


# PERIOPERATIVE PULMONARY MANAGMENT

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Recent studies define perioperative pulmonary complications as the events influencing outcome following surgery.

These include complications either known to prolong the hospital stay or known to be responsible for morbidity and mortality.




The frequency rate of these complications varies from 5% - 70% !!!!

Postoperative pulmonary complications prolong the hospital stay by an average of 1 -2-weeks.



Ideally, the task of the preoperative ,  
physiologic assessment is to identify  
patients at high risk for perioperative  
complication and long-term disability  
using the least invasive tests possible.

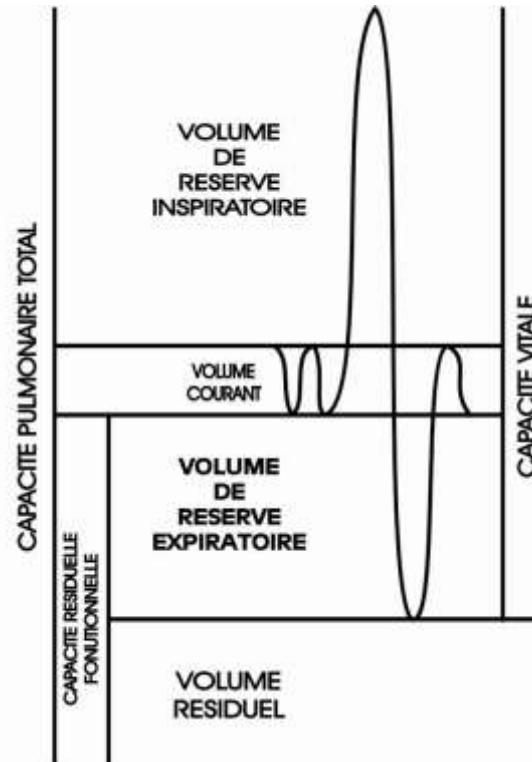


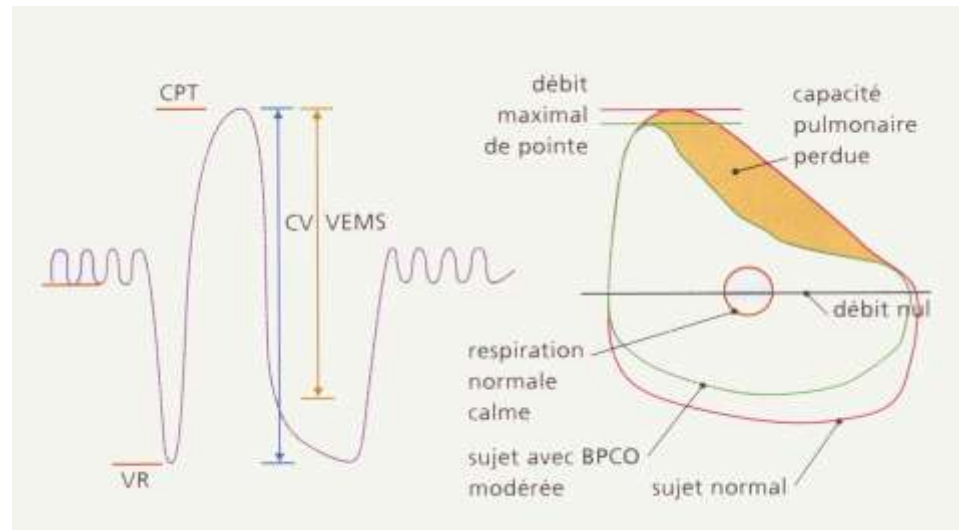
The purpose of this preoperative physiologic assessment is two fold: to enable adequate counseling of the patient on treatment options and risks so that they can make a truly informed decision, and to identify possible steps to reduce the risks of perioperative complication and long-term pulmonary disability

# CAPACITIES

## السعات .2

1. السعة الحيوية VOLUME CAPACITY
2. السعة المتبقية الوظيفية FONCTIONAL RESIDUAL CAPACITY
3. السعة الرئوية الكاملة TOTAL LUNG CAPACITY





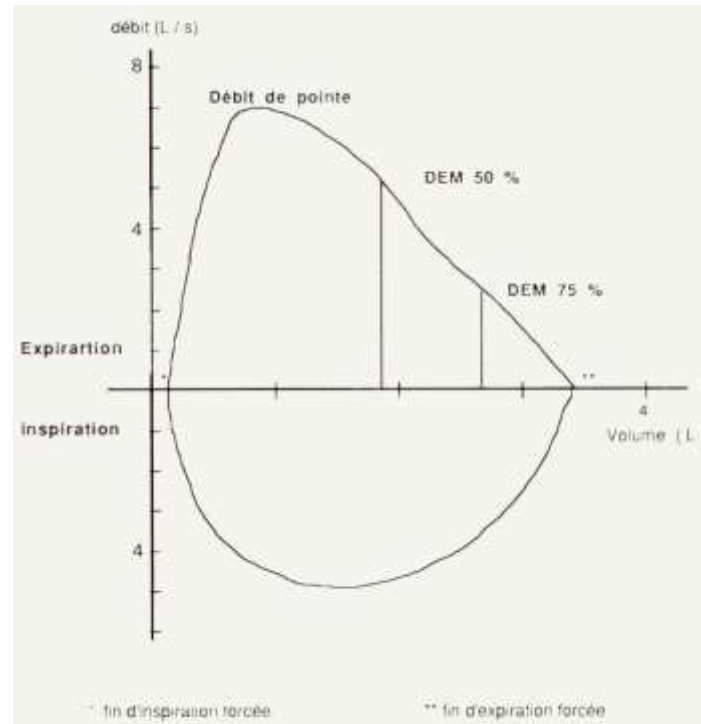
# الجريانات الغازية VENTILATORY FLOW 3.

(a) حجم الزفير الأقصى في الثانية الأولى / FEV<sub>1</sub> - VEMS /

(b) علاقة تيفنو 80% = FEV<sub>1</sub> / VC

(c) الجريان الزفيري الأوسطي FEV 25% - 75%

DEM 25% - 75%



حلبة الجريان الحجم LOOP FLOW VOLUME





# Respiratory effects of general anesthesia

1 / diminished relation  $V/Q$  N.( 2% ) to ( 5% ) due to diaphragm and chest wall relaxation with eventual reduction FRC by 30% & increased shunt fraction with arterial hypoxemia.

2/ This decrease in lung volume promotes atelectasis in the dependant lung regions and persists for more than 24 hours in 50% of patients.





3/Postoperative respiratory physiology in upper abdominal and thoracic surgery.

a/ Reduction in vital capacity by 50%.

b/ Shift of breathing pattern.

c/Rapid shallow breathing.



# **PATIENT- AND PROCEURE- RELATED RISK FACTORS**



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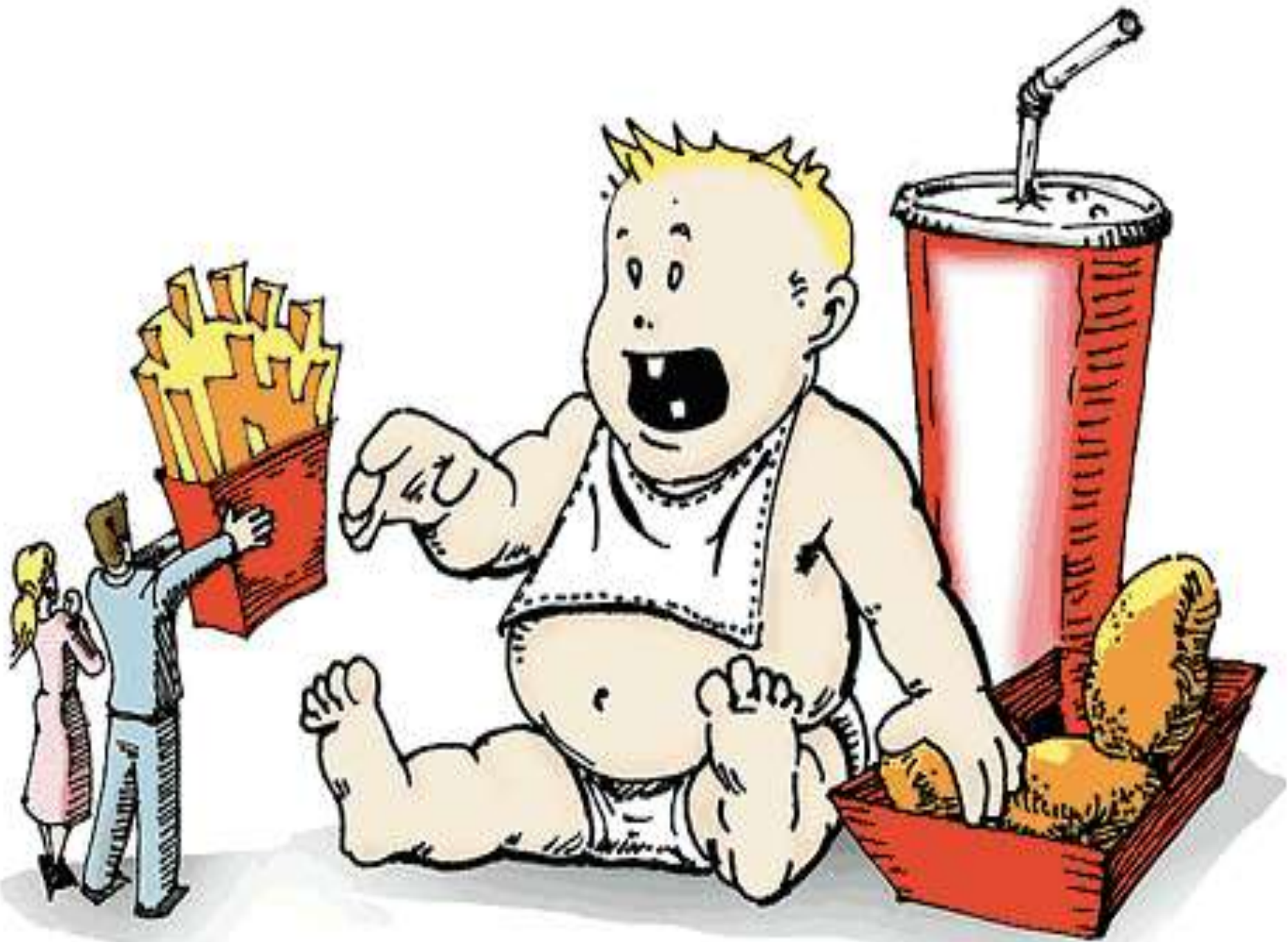
1 / Age : In patients older than 80 years the overall 30-day mortality rate was 6,2%.

2 / Obesity : A BMI > 27 kg/m<sup>2</sup> .


, increases the risk of postoperative pulmonary complications.

3 / General health status










4/ Smoking :Patients who currently smoke have a 2-fold increased risk of POC even in the absence of COPD.

Currently smoked patients developed POC at a rate of 57% compared with 33% for individuals who quit for less than 8 weeks and 11.9% in persons who never smoked.

5/ COPD patients :This is one of the most important risk factors. The operation must be contraindicated in the following situations:


- a/  $FEV1 < 1$  litre and/or  $PEFR < 200$  ml.
- b/  $PaCO_2 > 45$  and /or  $PaO_2 < 50$ .
- c/  $SaO_2 < 90\%$ .
- d/  $DLCO < 40\%$ .
- e/ Postoperative  $FEV1 < 40\%$ .



$\text{ppo FEV}_1 = \text{preoperative FEV}_1 \times (\text{No. of segments remaining} / \text{total No. segments})$


where ppo  $\text{FEV}_1$  is expressed as a percentage of predicted to give %ppo





In patients with lung cancer being considered for surgical resection, either a %ppo FEV<sub>1</sub> <40% or a %ppo Dlco < 40% indicate a high risk for perioperative death and cardiopulmonary complications .

(MICHAEL A . Chest 2003)



6/ Asthma : Optimal asthma control is defined as the absence of symptoms and an FEV1 of more than 80% of predicted.

7/Sleep apnea Syndrome: The severity is judged based on the apnea-hypopnea index and the lowest O2 saturation value during sleep.

8/Others: Diabetes ,liver cirrhosis , renal failure , electrolytes imbalances , blood tests abnormalities  
....



## **9/ Clinical Predictors of Increased Preoperative Cardiovascular Risk**

Unstable coronary syndromes

○ Recent myocardial infarction with evidence of important ischemic risk by clinical

symptoms or noninvasive study

Unstable or severe angina

Decompensated congestive heart failure

Significant arrhythmia

Severe valvular disease



# PROCEDURE – RELATED RISK FACTORS





A diagram with a central rectangular box labeled "Peri-operative preparation". Four speech bubble-shaped boxes point towards this central box from the corners. The top-left bubble is labeled "situation", the top-right bubble is labeled "Nature of surgery (minor or major)", the bottom-left bubble is labeled "Facilities available", and the bottom-right bubble is labeled "Location of surgery".

situation

Nature of surgery  
(minor or major)

Peri-operative preparation

Facilities available

Location of  
surgery

# Preoperative Preparation for Surgery


## Situation

**Emergency** :life-threatening condition ➤

requiring immediate action,(e.g. ruptured aneurysm, penetrating trauma)


**Urgent**: surgery required within a few hours (e.g. ➤  
appendicitis , wound debridement)

**Elective** (e.g. hernia ,varicose vein) ➤



1 / Surgical site :The incidence is inversely related to the distance of the surgical incision from the diaphragm: 17-76% in upper abdominal,0-5% in lower abdominal,19-59% for thoracic surgery.

2/ Laparoscopic Cholecystectomy is associated with a lower incidence of complications, the mean decrease in forced vital capacity was reported at 23%,as compared to 50%with laparotomy



3/Duration of surgery :Patients undergoing procedures lasting longer than 3-4 hours have a higher incidence rate ( 40% vs 8% ) for operations lasting <2 h.

Thank you

