PERIOPERATIVE MANAGEMENT OF PATIENTS FOR LUNG RESECTION

Essay

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CONTENTS

Page

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS

6MWT	6-minute walk test
BTPs	Body temperature pressure saturated with water vapour
cAMP	Cyclic adenosine monophospahte
CAPP	Continuous positive airway pressure
COPD	Chronic obstructive pulmonary disease
CT	Computed tomography
CVP	Central venous pressure
DLCO	Diffusion capacity of carbon monoxide
DLT	Double lumen tube
ERV	Expriatory reserve volume
FEF	Forced expiratory flow
FEV_1	Time-forced expiratory volume
FIVC	Forced inspiratory vital capacity
FVC	Forced vital capacity
HPV	Hypoxic pulmonary vasoconstriction
IC	Inspiratory capacity
IRV	Inspiratory reserve volume
IVC	Inspriatory vital capacity
MBC	Maximum breathing capacity
MVV	Maximum voluntary ventilation
NSADs	Non-steroidal anti-inflammatory drugs
OLV	One lung ventilation
PAC	Pulmonary artery catheter
$PaCO_2$	Mixed venous partial pressure of CO_2
PaO_2	Arterial partial pressure of O_2
PEEP	Positive end expiratory pressure
PEFR	Peak expiratory flow rate
PPO FEV_1	Predicted postoperative forcex expiratory volume
REM	Rapid eye movement
RV	Residual volume
RV	Right ventricular
RVEDP	Right ventricular end diastolic pressure
RVEF	Right ventricular ejection fraction
SAHS	Sleep apnea hypoventilation syndrome
TEE	Transesopahgeal echocardiography
TENs	Transcutaneous electrical nerve stimulation
TLC	Total lung capacity

TVC	Time vital capacity
VC	Vital capacity
VI	Tidal volume
VO_{2max}	Maximal oxygen consumption
VTAs	Video-assisted thoracoscopic surgery

ABSTRACT

Pulmonary function tests (PFTs) continue to play a role in traditional preoperative evaluation of patients undergoing major surgeries, also enable the physician to follow the progression, of the impairment and to document the response to therapy. Thoracic surgery should focus on the extent and severity of pulmonary disease and cardiovascular involvement, developing postoperative complications. Smoking increases airway irritability, decreases mucociliary transport. It also decreases forced vital capacity (FVC), intraoperative management focus on monitoring, one-lung ventilation and fluid management. The strategy for postoperative analgesia should be developed and discussed with the patient.

Keywords:
Perioperative management
Lung resection
Pulmonary function tests
Pain management

INTRODUCTION

INTRODUCTION

Perioperative management of patients for lung resection is a continually evolving science and art. Recent advances in anesthetic management, surgical techniques and perioperative care have expanded the envelope of patients now considered to be “operable”. It is the anesthesiologist’s responsibility to use the preoperative assessment to identify those patients at elevated risk and then to use that risk assessment to stratify perioperative management and focus resources on the high-risk patients to improve their outcome. This is the primary function of the pre-anesthetic assessment.

Pre-thoracotomy assessment naturally involves all of the factors of a complete anesthetic assessment: past history, allergies, medications, upper airway, etc. This essay will focus on the additional information beyond a standard anesthetic assessment that the anesthesiologist needs to manage a pulmonary resection patient.

To assess patients for thoracic anesthesia it is necessary to have an understanding of the risks specific to this type of surgery. The major cause of perioperative morbidity and mortality in the thoracic surgical population is respiratory complications. Major respiratory complications: atelectasis, pneumonia and respiratory failure occur in 15-20% of patients and account for the majority of the expected 3-4% mortality.

The best assessment of respiratory function comes from a detailed history of the patient’s quality of life. A completely asymptomatic ASA class 1 or 2 patient with no limitation of activity and full exercise capacity probably does not need screening

cardiorespiratory testing prior to pulmonary resection. Unfortunately, due to the biology of lung cancer these are a small minority of the patient population. Because the anesthesiologist who will manage the case often has to assimilate a great deal of information about the patient in a short period of time it is very useful to have objective standardized measures of pulmonary function that can be used to guide anesthetic management and to have this information in a format that can be easily transmitted between members of the health care team. Much effort has been spent to try and find a single test of respiratory function that has sufficient sensitivity and specificity to predict outcome for all pulmonary resection patients. It is now clear that no single test will ever accomplish this. There are many factors that determine overall respiratory performance. It is useful to think of the respiratory function in three related but somewhat independent areas: respiratory mechanics, gas exchange, and cardio-respiratory interaction. These three factors give the "3-legged tool" of prethoracotomy respiratory assessment:

1. Respiratory mechanism.
2. Lung parenchymal function.
3. Cardiopulmonary interaction.
4. Ventilation perfusion (V/Q) scintigraphy.
5. Split-lung function studies.
6. Flow-volume loops.
7. Combination of tests.

Inter-current medical conditions:

1. Age.
2. Cardiac disease.
3. Renal dysfünction.
4. Chronic obstructive pulmonary disease.

5. Smoking.
6. Lung cancer.

Anesthesiologists are familiar with the clinical assessment of the upper airway for ease of endotracheal intubation. In a similar fashion, each thoracic surgical patient must be assessed for the ease of endobronchial intubation.

The strategy for postoperative analgesia should be developed and discussed with the patient during the initial preoperative assessment. Many techniques have been shown to be superior to the use of on-demand parenteral (intramuscular or intravenous) opioids alone in terms of pam control. These include the addition of neuraxial blockade, intercostal/paravertebral blocks, interpleural local anesthetics, NSAIDS, etc.

CHAPTER I

ANATOMY AND PHYSIOLOGY OF THE RESPIRATORY SYSTEM