Gruppo di ricerca geriatrica

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# BPCO: aspetti diagnostici

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# Definizione di BPCO

- Chronic obstructive pulmonary disease (COPD) is a preventable and treatable disease state characterised by airflow limitation that is not fully reversible.

- The airflow limitation is usually progressive and is associated with an abnormal inflammatory response of the lungs to noxious particles or gases, primarily caused by cigarette smoking.

- Although COPD affects the lungs, it also produces significant systemic consequences.

*ATS/ERS 2004- GOLD 2006*

# Definizione di BPCO

In patients with COPD two conditions may be present. However, the relative contribution of each to the disease process is often difficult to discern.

**Emphysema** is defined pathologically as the presence of permanent enlargement of the airspaces distal to the terminal bronchioles, accompanied by destruction of their walls and without obvious fibrosis.

**Chronic bronchitis** is defined clinically as chronic productive cough for 3 months in each of 2 successive years in a patient in whom other causes of productive chronic cough have been excluded.

*ATS/ERS 2004- GOLD 2006*

# Epidemiologia

COPD is the fourth leading cause of death in the USA and Europe and COPD mortality in females has more than doubled over the last 20 years.

| Leading causes of death in the USA, 1998 | Number |
|---|---|
| Heart | 724,269 |
| Cancer | 538,947 |
| Cerebrovascular disease (stroke) | 158,060 |
| **Respiratory diseases (COPD)** | **114,381** |
| Accidents | 94,828 |
| Pneumonia and influenza | 93,207 |
| Diabetes | 64,574 |
| Suicide | 29,264 |
| Nephritis | 26,265 |
| Chronic liver disease | 24,936 |
| All other causes of death | 469,314 |

*ERS-ATS COPD Guidelines 2005*

# Epidemiologia

- COPD is a more costly disease than asthma and, depending on country, 50–75% of the costs are for services associated with exacerbations.
- Tobacco smoke is by far the most important risk factor for COPD worldwide.
- Other important risk factors are:

| Host factors | Exposures |
|---|---|
| - Genetic factors<br>- Sex<br>- Airway hyperreactivity,<br>- IgE and asthma | - Smoking<br>- Socio-economic status<br>- Occupation<br>- Environmental pollution<br>- Perinatal events and childhood illness<br>- Recurrent bronchopulmonary infections<br>- Diet |

*ERS-ATS COPD Guidelines 2005*

# Diagnosi di BPCO

- Clinical assessment

- Pulmonary function testing

# Clinical assessment

# Clinical assessment: symptoms

A clinical diagnosis of COPD should be considered in any patient who has dyspnea, chronic cough or sputum production, and/or a history of exposure to risk factors for the disease.

| | |
|---|---|
| **Dyspnea** that is: | Progressive (worsens over time)<br>Usually worse with exercise<br>Persistent (present every day)<br>Described by the patient as an "increased effort to breathe," "heaviness," "air hunger," or "gasping." |
| **Chronic Cough** | May be intermittent and may be unproductive. |
| **Chronic sputum production:** | Any pattern of chronic sputum production may indicate COPD. |
| **History of exposure to risk factors,** *especially:* | Tobacco smoke.<br>Occupational dusts and chemicals<br>Smoke from home cooking and heating fuels. |

The diagnosis must be confirmed by spirometry

# Clinical assessment

## Dyspnoea

Dyspnea, the **hallmark symptom of COPD**, is the reason most patients seek medical attention and is a major cause of disability and anxiety associated with the disease. Typical COPD patients describe their dyspnea as a sense of increased effort to breathe, heaviness, air hunger, or gasping. However, the terms used to describe dyspnea vary both by individual and by culture.
It is often possible to distinguish the breathlessness of COPD from that due to other causes by analysis of the terms used, although there is considerable **overlap with descriptors of bronchial asthma**.

**Functional dyspnoea** can be assessed by the **Medical Research Council dyspnoea scale.**

**0)** not troubled with breathlessness except with strenuous exercise.

**1)** troubled by shortness of breath when hurrying or walking up a slight hill.

**2)** walks slower than people of the same age due to breathlessness or has to stop for breath when walking at own pace on the level.

**3)** stops for breath after walking ~100 m or after a few minutes on the level.

**4)** too breathless to leave the house or breathless when dressing or undressing.

# Clinical assessment

## Cough

Chronic cough, often the first symptom of COPD to develop, is often discounted by the patient as an expected consequence of smoking and/or environmental exposures.

Initially, the cough may be intermittent, but later is present every day, often throughout the day.

The chronic cough in COPD may be unproductive.

In some cases, significant airflow limitation may develop without the presence of a cough.

## Possibili cause di tosse

**Intrathoracic**

- Chronic obstructive pulmonary disease
- Bronchial asthma
- Central bronchial carcinoma
- Endobronchial tuberculosis
- Bronchiectasis
- Left heart failure
- Interstitial lung disease
- Cystic fibrosis

**Extrathoracic**

- Postnasal drip
- Gastroesophageal reflux
- Drug therapy (e.g., ACE inhibitors)

# Clinical assessment

## Sputum production

COPD patients commonly raise small quantities of tenacious sputum after coughing bouts. Regular production of sputum for 3 or more months in 2 consecutive years (in the absence of any other conditions that may explain it) is the epidemiological definition of chronic bronchitis, but this is a somewhat arbitrary definition that does not reflect the range of sputum production in COPD patients. Sputum production is often difficult to evaluate because patients may swallow sputum rather than expectorate it, a habit subject to significant cultural and gender variation.

Patients producing large volumes of sputum may have underlying bronchiectasis.

The presence of purulent sputum reflects an increase in inflammatory mediators, and its development may identify the onset of an exacerbation.

# Clinical assessment

## Past medical history and review of systems

- Any history of asthma, allergy, respiratory infections in childhood or any other respiratory diseases such as tuberculosis
- Any family history of COPD or other respiratory disease
- Any history of exacerbations of COPD or hospitalisations
- Any comorbidities, *e.g.* those associated with the heart or peripheral vasculature, or neurological comorbidities that share the same risk factor (*i.e.* cigarette smoke exposure)
- Any history of unexplained weight loss is important because, if caused by COPD, it heralds a poor prognosis
- Other, nonspecific symptoms, such as wheezing or pain, and morning headache

# Clinical assessment

## Exposure history

The history of exposure to risk factors, such as smoking, or occupational or environmental noxious agents, should be noted. A detailed smoking history is essential (pack-years). Pack-years are calculated by multiplying the number of pack equivalent smoked every day by the total number of years.

# Clinical assessment

**Physical examination**

A normal physical examination is frequent in early COPD. As the disease progresses some signs become apparent and in the advanced stages many are almost pathonogmonic.

The examination should be aimed at eliciting the presence of the respiratory and systemic effects.

# Clinical assessment

## Respiratory signs

**Inspection:** check for barrel chest deformity, pursed-lips breathing, chest/abdominal wall paradoxical movements and use of accessory respiratory muscles. All these are signs of severe airflow limitation, hyperinflation and impairment of the mechanics of breathing.

**Percussion:** check for decreased motion of the diaphragm and tympanic sounds due to hyperinflation or bullae; in addition the liver becomes easily palpable.

**Auscultation**: adventitious rhonchi and wheezing may help differentiate COPD from congestive heart failure or pulmonary fibrosis, which are often associated with crackles.

**Auscultation of the heart**: may show signs of cor pulmonale, such as split of second sound (pulmonic), murmurs of pulmonary or tricuspid insufficiency.

# Clinical assessment

## Systemic signs

**Neck vein distension**, **liver enlargement and peripheral oedema** could be due to cor pulmonale or due to severe hyperinflation.

**Loss of muscle mass** and **peripheral muscle weakness** are consistent with malnutrition and/or skeletal muscle dysfunction.

**Cyanosis or bluish colour of the mucosal membranes** may indicate hypoxiemia.

# Clinical assessment

## Additional features in severe disease

Weight loss and anorexia are common problems in advanced COPD.
They are prognostically important and can also be a sign of other diseases (e.g., tuberculosis, bronchial tumors), and therefore should always be investigated.

Cough syncope occurs due to rapid increases in intrathoracic pressure during attacks of coughing.

Coughing spells may also cause rib fractures, which are sometimes asymptomatic.

Ankle swelling may be the only symptomatic pointer to the development of cor pulmonale.

Finally, psychiatric morbidity, especially symptoms of depression and/or anxiety, is common in advanced COPD and merits specific enquiry in the clinical history.

# Pulmonary Function Testing

# Pulmonary function Testing

## All patients

- Spirometry

- Bronchodilator reversibility test

# Pulmonary function Testing

## Spirometry

This is necessary for:

- diagnosis
- assessment of severity of the disease
- following the progress of the disease

# Pulmonary function Testing

## Explanation of common test values in FVC Tests

- **FVC (***Forced Vital Capacity):* is the total amount of air that you can forcibly blow out after full inspiration, measured in liters.

- **$FEV_1$ (***Forced Expiratory Volume in 1 Second):* is the amount of air that you can forcibly blow out in one second, measured in litres. Along with FVC it is considered one of the primary indicators of lung function.

- **$FEV_1$/FVC (The Tiffeneau index):** is the ratio of FEV 1 to FVC. In healthy adults this should be approximately 75 – 80%.

- **PEF (***Peak Expiratory Flow):* is the speed of the air moving out of your lungs at the beginning of the expiration, measured in liters per second.

- **TV (***Tidal Volume):* During the respiratory cycle, a specific volume of air is drawn into and then expired out of the lungs. This volume is tidal volume.

# Pulmonary function Testing

## Bronchodilator reversibility:

Should be performed at least once to exclude asthma and to establish the best lung function for the individual patient, and, to a lesser degree, to estimate the prognosis. The increase in forced expiratory volume in one second (FEV1) should be expressed as a percentage of the predicted value that is less dependent on the baseline FEV1. Although some bronchodilation may be present in some patients with COPD, a large increase in postbronchodilator FEV1 supports the diagnosis of asthma.

This test should be performed when patients are clinically stable and free from respiratory infection. Patients should not have taken inhaled short-acting bronchodilatators in the previous six hours, long-acting bronchodilatator in the previous 12 hours, or sustained-release theophylline in the previous 24 hours. FEV1 should be measured before a bronchodilatator is given. The bronchodilatator dose should be selected be high on the dose/response curve. Possible dosage protocols are 400 µg β2-agonist, up to 160 µg anticholinergic, or the two combined. FEV1 should be measured again 10-15 mnutes after a short-acting bronchodilatator is given; 30-45 minutes after the combination.

An increase in FEV1 that is both greater than 200 ml and 12% above the pre-bronchodilatator FEV1 is considered significant. It is usually helpful to report the absolute change as well as the % change from baseline to set the improvement in a clinical context.

# Diagnosis of COPD (2)

ERS-ATS COPD guideline, 2005

## Spirometry

- **Spirometric classification of COPD**:
  - Post-bronchodilator FEV1/forced vital capacity <0.7 confirms the presence of airflow limitation that is not fully reversible.

| Severity | Postbrochodilator FEV1/FVC | FEV1 % pred |
|---|---|---|
| **At risk**<br>Patients who:<br>smoke or have exposure to pollutants<br>have cough, sputum or dyspnoea<br>have family history of respiratory disease | >0.7 | ≥80 |
| **Mild COPD** | ≤0.7 | ≥80 |
| **Moderate COPD** | ≤0.7 | 50–80 |
| **Severe COPD** | ≤0.7 | 30–50 |
| **Very severe COPD** | ≤0.7 | <30 |

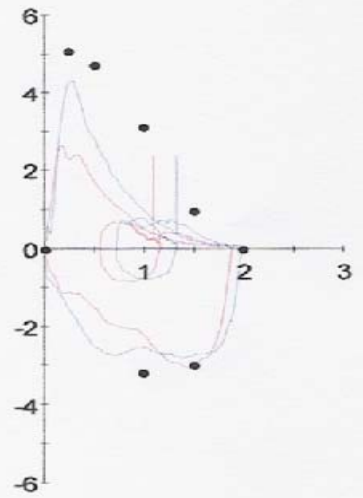
# ISTITUTO CLINICO S.ANNA

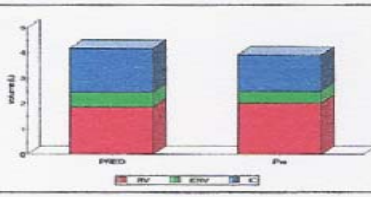
**Via del Franzone, 31 Brescia**

**Respiratoria**

| | | | |
|---|---|---|---|
| | BSA: 1.68 | Data: | 26/09/2006 |
| | Anni: 70 | Stanza: | FKT |
| Medico: Ranieri, Piera | Peso: 72.00 | Sesso Female | Razza: Caucasian |

| | Pre-Bronch | | | Post-Bronch | | | |
|---|---|---|---|---|---|---|---|
| | Attuale | PRED | %Pred | LLN | Attuale | Pred | Chng |
| ----SPIROMETRIA----- | | | | | | | |
| FVC (L) | 1,75 | 1,98 | 89 | 1,65 | 1,87 | 95 | 7 |
| FEV1 (L) | *1,11 | 1,61 | *69 | 1,34 | *1,34 | *83 | 21 |
| FEV1/FVC (%) | *63 | 76 | | 63 | 71 | | 13 |
| FEF 25% (L/sec) | *1,93 | 4,71 | *41 | 3,93 | *3,02 | *64 | 55 |
| FEF 50% (L/sec) | 0,76 | 3,11 | *25 | 2,60 | *1,30 | *42 | 70 |
| FEF 75% (L/sec) | 0,17 | 0,95 | *18 | 0,79 | 0,37 | *39 | 117 |
| FEF 25-75% (L/sec) | 0,53 | 2,43 | *22 | 2,03 | *1,02 | *42 | 93 |
| FEF Max (L/sec) | *2,52 | 5,10 | *49 | 4,26 | 4,28 | 84 | 70 |
| FIV1 (L) | 1,85 | | | | 1,98 | | 7 |
| FIF 50% (L/sec) | *2,10 | 3,18 | *66 | 2,66 | *2,57 | *81 | 22 |
| FIF Max (L/sec) | 3,07 | 3,68 | 84 | 3,07 | *2,82 | *77 | -8 |
| Time To FEFmax (sec) | 0,063 | | | | 0,069 | | 10 |
| Expiratory Time (sec) | 9,42 | | | | 8,33 | | -12 |
| VOLUMI POLMONARI | | | | | | | |
| SVC (L) | *1,91 | 2,33 | *82 | 1,95 | | | |
| IC (L) | *1,42 | 1,73 | *82 | 1,44 | | | |
| ERV (L) | 0,49 | 0,60 | *82 | 0,50 | | | |
| TGV (L) | 2,49 | 2,45 | 102 | 1,96 | | | |
| RV (Pleth) (L) | 2,00 | 1,85 | 108 | 1,48 | | | |
| TLC (Pleth) (L) | 3,91 | 4,18 | 94 | 3,34 | | | |
| RV/TLC (Pleth) (%) | 51 | 43 | | 34 | | | |



Riduzione dei volumi polmonari dinamici di tipo ostruttivo di grado moderato, significativamente migliorati dopo β2-stimolante (salbutamolo spray). Volumi polmonari statici nei limiti della norma.

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# Altri tests.....all patients

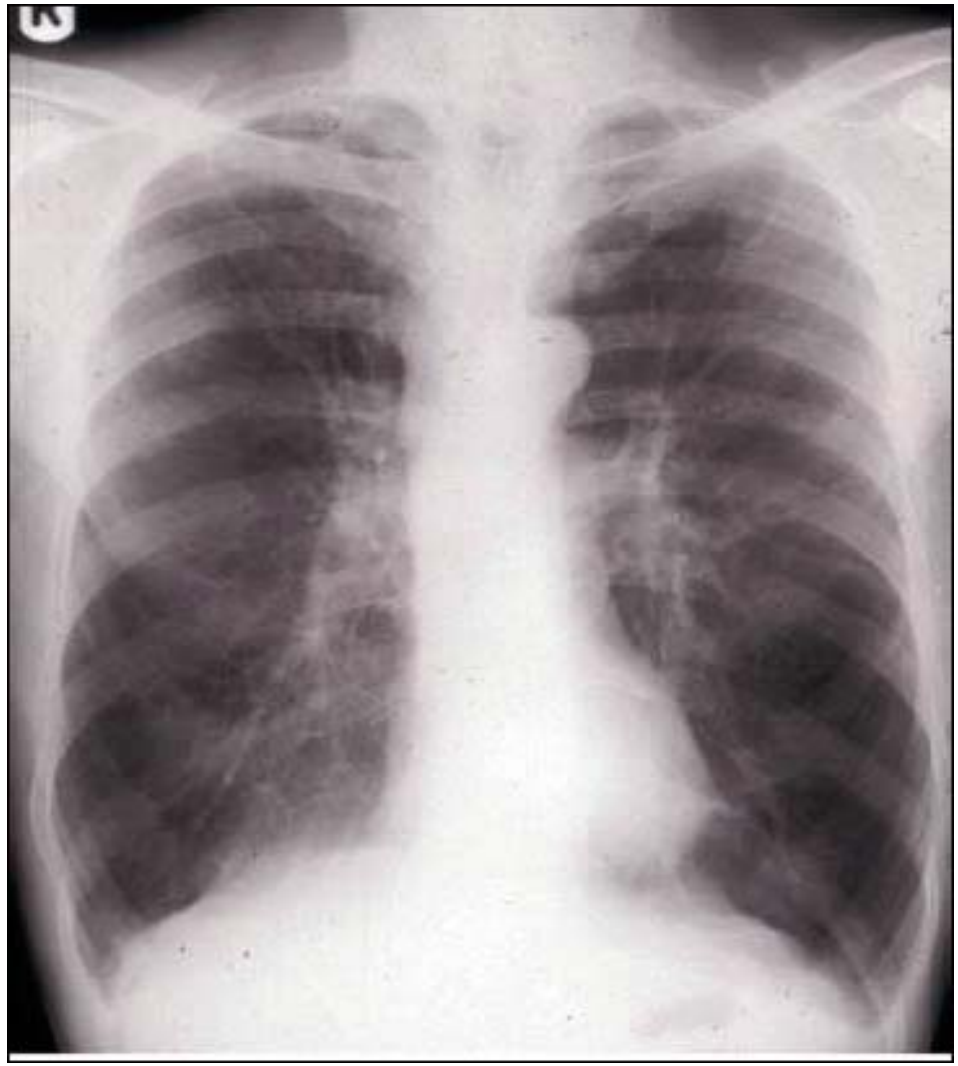
**Chest radiography:**

It is not sensitive for the diagnosis, but it is helpful in excluding other diseases (pneumonia, cancer, congestive heart failure, pleural effusions and pneumothorax). It is also of value to detect bullous disease. Common but not specific signs of emphysema are flattening of the diaphragm, irregular lung radiolucency, reduction or absence of vasculature.

# Chest radiograph

Chest radiograph showing typical changes of COPD

- hyperinflated lung fields
- flat diaphragms
- prominent pulmonary arteries
- increased translucency of lung fields
- “squared off” lung apices



# Altri tests……..selected patients

**1) α1-antitrypsin levels:** should be measured in young patients (4th or 5th decade) who develop COPD and have a strong family history. This may be followed by family screening. A serum value of α1-antitrypsin <15–20% of the normal limits is highly suggestive of homozygous α1-antitrypsin deficiency.

**2) Static lung volumes:** including total lung capacity **(TLC)**, residual volume **(RV)**, functional residual capacity and the **ratio RV/TLC** are all characteristically increased in advanced COPD. A good index of hyperinflation is the measure of the inspiratory capacity. Lung volumes are useful in patients with more advanced disease and those being considered for surgery.

3) **Transfer factor of the lung for carbon monoxide (TLCO):** is usually reduced in COPD, particularly in emphysema. If TLCO is reduced, asthma can be excluded. A low diffusion capacity is helpful in stratifying patients for lung resection.

**4) Arterial blood gas measurement:** In advanced COPD, measurement of arterial blood gases while the patient is breathing air is important. This test should be performed in stable patients with FEV1 < 50% predicted or with clinical signs suggestive of respiratory failure or right heart failure. Several considerations are important to ensure accurate test results. The inspired oxygen concentration (FiO2 – normally 21% at sea level) should be noted, a particularly important point if patient is using an O2-driven nebulizer. Changes in arterial blood gas tensions take time to occur, especially in severe disease. Thus, 20-30 minutes should pass before rechecking the gas tensions when the FiO2 has been changed, e.g., during an assessment for domiciliary oxygen therapy.

**Blood gases monitoirg is mandatory during a severe excerbations, leading to respiratory failure.**

# Altri tests……selected patients

## Sleep studies

Selected patients should be assessed for the presence of nocturnal hypoxiemia. Finding nocturnal hypoxemia dos not, however, provide any further prognostic or clinically useful information in the assessment of patients with COPD unless coexisting sleep apnea syndrome is suspected. Individuals who desaturate at night may be canditates fo oxygen therapy.

# Assessment of COPD severity

Assessment of COPD severity is based on the patient's level of simptoms, the severity of the spirometric abnormality and the presence of complications such as *respiratory failure*, *right heart failure*,*weight loss*, *arterial hypoxiemia*. A relatively simple approach to identifying disease severity using a combined of most of the above variables has been proposed. The BODE method gives a composite score (Body mass index, Obstruction, Dyspnea and Exercise capacity measured by the six-minute-walking test) that is a *better predictor of subsequent survival* than any component singly, and its properties as a measurement tool are under investigation. **The BODE index is a multidimensional scale (the total possible values range from 0 to 10) in which higher scores indicate a higher risk of death.**

# Diagnosis of COPD (3)

ERS-ATS COPD guideline, 2005

## BMI and dyspnoea

- Body Mass Index (BMI) and dyspnoea have proved useful in predicting outcomes such as survival, and should thus be evaluated in all patients.
  - BMI values < 21 $kg \cdot m^{-2}$ are associated with increased mortality.
  - Functional dyspnoea can be assessed by the Medical Research Council dyspnoea scale:

| | |
|---|---|
| 0 | Not troubled with breathlessness except with strenuous exercise. |
| 1 | Troubled by shortness of breath when hurrying or walking up a slight hill. |
| 2 | Walks slower than people of the same age due to breathlessness or has to stop for breath when walking at own pace on the level. |
| 3 | Stops for breath after walking about 100 m or after a few minutes on the level. |
| 4 | Too breathless to leave the house or breathless when dressing or undressing. |

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

# The Body-Mass Index, Airflow Obstruction, Dyspnea, and Exercise Capacity Index in Chronic Obstructive Pulmonary Disease

Bartolome R. Celli, M.D., Claudia G. Cote, M.D., Jose M. Marin, M.D., Ciro Casanova, M.D., Maria Montes de Oca, M.D., Reina A. Mendez, M.D., Victor Pinto Plata, M.D., and Howard J. Cabral, Ph.D.

**Table 2. Variables and Point Values Used for the Computation of the Body-Mass Index, Degree of Airflow Obstruction and Dyspnea, and Exercise Capacity (BODE) Index.***

| Variable | Points on BODE Index | | | |
|---|---|---|---|---|
| | 0 | 1 | 2 | 3 |
| $FEV_1$ (% of predicted)† | ≥65 | 50–64 | 36–49 | ≤35 |
| Distance walked in 6 min (m) | ≥350 | 250–349 | 150–249 | ≤149 |
| MMRC dyspnea scale‡ | 0–1 | 2 | 3 | 4 |
| Body-mass index§ | >21 | ≤21 | | |

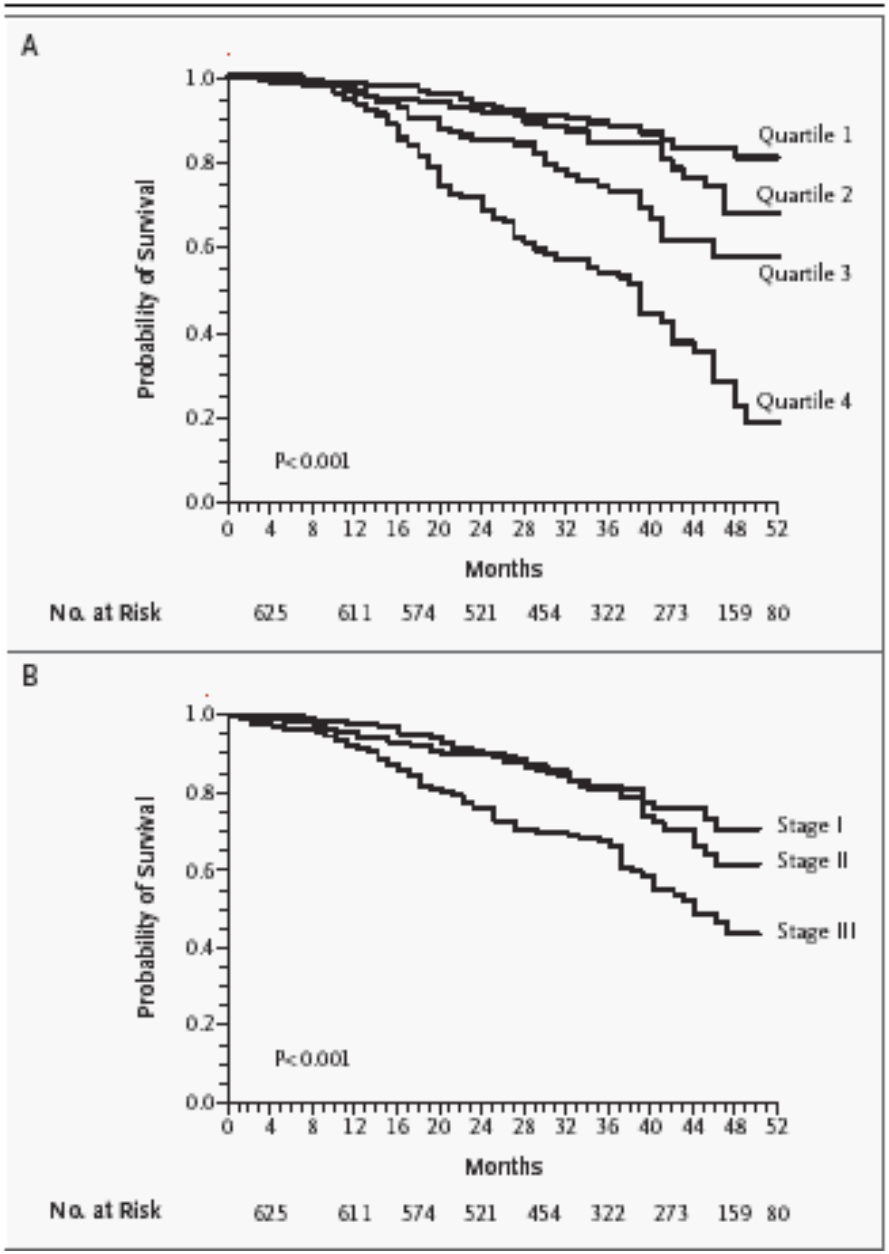



**Figure 1.** Kaplan–Meier Survival Curves for the Four Quartiles of the Body-Mass Index, Degree of Airflow Obstruction and Dyspnea, and Exercise Capacity Index (Panel A) and the Three Stages of Severity of Chronic Obstructive Pulmonary Disease as Defined by the American Thoracic Society (Panel B).

In Panel A, quartile 1 is a score of 0 to 2, quartile 2 is a score of 3 to 4, quartile 3 a score of 5 to 6, and quartile 4 a score of 7 to 10. Survival differed significantly among the four groups ($P<0.001$ by the log-rank test). In Panel B, stage I is defined by a forced expiratory volume in one second ($FEV_1$) that is more than 50 percent of the predicted value, stage II by an $FEV_1$ that is 36 to 50 percent of the predicted value, and stage III by an $FEV_1$ that is no more than 35 percent of the predicted value. Survival differed significantly among the three groups ($P<0.001$ by the log-rank test).

*New Engl J Med 350; 10 March 4, 2004*

# BPCO Riacutizzata

# Exacerbations of COPD

Definitions of exacerbations in COPD are based on:
- increasing symptoms (dyspnoea, sputum volume and sputum purulence with or without symptoms of upper respiratory infection
- and/or increased health care utilisation

The most common cause of an exacerbations are infection of the trachebronchial tree and air pollution, but the cause of about one-third of severe exacerbations cannot be identified.

Bacteria are isolated from between 40-60% of acute exacerbations of COPD.

Three bacterial species account for most isolates:
- *Haemophilus influenzae (is present in about 50% of culture positive in most clinical trials), Streptococcus pneumoniae* and *Moraxella catarrhalis.*

*Haemophilus parainfluenzae, Pseudomonas aeruginosa, Staphylococcus aureus* and *Enterobacteriaciae* are encountered less frequently.

# Exacerbations of COPD

## Indications for hospitalisation of patients with a COPD exacerbation

- presence of high-risk co-morbid conditions, including pneumonia, cardiac arhytmia, congestive heart failure, diabetes mellitus, renal or liver failure
- inadequate response of symptoms to outpatient management
- marked increase in dyspnoea
- inability to eat or sleep due to symptoms
- worsening hypoxaemia
- worsening hypercapnia
- changes in mental status
- inability of the patient to care for her/himself
- uncertain diagnosis
- inadequate home care

# Exacerbations of COPD

*ERS-ATS COPD Guidelines, 2005*

The Operational Classification of severity is as follows: ambulatory (Level I), requiring hospitalisation (Level II), acute respiratory failure (Level III)

| | Level I | Level II | Level III |
|---|---|---|---|
| **Clinical history** | | | |
| Co-morbid conditions | + | +++ | +++ |
| History of frequent exacerbations | + | +++ | +++ |
| Severity of COPD | Mild/moderate | Moderate/severe | Severe |
| **Physical findings** | | | |
| Haemodynamic evaluation | Stable | Stable | Stable/unstable |
| Use accessory respiratory muscles, tachypnoea | Not present | ++ | +++ |
| Persistent symptoms after initial therapy | No | ++ | +++ |
| **Diagnostic procedures** | | | |
| Oxygen saturation | Yes | Yes | Yes |
| Arterial blood gases | No | Yes | Yes |
| Chest radiograph | No | Yes | Yes |
| Blood tests | No | Yes | Yes |
| Serum drug concentrations | If applicable | If applicable | If applicable |
| Sputum gram stain and culture | No | Yes | Yes |
| Electrocardiogram | No | Yes | Yes |

+: unlelikely to be present; ++: likely to be present; +++: very likely to be present

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REVIEW

# Exacerbations of chronic obstructive pulmonary disease

B.R. Celli* and P.J. Barnes#

ABSTRACT: **Exacerbations of chronic obstructive pulmonary disease are of major importance in terms of their prolonged detrimental effects on patients, the acceleration in disease progression and high healthcare costs.**

**There is still debate about how exacerbations should be defined and graded, and their mechanisms are poorly understood. The major causal agents are either bacteria or viral infections, or a combination of the two. Noninfective causes include air pollution and pulmonary embolus but, in some patients, no cause is identified.**

**Exacerbations represent an increase in the inflammation that is present in the stable state, with increased numbers of inflammatory cells (particularly neutrophils), cytokines, chemokines and proteases in the airways, and increased concentrations of certain cytokines and C-reactive protein in the blood. There are presently no reliable biomarkers with which to predict exacerbations.**

**Exacerbations have a long-lasting adverse influence on health status. High doses of bronchodilators are the mainstay of treatment and systemic corticosteroids have some benefit. The routine use of antibiotics remains controversial but they are of benefit with exacerbations of a bacterial origin. Noninvasive ventilation is beneficial in preventing the need for intubation and its important complications but it is not certain whether its use in stable patients prevents exacerbations. Although important advances have been made, more effective treatments are needed in the future for prevention and treatment of exacerbations.**

KEYWORDS: **Bacterial infection, exacerbation, health status, inflammation, viral infection**

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STATEMENT OF INTEREST
A statement of interest for this review can be found at www.erj.ersjournals.com/misc/statements.shtml

**TABLE 2** Proposed clinical definitions of chronic obstructive pulmonary disease (COPD) syndromes by analogy to syndromes in coronary artery disease

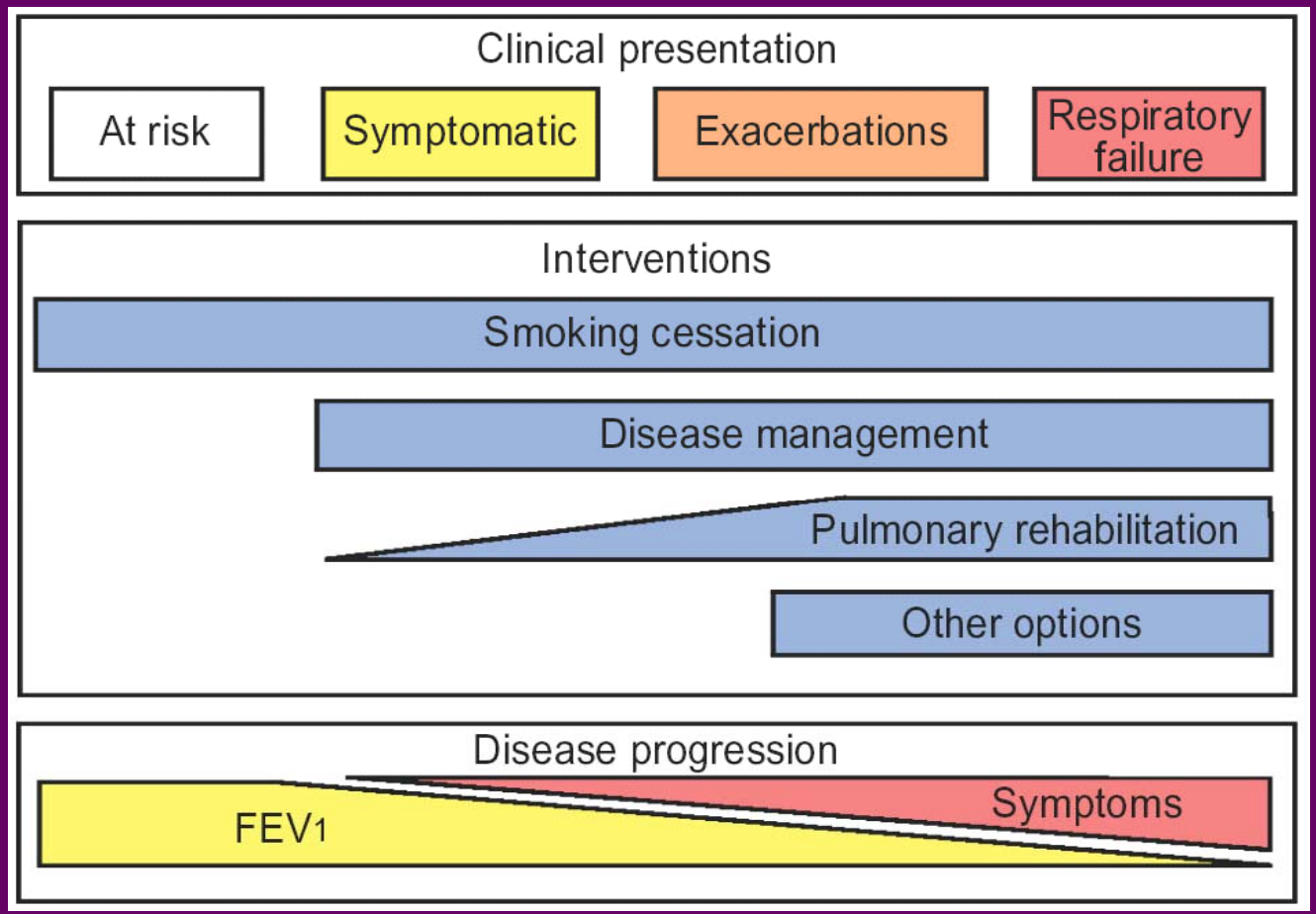
| Syndrome | Elements |
|---|---|
| **COPD** | |
| Unstable COPD | Worsening of dyspnoea cough or sputum |
| | RR <24 |
| | Dyspnoea <4 on 0–10 scale |
| | Normal laboratory investigations |
| Exacerbation | Worsening of dyspnoea, cough or sputum |
| | Dyspnoea ⩾4 on a 0–10 scale |
| | Normal chest radiograph |
| | WBC count >9000 cells·dL$^{-1}$ or CRP >10 mg·dL$^{-1}$ |
| Ventilatory insufficiency | Same plus elevation of $Pa,CO_2$ in arterial blood gases |
| **Coronary artery disease** | |
| Unstable angina | Worsening of chest pain |
| | No ECG changes |
| | Normal laboratory results |
| Myocardial infarction | Chest pain |
| | Abnormal ECG |
| | Abnormal serum enzyme pattern |
| Cardiogenic shock | Same syndrome plus shock |

RR: relative risk; WBC: white blood cell; CRP: C-reactive protein; $Pa,CO_2$: carbon dioxide arterial tension.

*Celli, Eur Respir J 2007*

ERS-ATS COPD guideline, 2005

# Diagnosis of COPD (4)



# Spirometria nel mondo reale

# Ambulatorio di Fisiopatologia Respiratoria (Istituto clinico S.Anna)

- In media 55 spirometrie/mese
- 66% dei pazienti sono ultra65enni
- 20% dei pazienti ultra65enni ha un MMSE< 24/30
- 10% dei pazienti ha insufficienza respiratoria cronica in ossigeno-terapia continuativa domiciliare
- 73% dei pazienti ottiene 1 curva flusso-volume accettabile secondo i criteri ATS
- 61% dei pazienti ottiene 3 curve flusso volume accettabile secondo i criteri ATS-ERS
- 91% dei pazienti soddisfa il criterio di riproducibilità

# Riabilitazione Geriatrica

(Residenze “Anni Azzurri” Rezzato)

| | N° | % |
|---|---|---|
| ricoveri | 218 | |
| BPCO | 67 | 30.7 |
| BPCO (I° diagnosi) | 30 | 44.7 |
| Spirometria | 10 | 33 |
| BPCO (comorbilità) | 37 | 55.2 |
| Spirometria | 6 | 16.2 |

Tot. spirometrie effettuate: 16 su 67 pz = 23.8%

# Spirometry Use in Clinical Practice Following Diagnosis of COPD*

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***Background:*** **Little is known about current use of pulmonary function testing in clinical practice. This study evaluated spirometry use in persons with COPD receiving care from the Veterans Health Administration health-care system.**

***Methods:*** **Administrative data were used to identify a cohort of patients who were ≥ 40 years of age with recently diagnosed COPD. Spirometry was identified using administrative data. Spirometry use was characterized over a 12-month period, and the use of spirometry around acute exacerbations and surgical procedures was examined.**

***Results:*** **A total of 197,878 patients met the inclusion criteria in 1999. The average age was 67.5 years (SD, 10.0), and 98.2% of patients were male. A total of 66,744 patients (33.7%) underwent spirometry. The use of spirometry for newly diagnosed COPD patients decreased with age and was 3.3 times higher for those visiting pulmonologists.**

***Conclusions:*** **This study suggests that spirometry is inconsistently used in the diagnosis of COPD or the care of patients with COPD. This inconsistent pattern of use is seen even with the endorsement of spirometry use for patients with COPD by two national guidelines; however, the data predate the most recent version of the guidelines. It is unclear whether it is lack of physician knowledge of, attitudes about, or belief in the utility of spirometry that underlie the current patterns of physician use of this clinical tool.** ***(CHEST 2006; 129:1509–1515)***

**Key words:** COPD; pulmonary epidemiology; spirometry

**Abbreviations:** ATS = American Thoracic Society; CI = confidence interval; ED = emergency department; ERS = European Respiratory Society; ICD-9 = *International Classification of Diseases*, ninth revision; OR = odds ratio; VHA = Veterans Health Administration

# Conclusioni

- La BPCO è la quarta causa di morte. Alcuni dati la indicano in aumento.

- I criteri diagnostici sono sufficientemente standardizzati.

- La diagnosi spirometrica è possibile anche nell'anziano.

- Tuttavia.....la diagnosi è ancora largamente clinica.

- Ageismo ?

- Scarsa conoscenza e/o scarsa aderenza alle linee guida ?

- L'età del paziente e la specialità del medico che lo valuta influenzano l'esecuzione della spirometria.