

# Diaphragm ultrasound and trends in electrolyte disorders and transthyretin level as a method to predict ventilation outcome in children: the prospective observational cohort study

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<b>Registration date</b> 12/07/2018	<b>Overall study status</b> Completed	<input type="checkbox"/> Statistical analysis plan <input type="checkbox"/> Results
<b>Last Edited</b> 12/03/2019	<b>Condition category</b> Respiratory	<input type="checkbox"/> Individual participant data <input type="checkbox"/> Record updated in last year

## Plain English summary of protocol

### Background and study aims

The diaphragm is a dome-shaped sheet of muscle that plays a vital role in breathing. Diaphragm dysfunction worsens outcomes in mechanically ventilated patients (breathing supported using a machine). However, the clinical impact of changes in diaphragm structure and function due to mechanical ventilation is unknown. In addition sick children who are provided with mechanical ventilation often have moderate or severe malnutrition together with deterioration of electrolyte levels and are at risk of refeeding syndrome (metabolic disturbances) and severe hypophosphatemia (low phosphate levels in the blood). The aim of this study is to find out whether diaphragm atrophy developing during mechanical ventilation leads to prolonged ventilation.

### Who can participate?

Patients aged 1 month - 6 years who are mechanically ventilated

### What does the study involve?

All participants receive the same treatment of underlying disease. Diaphragm thickness at the end of inspiration (breathing in) and diaphragmatic excursion (movement of the diaphragm during breathing) are measured on the 1st, 3rd, 5th and then every five days during mechanical ventilation by ultrasound. At the same time the levels of phosphorus, magnesium, calcium, potassium and sodium in the blood are measured.

### What are the possible benefits and risks of participating?

The results of this study may improve the understanding of the role of diaphragm dysfunction during mechanical ventilation and its impact on malnutrition and electrolyte levels. There are no risks expected.

### Where is the study run from?

Lviv Regional Clinical Children Hospital "OCHMATDYT" (Ukraine)

When is the study starting and how long is it expected to run for?  
July 2018 to July 2019

Who is funding the study?  
Danylo Halytsky Lviv National Medical University (Ukraine)

Who is the main contact?  
Dr Olha Filyk  
doctor\_555@ukr.net

## Contact information

### Type(s)

Public

### Contact name

Dr Olha Filyk

### ORCID ID

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### Contact details

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## Additional identifiers

### Protocol serial number

1-2018

## Study information

### Scientific Title

Diaphragm ultrasound and trends In electrolyte disorders and transthyretin level as a method to predict ventilation outcome in children: the prospective observational cohort study

### Study objectives

The duration of mechanical ventilation stay in the intensive care unit, and the frequency of complications in children depend on the degree of diaphragm atrophy.

### Ethics approval required

Old ethics approval format

### Ethics approval(s)

## **Study design**

Prospective observational cohort study

## **Primary study design**

Observational

## **Study type(s)**

Diagnostic

## **Health condition(s) or problem(s) studied**

Acute respiratory failure

## **Interventions**

Diaphragm thickness (Tdi) at end of inspiration and diaphragmatic excursion will be measured on 1st, 3rd, 5th and then every five days during mechanical ventilation by ultrasound in children requiring invasive mechanical ventilation, and inspiratory effort will be assessed by thickening fraction. At the same time levels of phosphorus, magnesium, calcium, potassium and sodium in the patient's plasma will be evaluated.

## **Intervention Type**

Other

## **Primary outcome(s)**

The time to liberation from ventilation; every day from baseline the trialists will check the possibility of weaning patients from mechanical ventilation (its mean decreasing of parameters during mechanical ventilation and extubation - both together) and then take into account duration of mechanical ventilation

## **Key secondary outcome(s)**

1. Complications (reintubation, tracheostomy, prolonged ventilation, or death); the trialists will check for the presence of these adverse events every day from baseline, then on day 28 of hospitalisation and until patient is discharged from the hospital
2. Electrolyte levels (calcium, potassium, sodium measured using mixed venous blood test on acid-base balance; phosphorus and magnesium measured using biochemical venous blood test) and transthyretin level (blood samples analysed by ELISA); checked on 1st, 3rd, 5th, 7th, 9th and then every five days of mechanical ventilation until patient is weaned from mechanical ventilation and on 3rd and 5th days after weaning

## **Completion date**

01/07/2019

## **Eligibility**

### **Key inclusion criteria**

1. Presence of informed consent from legal representatives of the child to take part in trial
2. Children aged 1 month - 6 years old

3. Acute respiratory failure with clinical data of excessive work of breathing, laboratory data of hypoxemia, hypercapnia or both, acidosis which leads to need to provide invasive mechanical ventilation

**Participant type(s)**

Patient

**Healthy volunteers allowed**

No

**Age group**

Child

**Lower age limit**

1 months

**Upper age limit**

6 years

**Sex**

All

**Key exclusion criteria**

1. Absence of informed consent from legal representatives of the child to take part in trial at any stage of this trial
2. Acute or chronic respiratory failure without need to provide invasive mechanical ventilation
3. Congenital heart diseases
4. Neuromyotonia according to results of electromyography

**Date of first enrolment**

15/07/2018

**Date of final enrolment**

01/06/2019

**Locations**

**Countries of recruitment**

Ukraine

**Study participating centre**

Lviv Children Clinical Hospital "OCHMATDYT"

Lysenka str., 31

Lviv

Ukraine

79010

# Sponsor information

## Organisation

Danylo Halytsky Lviv National Medical University

## ROR

<https://ror.org/0027cag10>

# Funder(s)

## Funder type

University/education

## Funder Name

Danylo Halytsky Lviv National Medical University

# Results and Publications

## Individual participant data (IPD) sharing plan

The datasets generated during and/or analysed during the current study are/will be available upon request from Olha Filyk (doctor\_555@ukr.net). Type of data will be patient cards and researcher tables which will be available on request 20 years after the research ends, the data will become available after end of the research. The consent from participants (their parents or legal representative of the patient) will be obtained before their enrolling into trial. Data will be anonymised in any published results of this investigation. This study has no ethical or legal restrictions.

## IPD sharing plan summary

Available on request