Expiratory Flow limitation in adult cardiac surgery

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Background and Goal of Study: Expiratory Flow Limitation (EFL), a functional condition in which expiratory flow cannot increase, is associated with increased incidence of Postoperative Pulmonary Complications (PPCs) during general anaesthesia¹.

EFL can be detected by a PEEP test.

This test consists of a sudden subtraction of 3cm H₂O of PEEP; if expiratory flow doesn't increase the patient is considered flow-limited.

The aim of this study is to investigate the incidence and risk factors of EFL during adult cardiac surgery.

Materials and Methods: After the Ethics Committee's approval, we conducted a prospective observational trial. Two hundred patients were continuously enrolled from december 2015 to january 2017.

We collected data by the anaesthesia machine: tidal volume, PEEP, FiO₂, peak and plateau pressure, lung compliance and EFL.

We analysed 200 patients; Chi-square test was used for dichotomous variables, z-test/t-test or the Mann-Whitney U.test for continuous variables, as appropriate.

Statistical significance if $p < 0,05$.

Results and Discussion: Our sample was composed mostly by males(130;65%), with a mean age of 61,92 ($\pm 14,18$) years and a BMI of 26 ($\pm 5,04$).

The number of redo was 28(14%), and the most performed surgery was valvular surgery (111;55,5%).

31 patients(15,5%) presented EFL immediately after anaesthesia induction.

At the end of the surgery 62 patients (31%)

showed EFL; 78 patients (39%) had least one EFL throughout the surgery.

Patients who presented EFL at the beginning of the surgery had a significantly higher incidence of PaO₂/FiO₂ ratio <200 at ICU discharge (32,3% vs 14,2%; $X^2=6,05$; $p=0,02$) and need of NIMV (48,4% vs 29%; $X^2=4,52$; $p=0,038$).

Being flow-limited during any time of the surgery resulted in lower PaO₂/FiO₂ ratio at ICU discharge ($273,4 \pm 121,3$ vs $316,87 \pm 111,9$; $p=0,012$), higher need of NIMV (42,31% vs 25,41% ; $X^2=6,24$; $p=0,012$).

Conclusion(s): Assessing EFL during general anaesthesia is easy and feasible, EFL monitoring could be used to identify patients at risk of PPCs and allow the implementation of protective ventilation strategies.