

Criteria of prescription of antibiotics and systemic corticosteroids among pulmonologists and general practitioners during asthma and COPD exacerbations: a southern Italian survey

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Abstract. To date, there is still a lack of unanimity regarding the definition of exacerbation of asthma and COPD and about objective measurements in the currently used criteria. The aim of our study was to conduct a survey among general practitioners (GPs) and pulmonologists regarding the clinical criteria arbitrarily considered as important to start a course of systemic corticoids and/or antibiotics in asthma and COPD.

We conducted a survey enrolling 50 general practitioners (GPs) and 50 pulmonologists, that evaluated the clinical criteria arbitrated as essential to start a course of systemic corticosteroids or antibiotics during asthma and/or COPD exacerbations. Our results demonstrated incongruities between GPs and pulmonologist and within the same professional category concerning systemic corticosteroids. Conversely, we showed higher consensus between and within the groups about criteria to prescribe antibiotics. (www.actabiomedica.it)

Keywords: asthma, COPD, exacerbation, corticosteroids, antibiotics, prescribing criteria

Introduction

Asthma and Chronic Obstructive Pulmonary Disease (COPD) are two chronic respiratory diseases in which the clinical history is interposed by intermittent events of acute worsening of symptoms named exacerbations. Exacerbations are key events in the natural course of asthma and COPD and lead to major consequences in terms of morbidity, mortality and economic burden (1,2).

Defining exacerbations in asthma and COPD is essential for both daily care practice and research. However, there is a lack of unanimity regarding the definition of exacerbation and about objective measurements in the currently used criteria. Definitions may be based on the presence of symptoms (symptom-based definition), the kind of healthcare resources used (healthcare-based definition), or their combina-

tion (3). Hence, the need of systemic corticosteroids has become the most used definition of exacerbation in asthma, whereas, for COPD, the most adopted criterion is the necessity of antibiotics and/or systemic corticosteroids.

Very few studies have examined the criteria on which clinicians establish their decision to prescribe a given medication. Therefore, the aim of our study was to conduct a survey among general practitioners (GPs) and pulmonologists regarding the clinical criteria arbitrarily considered as important to start a course of systemic corticoids and/or antibiotics in asthma and COPD.

Materials And Methods

Based on a previous study of Louis et al (4), The survey consisted of two different sets of three ques-

tionnaires each, the first specifically developed for GPs and the second for pulmonologists.

These questionnaires were developed with the help of GPs and pulmonologists with certified expertise in obstructive diseases.

All questionnaires included a list of clinical, biological and functional criteria which have been considered important for prescribing decisions. We had designed a list for GPs and another, separate, for pulmonologists, in selecting criteria that took into account respective clinical practices of each professional groups. So the list developed for pulmonologists had more criteria, including respiratory functions, than that proposed general practitioners.

Three different questionnaires had been developed:

- The first, dedicated to asthmatic patients, asked about the reasons for prescribing systemic corticosteroids and the posological scheme.
- The second, dedicated to COPD patients, also asked about reasons for initiating a course of systemic corticosteroids and the posological scheme;
- The third, always dedicated to patients COPD, asked about the reasons for prescribing antibiotics and which class was preferred.

All questionnaires translated from Italian are shown in an online supplement.

In total, 50 pulmonologists and 50 GPs participated to the survey. Participants were asked to identify from the enclosed lists the five criteria that in their opinion were the most important, by assigning them a

score ranging from 1 to 5, the value of 1 reflecting the most relevant. Depending on the answers, the criteria received an encrypted value based on their importance: a criterion placed in first position received 5 points, gradually down to that placed in position 5 which had 1 point assigned.

This study was conducted in accordance with guidelines for good clinical practice and the ethical principles originating in the Declaration of Helsinki. Due to the nature of the study, there was no need to require a formal approval by the ethics committee. All participants gave their written informed consent to participate to the survey.

Results

A summary of the three most chosen criteria for each therapeutic decision is displayed in Table 1.

Regarding asthma exacerbations, GPs define the following criteria as most important to initiate a course of systemic corticosteroids: limitation of daily activities (score 120 points), tirage (112 points), persistent cough (83 points), whereas pulmonologists highlight the presence of: tirage (104 points), limitation of daily activities (103 points) and FEV₁>30% of predicted (75 points). About posological scheme, the majority of both medical classes (81% of GPs and 94% of pulmonologists) suggested oral prednisone 25mg once daily with tapering strategy for not more than 12 days.

Table 1 - Best three arbitrary criteria for the prescription of systemic corticosteroids and antibiotics during asthma and COPD exacerbations.

	General Practitioners	Pulmonologists
Ashtma- Systemic corticosteroids	Daily activities limitation, 120 (81%)	Tirage, 104 (42%)
	Tirage, 112 (61%)	Daily activities limitation, 103 (40%)
	Persistent cough, 83 (62%)	FEV ₁ <30% pred, 75 (81%)
COPD-Systemic corticosteroids	Daily activities limitation, 109 (77%)	Diffuse wheezing, 111 (63%)
	Tirage, 105 (84%)	SaO ₂ <90%, 97 (40%)
	Cyanosis, 98 (60%)	Daily activities limitation, 100 (43%)
COPD-Antibiotics	Suspected bacterial exacerbation, 130 (97%)	Purulent sputum, 232 (100%)
	Purulent sputum, 118 (79%)	Temperature>38°C, 157 (82%)
	SaO ₂ <90%, 103 (41%)	C reactive protein>6 mg/l, 108 (64%)

Values are intended as total score, which takes into account the frequency of choice by the practitioner and the importance given (see material and methods section). The percentage in brackets reflects the proportion of practitioners who chose this criterion without taking into account the order of importance.

Concerning COPD exacerbation, GPs consider as most relevant factors to start a course of systemic corticosteroids: limitation of daily activities (score 109 points), tirage (105 points) and asthma (98 points), whereas respiratory physicians evidenced diffuse wheezing (111 points), SaO₂<90% (97 points) and limitation of daily activities (100 points). About posological scheme, both GPs and pulmonologist were concordant in suggesting (74% of GPs and 82% of pulmonologists) oral prednisone 25mg once daily with tapering strategy for not more than 12 days.

Finally, relating to the criteria of prescribing antibiotics during a COPD exacerbation, GPs mainly focused on suspicion of bacterial exacerbation (score 130 points), purulent sputum (118 points) and SaO₂<90% (103 points) whereas pulmonologist outlined the presence of purulent sputum (232 points), temperature >38°C (157 points) and C Reactive Protein levels >6 mg/l (108 points). About antibiotic choice, 68% of GPs and 75% of pulmonologist privileged β -lactams, and macrolides were the second most used.

Discussion

The results of our study show divergences between GPs and chest physicians regarding the decision of prescribing systemic corticoids in both asthma and COPD exacerbations. Interestingly, discrepancies were also reported within the same professional groups, especially among pulmonologists. In contrast, criteria for prescribing antibiotics during COPD exacerbation were more concordant between pulmonologists and GPs as well as within the groups.

About asthma exacerbations, it appears that GPs were coherent only in limitation of daily activities (81% of participants) whereas for other self-reported important criteria such as tirage and persistent cough the percentage was barely higher than 50% of applicants. Notably, pulmonologists showed concordance only in FEV₁<30%pred. (81%) and not unanimous consensus about the other proposed criteria. It is worth to be mentioned that our data revealed differences with those of Louis et al (4), especially concerning nocturnal awakenings, which have been poorly considered by Italian pulmonologists, whereas Belgian GPs have

a higher focus on cyanosis than persistent cough (4). Surprisingly, in both studies participants did not give importance to the lack of response of FEV₁ after inhalation of short acting β -2 agonists, which is an important criterion defining the exacerbation according to Tattersfield et al. (5) and which allows to differentiate an exacerbation from an poorly controlled asthma (6). Similarly as above, levels of circulating eosinophils, which may predict the degree of eosinophilic bronchial inflammation (7) and an adequate clinical response to corticosteroid therapy (8) rarely emerges as a relevant criterion for respiratory physicians and has not been taken into account by GPs.

About prescription of systemic corticosteroids during COPD exacerbations, our data evidenced some discrepancies between generalists and pulmonologists. Indeed, generalists highlight the limitation of daily activity (77%) and tirage (84%), whereas pulmonologists are somewhat concordant only on diffuse wheezing (63%). The current findings are coherent to those previously collected by Belgian practitioners (4), both indicating that Pulmonologists favor clinical signs and GPs give greater importance to the impact of patient's health status.

Differently from what observed for the prescription of systemic corticosteroids, we found a consistency within generalists and pulmonologists for prescribing antibiotics in exacerbated patients with COPD. In detail, GPs favor the criteria of suspicion of bacterial exacerbation (97%) and purulent sputum (79%), the latter being shared by chest physicians (100%) associated to body temperature above 38°C (82%). These data perfectly overlap with those of Louis et al (4) concerning pulmonologist and differ among their GPs, which rather reflect the criteria chosen by the respiratory specialists.

Finally, Italian and Belgian prescribers showed similar posological schemes, with the exception that prednisone is more preferred in south Italy compared to methyl-prednisolone, which appears to be widely used in Belgium (4).

Conclusions

In conclusion, our study ratifies that clinical criteria arbitrarily considered as important to start a course

of systemic corticoids and/or antibiotics in asthma and COPD may differ between generalists and pulmonologists, but also between practitioners of the same discipline. Moreover, the above discrepancies are confirmed when comparing data of practitioners from abroad.

Based on the above, efforts should be made for international harmonization of guidelines for the prescription of systemic corticosteroids and antibiotics in asthma and COPD.

Conflicts of interest: Each author declares that he or she has no commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangement etc.) that might pose a conflict of interest in connection with the submitted article.

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APPENDIX**Questionnaires for General practitioners and pulmonologists (translated from Italian)
FOR GENERAL PRACTITIONERS:**

Questionnaire 1

Which of the following criteria do you consider more relevant for prescribing a course of systemic corticosteroids (oral or intramuscular) during an asthma exacerbation?

Please list your 5 most important criteria, by assigning a score from 1 to 5 according to the order of importance (1=the most important, 5=the least important).

- Daily activities limitation due to dyspnea
 - Tirage
 - Cyanosis
 - FC > 120 / min
 - Absence of symptom improvements after inhalation of 200-400 µg of salbutamol
 - Marked lung sounds reduction at auscultation
 - Difficulty in speaking
 - Persistent cough
 - Respiratory rate > 30 / min
 - Diffuse wheezing
 - Frequent night awakenings
 - Respiratory rate > 24 / min
 - Sa O₂ <90%
 - Decrease of Peak Espiratory Flow of at least 250 ml / min
 - High level of circulating eosinophils > 400 / µl
 - Prescription of antibiotics without clinical improvements
 - Runny nose and pharyngitis
 - Purulent sputum
 - Temperature > 38 C °
 - Sa O₂ <95%
 - C Reactive protein levels > 6 mg / l
 - Fibrinogen values (> 4 g / L)
 - Suspected viral exacerbation
 - Suspected bacterial exacerbation
 - State of general impairment of the patient
 - Frequent episodes of exacerbation
-

Questionnaire 2:

Which of the following criteria do you consider more relevant for prescribing a course of systemic corticosteroids (oral or intramuscular) during a COPD exacerbation in a patient already under inhaled bronchodilator therapy? Please list your 5 most important criteria, by assigning a score from 1 to 5 according to the order of importance (1=the most important, 5=the least important).

- Daily activities limitation due to dyspnea
 - Tirage
 - Cyanosis
 - FC > 120 / min
 - Absence of symptom improvements after inhalation of 200-400 µg of salbutamol
 - Marked lung sounds reduction at auscultation
 - Difficulty in speaking
 - Persistent cough
 - Respiratory rate > 30 / min
 - Diffuse wheezing
 - Frequent night awakenings
 - Respiratory rate > 24 / min
 - Sa O₂ <90%
 - Decrease of Peak Espiratory Flow of at least 250 ml / min
 - High level of circulating eosinophils > 400 / µl
 - Prescription of antibiotics without clinical improvements
 - Runny nose and pharyngitis
 - Purulent sputum
 - Temperature > 38 C °
 - Sa O₂ <95%
 - C Reactive protein levels > 6 mg / l
 - Fibrinogen values (> 4 g / L)
 - Suspected viral exacerbation
 - Suspected bacterial exacerbation
 - State of general impairment of the patient
 - Frequent episodes of exacerbation
 - Use of more than 8 puffs/day of bronchodilators
 - Symptoms improvement after administration of short-acting bronchodilators
 - High level of circulating neutrophils (> 7500 / µL)
 - Neutrophils percentage > 75%
-

Questionnaire 3:

Which of the following criteria do you consider more relevant for prescribing a course of antibiotics during a COPD exacerbation?

Please list your 5 most important criteria, by assigning a score from 1 to 5 according to the order of importance (1=the most important, 5=the least important).

- Daily activities limitation due to dyspnea
 - Tirage
 - Cyanosis
 - FC > 120 / min
 - Absence of symptom improvements after inhalation of 200-400 µg of salbutamol
 - Marked lung sounds reduction at auscultation
 - Difficulty in speaking
 - Persistent cough
 - Respiratory rate > 30 / min
 - Diffuse wheezing
 - Frequent night awakenings
 - Respiratory rate > 24 / min
 - Sa O₂ <90%
 - Decrease of Peak Espiratory Flow of at least 250 ml / min
 - High level of circulating eosinophils > 400 / µl
 - Prescription of antibiotics without clinical improvements
 - Runny nose and pharyngitis
 - Purulent sputum
 - Temperature > 38 C °
 - Sa O₂ <95%
 - C Reactive protein levels > 6 mg / l
 - Fibrinogen values (> 4 g / L)
 - Suspected viral exacerbation
 - Suspected bacterial exacerbation
 - State of general impairment of the patient
 - Frequent episodes of exacerbation
 - Use of more than 8 puffs/day of bronchodilators
 - Symptoms improvement after administration of short-acting bronchodilators
 - High level of circulating neutrophils (> 7500 / µL)
 - Neutrophils percentage > 75%
-

FOR PULMONOLOGISTS:

Questionnaire 1:

Which of the following criteria do you consider more relevant for prescribing a course of systemic corticosteroids (oral or intramuscular) during an asthma exacerbation in a patient already under inhaled corticosteroid therapy? Please list your 5 most important criteria, by assigning a score from 1 to 5 according to the order of importance (1=the most important, 5=the least important).

- Daily activities limitation due to dyspnea
 - Tirage
 - Cyanosis
 - FC > 120 / min
 - Absence of symptom improvements after inhalation of 200-400 µg of salbutamol
 - Marked lung sounds reduction at auscultation
 - Difficulty in speaking
 - Persistent cough
 - Respiratory rate > 30 / min
 - Diffuse wheezing
 - Frequent night awakenings
 - Respiratory rate > 24 / min
 - Sa O₂ <90%
 - Decrease of Peak Espiratory Flow of at least 250 ml / min
 - High level of circulating eosinophils > 400 / µl
 - Prescription of antibiotics without clinical improvements
 - Runny nose and pharyngitis
 - Purulent sputum
 - Temperature > 38 C °
 - Sa O₂ <95%
 - C Reactive protein levels > 6 mg / l
 - Fibrinogen values (> 4 g / L)
 - Suspected viral exacerbation
 - Suspected bacterial exacerbation
 - State of general impairment of the patient
 - Frequent episodes of exacerbation
 - FEV₁ <50% of predicted values.
 - Sa O₂ <90%
 - FEV₁ <30% of predicted values
 - FEV₁ <250 l / min
-

Questionnaire 2:

Which of the following criteria do you consider more relevant for prescribing a course of systemic corticosteroids (oral or intramuscular) during a COPD exacerbation in a patient already under inhaled bronchodilator therapy? Please list your 5 most important criteria, by assigning a score from 1 to 5 according to the order of importance (1=the most important, 5=the least important).

- Daily activities limitation due to dyspnea
 - Tirage
 - Cyanosis
 - FC > 120 / min
 - Absence of symptom improvements after inhalation of 200-400 µg of salbutamol
 - Marked lung sounds reduction at auscultation
 - Difficulty in speaking
 - Persistent cough
 - Respiratory rate > 30 / min
 - Diffuse wheezing
 - Frequent night awakenings
 - Respiratory rate > 24 / min
 - Sa O₂ <90%
 - Decrease of Peak Espiratory Flow of at least 250 ml / min
 - High level of circulating eosinophils > 400 / µl
 - Prescription of antibiotics without clinical improvements
 - Runny nose and pharyngitis
 - Purulent sputum
 - Temperature > 38 C °
 - Sa O₂ <95%
 - C Reactive protein levels > 6 mg / l
 - Fibrinogen values (> 4 g / L)
 - Suspected viral exacerbation
 - Suspected bacterial exacerbation
 - State of general impairment of the patient
 - Frequent episodes of exacerbation
 - Use of more than 8 puffs/day of bronchodilators
 - High level of circulating neutrophils (> 7500 / µL)
 - Neutrophils percentage > 75%
 - FEV₁ <50% of predicted
 - FEV₁ <30% of predicted
 - PaCO₂ > 45 mmHg
-

Questionnaire 3:

Which of the following criteria do you consider more relevant for prescribing a course of antibiotics during a COPD exacerbation?

Please list your 5 most important criteria, by assigning a score from 1 to 5 according to the order of importance (1=the most important, 5=the least important).

- Daily activities limitation due to dyspnea
 - Tirage
 - Cyanosis
 - FC > 120 / min
 - Absence of symptom improvements after inhalation of 200-400 µg of salbutamol
 - Marked lung sounds reduction at auscultation
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 - Persistent cough
 - Respiratory rate > 30 / min
 - Diffuse wheezing
 - Frequent night awakenings
 - Respiratory rate > 24 / min
 - Sa O₂ <90%
 - Decrease of Peak Espiratory Flow of at least 250 ml / min
 - High level of circulating eosinophils > 400 / µl
 - Prescription of antibiotics without clinical improvements
 - Runny nose and pharyngitis
 - Purulent sputum
 - Temperature > 38 C °
 - Sa O₂ <95%
 - C Reactive protein levels > 6 mg / l
 - Fibrinogen values (> 4 g / L)
 - Suspected viral exacerbation
 - Suspected bacterial exacerbation
 - State of general impairment of the patient
 - Frequent episodes of exacerbation
 - Use of more than 8 puffs/day of bronchodilators
 - Symptoms improvement after administration of short-acting bronchodilators
 - High level of circulating neutrophils (> 7500 / µL)
 - Neutrophils percentage > 75%
 - FEV₁ <30% of predicted
 - FEV₁ <50% of predicted
 - FEV₁ <50% of best observed in that patient
 - FEV₁ <80% of best observed in that patient
 - PaCO₂ > 45mmHg
-