

**Additional file 2: case report forms (CRF)**

Effects of intraoperative Low-PEEP on postoperative pulmonary complications in high-risk patients undergoing laparoscopic surgery: study protocol for a randomized controlled trial

## Case report form

### Checklist

Please check the checklist carefully when completed the questionnaire.

- Perioperative assessment: Informed patient details of the study and obtained informed consent from the patient.

Date of signing informed consent: \_\_\_\_\_

Admission date: \_\_\_\_\_

- Perioperative data      Surgery date: \_\_\_\_\_

- Completed the above registrations

Completed date: \_\_\_\_\_

Quality control personnel: \_\_\_\_\_

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## Case registration form

### Basic information

Case number:

Patient case number:

Random number:

Randomized group:  Low-PEEP group (Study Group)  
 Standard PEEP group (Control Group)

Gender      male/female

Height      \_\_\_\_\_ cm

Ideal weight \_\_\_\_\_ kg

Actual weight \_\_\_\_\_ kg

Calculation formula of ideal weight:

male=  $50 + 0.91 \times (\text{Height} - 152.4)$ ;

female=  $45.5 \pm 0.91 \times (\text{Height} - 152.4)$

Age (years) \_\_\_\_\_

Contact staff \_\_\_\_\_

Phone number \_\_\_\_\_

Address \_\_\_\_\_

Chief surgeon \_\_\_\_\_

## Baseline Characteristics of the Patients

### 1. Inclusion and exclusion criteria (Please ✓ if there is any situation as listed below)

Item	Inclusion criteria	
	yes	no
Age: ≥ 18 year		
Scheduled for elective laparoscopic abdominal surgery		
ASA physical status I-III		
BMI: 18-35 kg/m <sup>2</sup>		
General anesthesia expected to last more than 3 h		
Had a intermediate or high preoperative index for PPCs risk (ARISCAT score ≥ 26, Supplementary Appendix Table 1)		
	Exclusion criteria	
Emergency surgery		
Mechanical ventilation of > 1 hour within the last 2 weeks before surgery		
History of previous severe (COPD)		
Acute respiratory failure (pneumonia, acute lung injury or acute respiratory distress syndrome)		
Previous lung surgery		
Persistent hemodynamic instability or Severe cardiac disease		
Sepsis or septic shock		
Need renal replacement therapy		
Progressive neuromuscular illness		
Pregnancy		
Consented for another interventional study or refusal to participate		
Have a stake in the researcher		
Researchers consider that they are not suitable for clinical trials		

### 2. Perioperative data (Please ✓ or Write down specific situation or if there is any situation as listed below and

please / If there is no corresponding situation)

Preoperative		One hour after pneumothorax establishment		at the end of pneumothorax	
Temperature		arterial blood gas analysis			
ASA status		FiO <sub>2</sub>			
ARISCAT score		Pneumoperal pressure			
NYHA III-IV		Tidal volume			
History of smoking		Respiratory rate			
Drinking		PT-CO <sub>2</sub>			
Combined diseases		PEEP			
History of Medication		Platform / peak pressure			
Respiratory infection within one month		Blood pressure			
Weight change in the past one month		Heart rate			
Blood routine examination		Temperature			
Coagulation spectrum					
Biochemical tests		Intra-operative			
Chest X-ray or CT		Times of RM			
Pulmonary function test		Adverse events during RM			
mCPIS score		Antibiotic			
		Infusion volume			
		Blood transfusion			
Before anesthesia		Amount of bleeding			
SpO <sub>2</sub> without inhaling oxygen		Urine volume			
Arterial blood gas analysis		Vasoactive drug use			
		Operation time			
		Mechanical ventilation time			
		Other complications			

The amount of each day and duration for smoking and drinking; describe the specific disease and current medication and doses for columns of combined disease and medication history; only check if there is laboratory test or chest X-ray. etal; arterial blood gas analysis should performed after 10 min of air adaptation before anesthesia;

Intraoperative complications were recorded and defined as follows: 1. peripheral oxygen saturation less than 90% and/or end-tidal fractions of carbon dioxide more than 45 mmHg for more than 1 min, 2. need to change the ventilation setting (tidal volume and/or respiratory rate), 3. heart rate more than 100 beats/min or less than 60 beats/min, 4. systolic arterial pressure more than 150 mmHg or less than 90 mmHg.

Blood gas analysis during postoperative recovery room should done meet the following 2 points at the same time: 1. 30 minutes after the tracheal tube is removed; 2. after 10 min of air adaptation. If peripheral oxygen saturation dropped below 88% during the 10 min of adaptation, the maneuver was stopped and arterial blood gas analysis immediately obtained.

3. Postoperative pulmonary complications within 30 days after surgery (Please √ or Write down specific situation or if there is any situation as listed below and please / If there is no corresponding situation)

Items/times	POD 1	POD 3	POD 5	POD 7	POD 8-30
SpO <sub>2</sub> after 10 min of air adaptation					/
FiO <sub>2</sub> after 10 min of air adaptation					/
Arterial blood gas analysis			/	/	/
Heart rate					
Respiratory rate					
Chest X-ray	/	/		/	
Blood routine test					
CRP					
Biochemical tests					
Microbiology test					
Mechanical Ventilation					
Whether tracheal secretions was increased; the nature and quantity of secretions					
Cough					
Difficulty breathing					
Chest pain					
Postoperative hypoxemia					
Postoperative severe hypoxemia					
Suspected lung infection					
Pneumonia					
Exudation of the lungs					
Aspiration pneumonia					
Pulmonary embolism					
Atelectasis					
ARDS					
Pneumothorax					
Pleural effusion					

ARDS: acute respiratory distress syndrome.

3. Postoperative extra-pulmonary complications within 30 days after surgery (Please ✓ or Write down specific situation or if there is any situation as listed below and please / If there is no corresponding situation)

Items/times	POD 1	POD 3	POD 5	POD 7	POD 8-30
SIRS					
Sepsis					
Severe sepsis					
Sepsis shock					
Extrapulmonary infection					
Pulmonary edema caused by heart failure					
Blood transfusion					
Anastomotic leak					
Secondary surgery rate					

SIRS: Systemic inflammatory response syndrome; AKI: acute kidney injury; DIC: disseminated intravascular coagulation.