# Clinical Trial Protocol
# Iranian Registry of Clinical Trials

09 Jun 2026

## Comparison the effect of applying “expiratory rib cage compression” and “manual percussion” before suction on respiratory parameters in patients under mechanical ventilation

## Protocol summary

**Study aim**

Comparison the effect of applying “expiratory rib cage compression” and “manual percussion” before suction on respiratory parameters in patients under mechanical ventilation

**Design**

Randomized cross-over Clinical Trials, with A and B intervention groups will be performed on 46 patients.The letter A is written on 23 cards and the letter B on the other 23 cards. One of these two cards is randomly selected for each patient. Patients with card A enter Group A and patients with card B enter Group B.

**Settings and conduct**

The intensive care units of Kowsar Hospital will be used as a research environment. Both interventions will be performed by the researcher on the same day with an interval of 3 hours (to neutralize the previous intervention) and changes in study variables will be evaluated and recorded in the 4 interval before, 1,5, 25 minutes after endotracheal suctioning.

**Participants/Inclusion and exclusion criteria**

Inclusion criteria: intubated patients under mechanical ventilation for at least 48 h, not needing more than 2 times suction per shift, patients with stable hemodynamic parameters, reversible gastric secretion less than 100 ml before Intervention, aged 18 to 65 years Exclusion criteria: Respiratory distress, pneumothorax and Fractures of ribs, sternum and chest, chest burns and surgery, dysrhytmia and heart disease, Abscess and lung cyst.

**Intervention groups**

Intervention Group A: First, the Manual percussion and then the expiratory rib cage compression will be performed. Intervention Group B: First, the expiratory rib cage compression and then Manual percussion will be performed. Both interventions will be performed by the researcher in one day, observing a time interval of 3 hours (to neutralize the previous intervention).

**Main outcome variables**

End tidal CO2 (ET-CO2), arterial oxygen saturation, respiratory rate, pulmonary Compliance and airway resistance

## General information

**Reason for update**

**Acronym**

**IRCT registration information**

IRCT registration number: **IRCT20191030045281N1**
Registration date: **2020-06-25, 1399/04/05**
Registration timing: **registered_while_recruiting**

Last update: **2020-06-25, 1399/04/05**
Update count: **0**

**Registration date**

2020-06-25, 1399/04/05

**Registrant information**

**Name**

Maryam Rasuli

**Name of organization / entity**

**Country**

Iran (Islamic Republic of)

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**Recruitment status**

**Recruitment complete**

**Funding source**

**Expected recruitment start date**

2020-05-21, 1399/03/01

**Expected recruitment end date**

2020-09-22, 1399/07/01

**Actual recruitment start date**
empty
**Actual recruitment end date**
empty
**Trial completion date**
empty

**Scientific title**
Comparison the effect of applying “expiratory rib cage compression” and “manual percussion” before suction on respiratory parameters in patients under mechanical ventilation

**Public title**
Comparison the effect of applying “expiratory rib cage compression” and “manual percussion” before suction on respiratory parameters
**Purpose**
Prevention
**Inclusion/Exclusion criteria**
**Inclusion criteria:**
intubated patients Patients under mechanical ventilation with volumetric mode For at least 48 hours under mechanical ventilation not needing more than 2 times suction per shift patients with stable hemodynamic parameters reversible gastric secretion less than 100 ml before Intervention Age between 18 and 65 years
**Exclusion criteria:**
Respiratory distress pneumothorax and Fractures of the ribs, sternum and chest chest burns and surgery dysrhythmia and heart disease Abscess and lung cyst
**Age**
From **18 years** old to **65 years** old
**Gender**
Both

**Phase**
N/A
**Groups that have been masked**
*No information*
**Sample size**
Target sample size: **46**
**Randomization (investigator's opinion)**
Randomized
**Randomization description**
Group A is a group that will be carried out first by manual percussion and then expiratory rib cage compression. Group B group that will be performed first by expiratory rib cage compression and then manual percussion . The letter A is written on 23 cards and the letter B on the other 23 cards. One of these two cards is randomly selected for each patient. Patients with card A enter Group A and patients with card B enter Group B.
**Blinding (investigator's opinion)**
Not blinded
**Blinding description**
**Placebo**
Not used
**Assignment**
Crossover
**Other design features**

## Secondary Ids

empty

## Ethics committees

### 1

**Ethics committee**
**Name of ethics committee**
Ethics committee of Kurdistan University of Medical Sciences
**Street address**
Kurdistan University of Medical Sciences Campus, Pasdaran Ave, Sanandaj
**City**
Sanandaj
**Province**
Kurdistan
**Postal code**
13446-66177
**Approval date**
2020-03-14, 1398/12/24
**Ethics committee reference number**
IR.MUK.REC.1398.293

## Health conditions studied

### 1

**Description of health condition studied**
Patients under mechanical ventilation
**ICD-10 code**
**ICD-10 code description**

## Primary outcomes

### 1

**Description**
end Tidal CO2
**Timepoint**
Exhaled CO2 is measured 4 times: before and minutes 1, 5 and 25 minutes after endotracheal suctioning.
**Method of measurement**
Using Capnography Probe

### 2

**Description**
Oxygen saturation (SPO2)
**Timepoint**
Oxygen saturation (SPO2) is measured 4 times: before and minutes 1, 5 and 25 minutes after endotracheal suction
**Method of measurement**
Using a pulse oximeter device (via monitor view)

### 3

**Description**
Pulmonary compliance

**Timepoint**
Pulmonary compliance is measured 4 times: before and minutes 1, 5 and 25 minutes after endotracheal suction
**Method of measurement**
Through viewing the ventilator screen

**4**

**Description**
Airway resistance
**Timepoint**
Airway resistance measured 4 times: before and minutes 1, 5 and 25 minutes after endotracheal suction
**Method of measurement**
Through viewing the ventilator screen

**5**

**Description**
Respiratory rate
**Timepoint**
Respiratory rate is measured 4 times: before and minutes 1, 5 and 25 minutes after endotracheal suction
**Method of measurement**
Total spontaneous breathing and ventilator-provided breathing per minute by viewing the ventilator screen

## Secondary outcomes

empty

## Intervention groups

**1**

**Description**
Group A is the group that will do the manual percussion first and then expiratory rib cage compression. In the manual percussion procedure, the hands are cupped and all fingers are folded and the wrist joint is opened and performed at speeds of 100 to 120 times per minute. In the expiratory rib cage compression,gradually compressed the end and lateral parts of patients' rib cage during expiration by his hands. This technique was bilaterally performed, and in the end of expiration, the compression was released from the patients' rib cage to let them have a free inspiration. Both interventions will be performed by the researcher in one day with a 3-hour interval (to neutralize the previous intervention), respectively. Respiratory parameters: increased end-expiratory CO2, pulmonary compliance and hemoglobin saturation, and respiratory rate and airway resistance in patients undergoing mechanical ventilation in the ICU will be assessed before and 1, 5 and 25 minutes after endotracheal suctioning.
**Category**
Prevention

**2**

**Description**
Group B is the group that first will do the expiratory rib cage compression and then manual percussion before the suction. In the manual percussion procedure, the hands are cupped and all fingers are folded and the wrist joint is opened and performed at speeds of 100 to 120 times per minute. In the expiratory rib cage compression,gradually compressed the end and lateral parts of patients' rib cage during expiration by his hands. This technique was bilaterally performed, and in the end of expiration, the compression was released from the patients' rib cage to let them have a free inspiration. Both interventions will be performed by the researcher in one day with a 3-hour interval (to neutralize the previous intervention), respectively. Respiratory parameters: increased end-expiratory CO2, pulmonary compliance and hemoglobin saturation, and respiratory rate and airway resistance in patients undergoing mechanical ventilation in the ICU will be assessed before and 1, 5 and 25 minutes after endotracheal suctioning.
**Category**
Prevention

## Recruitment centers

**1**

**Recruitment center**
**Name of recruitment center**
Kosar Medical Center of Sanandaj
**Full name of responsible person**
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## Sponsors / Funding sources

**1**

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**Grant name**
**Grant code / Reference number**
**Is the source of funding the same sponsor organization/entity?**
Yes
**Title of funding source**
Sanandaj University of Medical Sciences
**Proportion provided by this source**
100
**Public or private sector**
Public
**Domestic or foreign origin**
Domestic
**Category of foreign source of funding**
*empty*
**Country of origin**
**Type of organization providing the funding**
Academic

## Person responsible for general inquiries

**Contact**
**Name of organization / entity**
Sanandaj University of Medical Sciences
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**Position**
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## Person responsible for scientific inquiries

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## Person responsible for updating data

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## Sharing plan

**Deidentified Individual Participant Data Set (IPD)**
Undecided - It is not yet known if there will be a plan to make this available
**Study Protocol**
Undecided - It is not yet known if there will be a plan to make this available
**Statistical Analysis Plan**
Undecided - It is not yet known if there will be a plan to make this available
**Informed Consent Form**
Undecided - It is not yet known if there will be a plan to make this available
**Clinical Study Report**
Undecided - It is not yet known if there will be a plan to make this available
**Analytic Code**
Undecided - It is not yet known if there will be a plan to

| | |
|---|---|
| make this available | |
| **Data Dictionary** | Undecided - It is not yet known if there will be a plan to make this available |