Research protocols and record sheets

Research Title: Comparison of emergence and recovery with desflurane and propofol anesthesia in lung resection

Subject: 80 patients with ASA physical status I or II aged 20-75 years, who were scheduled for lung cancer surgery less extensive than pneumonectomy in the study.

Patient exclusion criteria: Exclude patients with one of the following:
①Heart disease above NYHAII degrees
②Respiratory dysfunction with VC or FEV_1 less than 50%
③Pulmonary hypertension with average pulmonary arterial pressure of 30 mmHg or more
④Coagulation dysfunction (PT-INR>1.2) or thrombocytopenia (platelet count 100,000 /μl)
⑤an infectious disease with active inflammation
⑥If the scheduled surgery is a total lung operation
⑦When epidural anesthesia is contraindicated
⑧Patients with severe cognitive impairment
⑨Patients with interstitial pneumonia

Research design: Envelope method randomly assigns participants to two groups: **desflurane (D) and propofol (P)**. Since the method of administering anesthetics is completely different between groups, blindness is not possible, so the research design is a random non-blind trial. If a clear significant difference is observed during the research, it will be terminated early.

Anesthesia method: Performed with epidural combined general anesthesia.
After electrocardiogram, non-invasive arterial pressure, and SpO2 are installed and measured, the thoracic epidural catheter is placed in the same position as the surgical position. Wear a Bispectral index (BIS) EEG monitor as a supine position.
In group D, general anesthesia is introduced with fentanyl remifentanil propofol, and anesthesia is maintained by general anesthesia with desflurane remifentanil and thoracic

epidural anesthesia.
In group P, general anesthesia is introduced with fentanyl remifentanil propofol, and anesthesia is maintained by general anesthesia with propofol remifentanil and thoracic epidural anesthesia.

Dosage of remifentanil in the anesthetic maintenance period (0.05μ μg/kg/time in the range of 0.1 to 0.3 g/kg/ hour depending on blood pressure and heart rate)

Dose of drugs for thoracic epidural anesthesia (Th6-7, 7-8): levobupibacaine4mL+ fentanyl 50μg+ morphine 1 to 2 mg of boras at the beginning of the surgery.

A disposable infusion pump (Baxter In-fusor® BB30-LV4, Baxter Healthcare, Deerfield, IL, USA) was filled with 0.25% levobupivacaine (144 mL) and morphine (3-6 mg). Continuous epidural infusion for intra- and post-operative analgesia was started at a rate of 3 mL/h during surgery, following epidural injection of 0.25% levobupivacaine (4ml).

Dose of desflurane in groupD and propofol in group P is an indicator of sleep levels, **:** BIS Strictly adjusted to be kept in a narrow range of 40-60

Remifentanil is discontinued at the end of surgery,
Desflurane and propofol are discontinued at the timing of the lateral to supine position.

Artificial ventilation during surgery:
Artificial respiration conditions during bilateral ventilation should be 60%in inhalation oxygen concentration. Control ventilation during OLV was achieved with pressure-controlled ventilation employing a peak pressure, 15-20 cmH2O; positive end-expiratory pressure, 4-6 cmH2O; and respiratory rate, 10-14/min; to maintain ETCO2 between 35 and 40 mmHg.
OLV is achieved with a Double-lumen tube. Artificial ventilation during OLV should be 100%inhaled oxygen concentration, Control ventilation during OLV was achieved with pressure-controlled ventilation employing a peak pressure, 15-20 cmH2O; positive end-expiratory pressure, 4-6 cmH2O; and respiratory rate, 10-14/min; to maintain ETCO2 between 35 and 40 mmHg

Monitoring: Normal monitoring of non-invasive blood pressure, and hemostatic arterial pressure (flow trac), electrocardiograph, thermometer, pulse oximeter, capnography, BIS.

Emergence from anesthesia

Remifentanil infusion was discontinued at the end of surgery.

In both groups, 60 of BIS levels is kept until discontinue of desflurane or propofol immediately before repositioning supine position. Sugammadex was administered with 2-4mg/kg, immediately after supine position.

When to observe: Until the Aldrete score is **at least 8** points.

How to observe:

①Awaking time

After the anesthetic discontinuing, investigator will call the patient's name at least every minute. Record the "eye- opening time"

: Called every minute after the end of anesthetic **administration.**

End time of anesthetic administration		**Awaking time**	**:**

②Extubation time

After confirming the emergence and eye-opening, the investigator shall appropriately extubate the patients in the following extubation criteria.

:Extubation criteria

(1) Be clear about consciousness

(2) Recovery of minute ventilation volume; more than 8 mL/kg/ minutes

(3) Stable circulatory dynamics; more than 100 mmHg of systolic blood pressure

Extubation time	**:**

③ Time to orientation; when they can say their name and birthday

After the extubation, the investigator calls the patient continuously. Record the time when the patients can say their name and birthday.

Time to clear consciousness	**:**

④Record the presence /absence and duration of Aggregation

: Defined RASS > +1

Agitation (+ / −)	**: ~ :**	**Duration minutes seconds**

⑤Aldrete Score

After the extubation, the investigator observes the patient's condition every 5 minutes for the following items (observe the patient's condition until Aldrite score is **8** points or more).

			After 5 minutes	**After 10 minutes**	**After 15 minutes**	**After 20 minutes**	**After 25 minutes**
Drain time	**:**	**point**	**:**	**:**	**:**	**:**	**:**
Active (Activity).	Four limbs moved on request or voluntarily	2					
	Two limbs moved on request or voluntarily	1					
	Four limbs not moving on request or voluntarily	0					
Breathing (Respiration)	Can take deep breaths and cough freely	2					
	Difficulty breathing or limited breathing	1					
	Apnea	0					
Circulation	Blood pressure (systolic±20%(vs. before anesthesia)	2					
	Blood pressure (systolic±21-49%(vs. pre-anesthesia)	1					
	Blood pressure (systolic±50%(vs. before anesthesia)	0					
Consciousness	Fully	2					
	Awakening to the Call	1					
	Unresponsive	0					
Oxygen Saturation (SpO_2)	SpO_2>92%(under indoor air)	2					
	SpO_2≧oxygen to maintain90%of the total	1					
	under the supply of oxygenSpO_2 < 90%	0					
	Observation end time		:				

⑥Nausea and vomiting

Nausea and vomiting **(+ / −)**	**:**	

⑦**Requirement an antiemetic metoclopramide during 24 postoperative hours**.

Requirement an antiemetic **(** + / − **)**		

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