of these two groups, shown in Table 1.

Table 1. *The comparison of general data of these two groups.*

Group	n	Age	Weight (kg)	Pneumoperitoneum (Min)
I Group	35	45.7 ± 2.1	47.3 ± 3.6	41.5 ± 3.2
II Group	35	46.2 ± 6.8*	44.1 ± 3.3*	42.9 ± 9.4*
p		>0.1	>0.1	>0.1

*Indicated that the data of age, weight, pneumoperitoneum of group I compared with group II, presented no significant difference.

General data of these two groups was counted, such as age, body weight and degree of pneumoperitoneum, as given in Table 1. Results showed that there was a statistical difference when the HR was at T0, T1 and T2 when compared with that before the pneumoperitoneum. The statistically different was more obvious in Group I than Group II, if compared to that before the pneumoperitoneum. However, no significant difference of SpO_2 was examined before and after the pneumoperitoneum. PET CO_2 significantly changed after the pneumoperitoneum, but no difference was identified between these two anaesthesia methods, as shown in Table 2.

Table 2. *The difference of HR, SpO_2, $PETCO_2$, MAP before and after the pneumoperitoneum.*

Time	HR (n/Min)		SpO_2 (%)		$PETCO_2$ (mmHg)		MAP (kPa)	
	I	II	I	II	I	II	I	II
T0	76.5 ± 4.3	77.5 ± 5.8	92.5 ± 0.5	93.2 ± 0.4	34.6 ± 1.5	35.8 ± 2.1	10.1 ± 1.2	10.2 ± 1.0
T1	75.5 ± 4.8*	74.2 ± 5.1**	92.3 ± 0.6	95.3 ± 0.7	36.5 ± 1.2*	37.2 ± 2.5*	11.2 ± 1.1*	11.1 ± 1.1*
T2	73.1 ± 3.9**	76.9 ± 4.5	92.6 ± 0.4	95.1 ± 0.6	37.9 ± 1.8*	38.6 ± 2.9*	10.9 ± 1.3	10.5 ± 1.3
T3	78.5 ± 5.2**	76.7 ± 6.3*	93.4 ± 0.7	96.4 ± 0.8	38.4 ± 1.7**	39.5 ± 3.4**	11.2 ± 1.2**	11.3 ± 1.4
T4	75.6 ± 3.8	76.5 ± 7.9	93.5 ± 0.9	93.4 ± 0.3	41.2 ± 1.4**	43.7 ± 3.7**	10.3 ± 1.0	10.1 ± 1.1

Compared with the data before pneumoperitoneum. *: $p<0.05$, indicated that there was great statistical difference between the two groups. **: $p<0.1$, indicated that there was statistical difference between the two groups.

Comparison of awakening and flatus recovery time after operation between these two groups.

Awakening time after the operation of Group I was significantly longer than that of Group II, but no great difference of flatus recovery time was identified (Table 3).

Table 3. *Comparison of awakening and flatus recovery time after operation.*

Group	n	T_w (min)	T_p (h)
I	35	28.2 ± 4.7	14.5 ± 3.1
II	35	16.32 ± 7.2	13.1 ± 2.2

Comparison of the difference of complications resulting from two anaesthesia methods

Both anaesthesia methods mainly cause vomiting, poor muscle which may affect the surgical operation and dragging pain which may agitate the patient, thus impacting the surgical procedure. The occurrence of vomiting, poor muscle may affect the operation and the complication probability of dragging pain, and the overall complication probability in Group II was less than that in Group I, as shown in Table 4.

Table 4. Comparison of the complications.

Group	vomiting	poor muscle affected operation	dragging pain induced complication
I	12	5	10
II	8	2	5

Discussion

The combination of general anaesthesia and epidural block may easily adapt the patient to pathological, physiological changes. It could be explained by the epidural block during the operation obstructing the sensory nerve excitation function of cardiac sympathetic nerve and trachea at the related part, weakening the mechanical stimulation to tracheal mucosa in tracheal intubation, and significantly suppressing the rise of plasma β-endorphin levels, catecholamine and other stress hormones [9]. And the epidural block obstructs the efferent impulse of sympathetic-adrenal medulla and suppresses the noxious stimulation, resulting in the excitation of hypothalamic-pituitary-adrenal axis and the decrease of adrenaline, noradrenaline and cortisol secretion.

In the gynaecological laparoscopic surgery, as CO_2 pneumoperitoneum would affect the breathing and circulation, and the trendelenburg position exacerbates the effect of gas pressure on diaphragm, the majority of gynaecological laparoscopic surgeries use laparoscopic surgery general anaesthesia [10]. However, the cardiovascular response to tracheal intubation is relatively obvious, while the simple CSEA cannot completely eliminate the stretch reflex in surgery, making it difficult to assure the fluency of airway [11,12]. CSEA with LMA was used here to provide a good abdominal muscle relaxation and analgesic effect, reduce the dosage of analgesic drugs and muscle relaxants during the operation, effectively improve the awakening, mental stress and other adverse reactions during CSEA, and LMA general anaesthesia maintained the ventilation easily and conveniently operated. In LMA insertion, there was a slight hemodynamic change since IMA had no direct mechanical stimulation to the trachea and larynx, which has been confirmed by other reports. This thesis also proved that patient undergoing LMA with CSEA had smaller stress responses. For the applications of LMA intravenous anaesthesia with CSEA to gynaecological laparoscopic surgery, most removed the laryngeal mask within 10 ~ 15 min, with quick awakening, painlessness and safety, which is conductive to postoperative care and recovery of lung function. The insertion of LMA into gastric tube for the drainage of gastric contents, which can effectively reduce and prevent the aspiration, with anaesthesia success rate of 100%. But it is noted that indications of LMA should be strictly mastered in satiation, intestinal obstruction, surgery prone position and other cases [13]. LMA is a new anaesthesia apparatus with the advantages of facial mask and endotracheal tube that maintains the ventilation, with no mechanical stimulation to the larynx and trachea and a slight impact on hemodynamic. In maintaining the fluency of airway, LMA not only keeps the awakening and breathing but also enables the assisted respiration and controlled breathing. Another channel is connected with the oesophagus, which can be inserted into the gastric tube to reduce the probability of regurgitation and aspiration, so that safety can be assured [14].

This thesis mainly investigated the efficacy and safety of two anaesthesia methods in laparoscopic surgery, and it was known that LMA and epidural block composite endotracheal intubation with intravenous general anaesthesia can significantly reduce the stress response incurred by pneumoperitoneum, cause less complications of anaesthesia and stabilize the intraoperative blood flow; the application of LMA and CSEA to gynaecological laparoscopic surgery was also safe and operable, with less general anaesthesia dosage and quicker recovery after operation if compared to the endotracheal intubation. Thus, two anaesthesia methods have their own advantages, which should be scientifically and rationally chosen according to the specific pathogenic condition of patient undergoing laparoscopic surgery and his or her individual needs.

References

1. Linna Y, Lin X, Xiaotao J. Application and progress of laparoscopic surgery in gynecological diseases. J Lap Surg 2008; 1: 86-89.
2. Shunrong H, Sheng X. Research progress of laparoscopic appendectomy. J Lap Surg 2009; 11:875-878.
3. Peng S, Huiping S, Jiajia H. Nursing cooperation of patients undergoing general anaesthesia with endotracheal intubation.Today Nurs 2013; 6: 92-93.
4. Weilian L. Comparison of the effects of general anaesthesia and deep sedation in patients with cerebrovascular disease. Practical J Card Cer Pneu Vascu Dis 2014; 12: 103-104.
5. Dadong Q, Yuan Y, Miao G. Application of epidural anaesthesia combined with general anaesthesia in laparoscopic hysterectomy. J Mod Medi Heal 2016; 7: 1054-1055.
6. Ying W. Analysis of the effect of epidural block combined with general anaesthesia on stress response in patients undergoing laparoscopic hysterectomy. China Pract Medi 2016; 4: 171-172.

7. Zhenping Z, Wanbai Y, Yunfeng H. Application of laryngeal mask assisted combined spinal epidural anaesthesia in gynecologic laparoscopic surgery. Pract Clin Med 2012; 12: 70-72.
8. Xueyong J, Dongmei S, Yan Q. Laryngeal mask airway anaesthesia combined with spinal epidural anaesthesia for laparoscopic hysterectomy. Nat Med Frontier China 2009; 4: 72-73.
9. Shuxia T, Jianxin L, Jinhai C. Effect of epidural block on coagulation function in patients with gynecologic laparoscopic surgery. Guangzhou Med J 2013; 4: 25-27.
10. Feng D, Naxuan Q, Yayun X. Choice of anaesthesia methods and the use of single pole electric coagulation device in gynecologic laparoscopic surgery. Fujian Med J 2001; 3: 25-26.
11. Shujuan M. Comparison of combined spinal epidural anaesthesia combined with combined spinal epidural anaesthesia in laparoscopic hysterectomy. Chinese F Med Res 2016; 1: 34-35.
12. Yi S. Combined spinal epidural anaesthesia combined with intravenous anaesthesia for laparoscopic surgery in the lower abdomen. China Med 2011; 11: 52-53.
13. Jiehua F, Chaoyang L, Chao C. Proseal, Supreme and I-gel three kinds of ProSeal laryngeal mask airway for airway management of gynecological laparoscopic anaesthesia. Chinese J Mod Oper Surg 2015; 4: 315-318.
14. Yan Z. Comparative study of the clinical application of blind insertion laryngeal mask airway and endotracheal intubation in first aid. China Med 2015; 9: 178-179.

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