PERISCOPE study

Prospective Evaluation of a Risk Score for postoperative pulmonary Complications in Europe

Predicting Postoperative Pulmonary Complications in Europe:
a 7-day data collection, prospective, observational study

Research protocol Version 1.2
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Signature

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**Introduction**

Postoperative pulmonary complications (PPCs) account for a substantial proportion of risk related to surgery and anaesthesia and are a major cause of postoperative morbidity and mortality and longer hospital stays [1,2]. The incidence rates ranges between 2% and 40%, depending on the type of patients and surgery [3].

The American College of Physicians issued guidelines for reducing PPCs in patients undergoing non-cardiac surgery and identified risk factors according to the level of evidence. However, the systematic review on which the guidelines are based detected many studies with such bias-introducing limitations as small sample size, narrow selection of patients and operations, retrospective or un-blinded outcome assessment and inconsistencies in PPC definition. Two studies of risk analyzed data from the National Veterans Affairs Quality Improvement Program in order to derive indices for predicting risk of pneumonia [4] and respiratory failure [5] after non-cardiac surgery. However, although these studies included the largest samples in the literature on PPC, the patients were mostly male veterans who were far from representative of a European general surgical population.

In 2006, in Catalonia (Spain), a prospective study on postoperative outcome in a representative general surgical population (ARISCAT study) found a 5% incidence of PPC. The 30-day mortality of patients with PPC was 20%. The ARISCAT also identified 7 independent risk factors for PPC (age, low preoperative SpO\textsubscript{2}, acute respiratory infection during the previous month, preoperative anaemia, upper abdominal or intrathoracic surgery, surgical duration ≥2 hours and emergency surgery). The C-statistics was 0.91. A simplified risk score was derived from the β coefficient for each variable [6].

Until now, there exists no definitive study providing a simple score for predicting PPC useful in any clinical setting. The hypothesis is that it is possible to generalize the preoperative use of a simple score, built up from a clinical set of variables, to predict PPC. The incidence of PPC can vary depending on factors related to geographic, economical status or clinical practices across Europe.
**Objectives**

1. To validate the ARISCAT score for predicting PPC (see appendix 1) in a multinational sample of patients across Europe.
2. To know the incidence of PPC in a general surgical population in Europe.

**Hypothesis**

It is possible to generalize the preoperative use of a simple score, built up from a clinical set of variables, to predict PPC.
Study design

International multicentre observational study of a random-sample cohort of patients undergoing a nonobstetric in-hospital surgical procedure under general or regional anaesthesia during a continued 7-day period of recruitment.
**Inclusion and exclusion criteria**

**Inclusion criteria**
Patients undergoing a non-obstetric in-hospital surgical procedure, elective or emergent, under general anaesthesia (alone or in combination with regional/neuraxial anaesthesia), neuraxial anaesthesia or plexus block (with and without sedation).

**Exclusion criteria** are:

a) age <18 years
b) obstetric procedures or any procedure during pregnancy
c) regional anaesthesia alone, except to neuroaxial and plexus anaesthesia
d) procedures outside the operating room
e) procedures related to a previous postoperative complication
f) transplantation
g) patients with preoperatively intubated trachea
h) outpatient procedures, defined as those requiring less than one day’s stay for a patient alive at discharge.
Data collection and data set
Each participating centre will be invited to recruit all patients undergoing a surgical procedure during a continued period of 7-days.

Each local research team will fill in a questionnaire (see appendix 2) and identify the PPC outcomes recorded in the charts of all eligible patients. An Internet based electronic CRF will be used. The patients will be followed up until hospital discharge. The following information will be collected for each patient necessary to calculate the score: Administrative (date of surgery and date and status - alive or dead- at hospital discharge), demographic (gender, birth date, height and weight), preoperative (preoperative SpO₂ breathing air in supine position, respiratory infection in the last month, preoperative haemoglobin, cough test, chronic pulmonary disease, smoking status and ASA class), intraoperative (surgical incision, surgical duration in hours, type of surgery - scheduled or emergency-, description of the surgical procedure, surgical specialty and anaesthetic technique), postoperative outcome (postoperative pulmonary complications, according to the definitions previously stated to avoid variations.

Outcome Measures
The main outcome, defined as a PPC, will be a composite of the in-hospital fatal or non-fatal postoperative events.

This composite will include (see appendix 3)

- Mild respiratory failure
- Severe respiratory failure
- ALI/ARDS
- Suspected pulmonary infection
- Pulmonary infiltrate
- Pleural effusion
- Atelectasis
- Pneumothorax
The investigators will not modify a centre’s customary management of patients. Patients with PPCs will identify by consulting medical records and looking for events that fulfilled any PPC definition. Diagnosis date for every complication will be recorded.

The secondary outcomes will be:

a) Postoperative length of stay

b) In-hospital mortality.
Ethical Considerations

All patients will receive routine care; no research-related intervention will be introduced.

Institutional approval will be mandatorily required to each participating centre in order to get permission for collecting observational clinical information. Additionally, an individual consent will be required (see appendix 4B). In the case of a patient were unable to give permission, this can be obtained from relatives or legal representative (see appendix 4C)
**Sample Size Calculation**

According to the ARISCAT study, the PPC incidence was 5%. We need at least 100 PPC for a decrease in c-statistics of 0.1. Then, the minimum sample size required will be around 2000 individuals. These figures have an 80% power to detect substantial differences in model performance. To find differences among countries or geographical areas we need 2000 individuals for each one.

**Statistics**

The PPC and mortality incidence and their 95% confidence intervals will be calculated. Individual risk score will be calculated for each patient. Risk factors will be evaluated for their bivariable association with the PPC based on t-test (continuous variables) and Fisher exact test or the chi-square test (categorical variables). Bivariable odds ratios (OR) for PPC and 95% confidence intervals (CI) will be also estimated.

The discriminative power of the risk score will be assessed by the mean of the area under the receiver operating characteristic (ROC) curve (C-statistics). The curve is a measure of the discriminating ability of the risk model and is a plot of sensitivity versus 1 − specificity. Accuracy of calibration will be evaluated by plotting the predicted versus the observed PPC according to population tenths of predicted risk and the goodness of fit Hosmer Lemeshow test. We will compare ROC curves among countries or geographical areas using the method of Delong et al implemented in Medcalc® software (version 11.1.0.0; Medcalc Software bvba, Belgium). Statistical analysis will be performed using the computer software SPSS (version 18.0; SPSS Inc. Chicago, IL).
**Organisation**

The research team will comprise: a steering Committee, national and local responsible investigators on behalf of the European Society of Anaesthesiology.

General and local training sessions will be held to instruct the investigators on how to fill in the structured questionnaire and how to identify the PPC outcomes recorded in the charts. They will supervise data collection and ensure all local regulatory approvals.
Funding

The Periscope study is funded and supported by the European Society of Anaesthesiology through the ESA Clinical Research Network.
References:


PERISCOPE Study Protocol Change History

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<thead>
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<th>Version Number</th>
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<td>NA</td>
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<td>02 May 2011</td>
<td>Protocol final , v 1.1</td>
<td>1) mistake in filiation of one steering committee member. Removed sentence &quot;professor in Anaesthesiology&quot; from Sergi Sabaté filiation minor change on page 2/15 2) addition of the ClinicalTrials.gov Identifier on the cover page NCT01346709 minor change on page 1/15</td>
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<td>20 February 2012</td>
<td>Protocol final , v 1.2</td>
<td>1) Deletion of 3 steering committee members (Klaus Markstaller, Jonathan Hardman, Valentin Mazo) as their inability to devote time to the project did not qualify for being part of the Steering Committee (page 2-3 -4/15) 2) Addition of Study Protocol Change History (page15/15)</td>
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