REVIEW

Short-course fluoroquinolone therapy in exacerbations of chronic bronchitis and COPD

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Summary
Acute exacerbations of chronic bronchitis (AECB) and chronic obstructive pulmonary disease (COPD) are associated with significant healthcare costs and contribute to the progress of the disease. Although a number of factors may trigger these episodes, between 40% and 60% are bacterial in nature. Antimicrobial therapy can be effective in treating exacerbations, leading to improved peak expiratory flow rates, fewer hospitalizations, lower relapse rates, and greater clinical success. Evidence suggests that short-course antimicrobial therapy can be as effective as standard duration therapy (>7 days) in treating exacerbations. Randomized trials have shown that clinical and bacteriological success rates are comparable with both 5-day and standard antibiotic courses. Furthermore, 5-day fluoroquinolone therapy is associated with faster recovery, fewer relapses, prolonged duration between episodes, and less hospitalization when compared with standard therapy. Both moxifloxacin and gemifloxacin have received FDA-approval for 5-day therapy in AECB.

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KEYWORDS
Chronic bronchitis; COPD; AECB; Fluoroquinolones; Duration of therapy; Short-course therapy

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Introduction

Approximately 13 million Americans suffer from chronic bronchitis or chronic obstructive pulmonary disease (COPD). Acute exacerbations of chronic bronchitis (AECB) affect many of these individuals and account for an estimated 12 million physician visits annually. Exacerbations lead to declines in lung function, cause significant morbidity and mortality, accelerate disease progression, and significantly lower the quality of life, including an increase in the risk of being housebound.

The cardinal symptoms of exacerbations are increased cough, dyspnea, increased sputum volume, and increased sputum purulence. COPD patients have between 1 and 3 exacerbation episodes per year, and the frequency may be associated with disease severity.

Etiology of exacerbations

Environmental factors such as air pollutants, allergens, temperature changes, or irritants (i.e., dust and cigarette smoke) can precipitate an exacerbation. Comorbid conditions such as congestive heart failure or pulmonary embolism may aggravate or mimic an exacerbation, while lack of compliance with therapy has also been implicated in some patients. However, infections are the most common trigger, with bacterial or viral pathogens accounting for 80% of AECB episodes.

Bacterial pathogens occur in 40–60% of AECB sputum samples, and require appropriate and timely antimicrobial therapy. Patients who are elderly or with multiple comorbid conditions, those who have more purulent sputum or patients with worsening COPD, are more likely to have bacterial infections. In many cases, bacterial exacerbations are secondary to viral infections, and 25% of patients may have a viral/bacterial coinfection.

Gram-negative bacteria are more likely to be involved in AECB, with Haemophilus influenzae accounting for 50% of all bacterial exacerbations. However, Moraxella catarrhalis causes some AECBs, and Pseudomonas aeruginosa and other Gram-negative bacilli, such as Enterobacteriaceae, are more prevalent in patients with severe impairment of lung function. Among Gram-positive bacteria, Streptococcus pneumoniae is the most common, and S. pneumoniae and M. catarrhalis have been found in approximately 30% of isolates obtained from patients with exacerbations. Atypical respiratory pathogens, including Chlamydia pneumoniae, occur in 5–10% of AECB. Resistance is an important issue in AECB, with both β-lactam and macrolide resistance occurring among causative pathogens. Further, multidrug-resistant bacteria are common among patients with severe acute exacerbations requiring intubation and mechanical ventilation.

Likely causative pathogens vary according to the severity of the underlying COPD and the degree to which the lung function is impaired. In patients with mild-to-moderate COPD, H. influenzae and S. pneumoniae are the most common pathogens implicated in exacerbations. Staphylococcus aureus and Gram-negative bacteria, such as P. aeruginosa and Enterobacteriaceae species, predominate in patients who experience severe exacerbations and have a forced expiratory volume in 1 s (FEV1) ≤ 35%. Approximately 30–50% of AECB are associated with a viral infection. These infections may exacerbate existing inflammation in patient airways and predispose individuals to secondary bacterial infection.

Antimicrobial therapy in the management of AECB

Successful management of AECB entails achievement of four goals: rapidly resolving symptoms, preventing relapse, prolonging the time between exacerbations, and interrupting the vicious cycle of recurrent infection induced lung damage. A number of guidelines have established treatment recommendations for AECB. The American College of Physicians and the American College of Chest Physicians endorse the benefit of antibiotic therapy, especially for patients with more severe exacerbations. Evidence indicates that antimicrobial therapy can be effective in treating exacerbations, leading to improved peak expiratory flow rates, fewer hospitalizations, lower relapse rates, and greater clinical success. Current guidelines for antimicrobial therapy in AECB include those from the Global Initiative for Chronic Obstructive Lung Disease (GOLD), the American Thoracic Society, the Canadian Thoracic Society and the Canadian Infectious Disease Society, the European Respiratory Society, and a consensus statement formulated by a number of Spanish medical societies.

Selection of effective antimicrobial therapy is critical. Some evidence suggests that use of inappropriate antibiotics may result in poor outcomes and greater likelihood of relapse. The Council for Appropriate and Rational Antibiogenic Therapy (CARAT) criteria recommend that selection of antibiotic treatment be supported with strong clinical evidence, such as data from randomized, double-blind, controlled multicenter trials. Table 1 presents Canadian guidelines for first-line antimicrobial treatment and alternatives for treatment failure in AECB. These guidelines represent a joint effort by the Canadian Thoracic Society...
<table>
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<th>Risk group</th>
<th>Basic clinical state</th>
<th>Symptoms and risk factors</th>
<th>Probable pathogens</th>
<th>First choice</th>
<th>Alternatives for treatment failure</th>
</tr>
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<tr>
<td>I</td>
<td>Chronic bronchitis without risk factors (simple)</td>
<td>Increased cough and sputum, sputum purulence, and increased dyspnea</td>
<td><em>Haemophilus influenzae</em>, <em>Haemophilus</em> spp., <em>Moraxella catarrhalis</em>, <em>Streptococcus pneumoniae</em></td>
<td>2nd-generation macrolide, 2nd- or 3rd-generation cephalosporin, amoxicillin, doxycycline, TMP-SMX</td>
<td>Fluoroquinolone, β-lactam/β-lactamase inhibitor</td>
</tr>
</tbody>
</table>
| II         | Chronic bronchitis with risk factors (complicated) | As in group I plus ≥1 of the following:  
- FEV₁ < 50% predicted  
- >4 exacerbations/yr  
- Cardiac disease  
- Use of home oxygen  
- Chronic oral steroid use  
- Antibiotic use in the past 3 mo | *Klebsiella* spp. + other Gram-negative pathogens Increased probability of β-lactam resistance | Fluoroquinolone or β-lactam/β-lactamase inhibitor  
May require parenteral therapy  
Consider referral to a specialist or hospital |
| III        | Chronic suppurative bronchitis | As in group II with constant purulent sputum  
- Some have bronchiectasis  
- FEV₁ < 35% predicted  
- Use of home oxygen  
- Multiple risk factors (e.g., frequent exacerbations and FEV₁ < 50% predicted) | As in group II plus *Pseudomonas aeruginosa* and multiresistant Enterobacteriaceae | Ambulatory patients: tailor treatment to airway pathogen  
P aeruginosa common (ciprofloxacin)  
Hospitalized patients: parenteral therapy usually required | – |

Duration of fluoroquinolone therapy in AECB and COPD

and the Canadian Infectious Disease Society.1 Patients are stratified according to risk factors, with antibiotic recommendations for each group.

P. aeruginosa and other Gram-negative bacilli are more common in patients who have frequent exacerbations, chronic use of oral steroids, or severe pulmonary disease (GOLD IV),11,13,23 such as Group III patients with AECB (Table 1) and patients with more-advanced exacerbations of COPD.24 In a recent study of hospitalized patients with exacerbations of COPD, Garcia-Vidal and colleagues identified the BODE (body mass index, airflow obstruction, dyspnea, exercise capacity) index ([odds ratio] OR 2.18; 95% confidence interval [CI], 1.26–3.78; P = 0.005), admissions in the previous year (OR 1.65; 95% CI, 1.13–2.43; P = 0.005), systemic steroid treatment (OR 14.7; 95% CI, 2.28–94.8; P = 0.01), and previous isolation of P. aeruginosa (OR 23.1; 95% CI, 5.7–94.3; P < 0.001) as risk factors for P. aeruginosa infection.21 Many of these organisms are resistant to traditional first-line agents, such as amoxicillin, doxycycline, trimethoprim/sulfamethoxazole, azalides, and macrolides.25 Fluoroquinolones (ciprofloxacin, and high-dose levofloxacin 750 mg) have been recommended as the agent of choice when these pathogens are identified in patients with AECB.1

Short-course therapy versus standard therapy

Duration of antimicrobial treatment is a critical decision. Short-course therapy (defined as <5 days) may have a number of advantages over standard therapy (>7 days), including improved speed of recovery, shortened time to symptom improvement, decreased relapse rate, and prolonged intervals between recurrences. Additionally, short-course therapy may reduce the risk of adverse events and the pressure that drives bacterial resistance as a result of shorter exposure to antibiotics.26,27 Reduced hospital admission rates, hospital lengths of stay, and healthcare costs have also been demonstrated with short-course therapy.26,28–32 Further, there may also be an impact on the long-term course of the disease.32 In patients with pseudomonas infections, mainly nosocomial infections, the current recommendations are to receive antibiotics for up to 15 days. Longer duration of therapy is associated with reduced failure rates.33

A meta-analysis of 7 randomized controlled trials, with a total patient population of 3083, compared different treatment durations of the same antibiotic regimen. The short-duration treatment proved as effective as and safer than long-duration antimicrobial therapy in patients with AECB.26 Short-course therapy was associated with fewer adverse events as compared with standard, longer duration treatment.26 A second meta-analysis involving 21 double-blind studies and 10,698 patients also found that clinical cure rates, at both early and late follow-up, and bacteriological cure rates observed with short-course therapy were comparable to those achieved with conventional duration therapy in patients with mild-to-moderate exacerbations.14 Similar observations were found for early cure when different treatment durations of the same antibiotic were compared. The authors suggested that a shorter course of antibiotic treatment may enhance compliance and reduce antibiotic costs, and further recommended that antibiotic treatment duration be no longer than 5 days, regardless of antibiotic class, in patient with mild-to-moderate exacerbations of COPD or chronic bronchitis.34

Short-course therapy with cephalosporins, β-lactams, and macrolides

A trial investigating the efficacy and safety of a 5-day course of pharmacokinetically-enhanced amoxicillin–clavulanate (2000/125 mg bid) compared with a 7-day course of conventional amoxicillin–clavulanate (875/125 mg bid) in AECB found that the shorter course was as effective clinically in the per-protocol (PP) population as the longer course regimen, with a clinical success rate of 90.3% and 91.7%, respectively.35 Further, bacteriological success was achieved in 76.7% and 73.0%, respectively.35 A once-daily, 5-day course of clarithromycin extended-release (1000 mg) was compared to 7-day clarithromycin regular-release taken twice daily (500 mg) for AECB. As with the other trials, results were similar in both groups—clinical cures among evaluable patients were 84% in both extended- and regular-release groups. The bacteriological cure rates were 87% and 89%, respectively, and overall target pathogen eradication rates were 88% and 89%, respectively.36 However, 5-day clarithromycin extended-release was better tolerated and caused statistically significantly fewer drug-related adverse events due to abnormal taste than the regular-release formulation (3% and 8%, respectively, P = 0.012).36

Short-course fluoroquinolone therapy

The respiratory fluoroquinolones (levofloxacin, moxifloxacin, and gemifloxacin) exhibit a broad-spectrum activity against most pathogens associated with AECB.28 Fluoroquinolones have been recommended as first-line treatment for AECB in patients with chronic bronchitis complicated by comorbid illness, severe COPD with a FEV1 < 50%, patients >65 years, or recurrent exacerbations (Table 1).1 Clinical studies have demonstrated comparable, and in some cases, superior efficacy for short-course, 5-day fluoroquinolone therapy to that of standard therapy in AECB, as measured by both clinical and bacteriological outcomes. In a randomized, double-blind study of a 5-day course of 500 mg levofloxacin qd compared with the 7-day, 500 mg qd regimen in 532 patients with AECB, the clinical success rates in the PP analysis were 82.8% for the 5-day regimen and 84.4% for the 7-day regimen. Bacteriological eradication rates were also similar at 82.1% and 83.2%, respectively.37

In a randomized, noninferiority study, 369 patients with severe AECB were randomized to receive either high-dose levofloxacin therapy (750 mg qd) for 5 days or amoxicillin/clavulanate (875/125 mg bid) for 10 days.38 Significantly more patients in the 5-day levofloxacin group had resolution of purulent sputum production (57.5% vs 35.6%; P < 0.006), sputum production (65.4% vs 45.3%; P < 0.013), and cough (60.0% vs 44.0%; P < 0.045), compared with the amoxicillin/clavulanate group in the intent-to-treat (ITT) population.30
Short-course levofloxacin therapy was also evaluated in 763 patients stratified by severity of illness, based on pre-determined criteria and risk factors. In the uncomplicated group, patients were randomized to levofloxacin (750 mg qd) for 3 days or azithromycin (500 × 1 d/250 mg qd) for 5 days, while those in the complicated AECB group received levofloxacin (750 mg qd) for 5 days or amoxicillin/clavulanate (875/125 mg bid) for 10 days. In the uncomplicated group, Martinez and colleagues showed that both clinical success and microbiological eradication rates in microbiologically evaluable patients were superior for the 3-day levofloxacin regimen as compared with 5 days of azithromycin (96.3% vs 87.4% and 93.8% vs 82.8%, respectively). In the complicated cases, the clinical success and microbiological eradication rates were similar for 5 days of levofloxacin and 10 days of amoxicillin/clavulanate (81.4% vs 80.9% and 81.4% vs 79.8%, respectively). The investigators concluded that short courses (3–5 days) of levofloxacin 750 mg are at least as effective as traditional courses of azithromycin and amoxicillin/clavulanate for the spectrum of patients with AECB.

Short-course moxifloxacin therapy has also been investigated in AECB. A 5-day course of moxifloxacin was explored in a randomized, multicenter study involving 936 patients with AECB that compared the efficacy of 5 days of moxifloxacin (400 mg qd) to 10 days of moxifloxacin (400 mg qd) or clarithromycin (500 mg bid). Overall, clinical resolution was similar: 89% for 5-day moxifloxacin, 91% for 10-day moxifloxacin, and 91% for 10-day clarithromycin. Bacteriological eradication rates at follow-up were also comparable at 94%, 95%, and 91%, respectively. The 5-day moxifloxacin therapy, however, has a favorable safety and tolerability profile as compared to 10-day treatment with moxifloxacin or clarithromycin; drug-related events were reported for 26%, 30%, and 35%, respectively. The investigators recommended that 5-day moxifloxacin is as effective and furthermore, a more convenient treatment regimen than a standard course of clarithromycin or a long duration of moxifloxacin therapy for patients with AECB.

Another clinical study of 563 patients compared 2 respiratory fluoroquinolones — levofloxacin and moxifloxacin — in the treatment of AECB. A 5-day, 400 mg qd course of moxifloxacin was both clinically and microbiologically equivalent to a 7-day, 500 mg qd course of levofloxacin. Clinical success rates were achieved in 91.0% and 94.0% of patients in the moxifloxacin and levofloxacin groups, respectively, while bacteriological eradication rates were 92.8% and 93.8%, respectively.

A randomized, nonblinded study including 162 patients observed clinical success rates of 88.6% and 89.2% and pathogen eradication rates at 14 days of 90.9% and 90.0% in the 5-day moxifloxacin (400-mg tablet qd) and 7-day amoxicillin/clavulanate (one, 625-mg tablet every 8 h) groups, respectively. Similar results comparing a 5-day course of moxifloxacin 400 mg qd to another short-course therapy, 3-day azithromycin 500 mg qd, were reported by Zervos et al. Of 342 patients randomized to either treatment, clinical success rates for azithromycin and moxifloxacin were comparable at days 10–12 (90% vs 90%) and days 22–26 (81% vs 82%) in the ITT analysis. Further, a similar safety and tolerability profile was observed in the two short-course treatment groups.

MOSAIC was a large international study that compared short- and long-term outcomes of antibiotic treatment of AECB in patients with a history of heavy smoking and significant COPD. Five-day moxifloxacin treatment was compared with a 7–10-day course of amoxicillin, clarithromycin, or cefuroxime-axetil. The 5-day moxifloxacin regimen demonstrated superior clinical cure rates and higher bacteriological success rates than standard therapy among the 730 patients enrolled. In the ITT population, clinical cure was achieved in 70.9% of patients receiving moxifloxacin compared with 62.8% given standard therapy (95% CI, 1.4—14.9), while in the PP population those figures were 69.7% and 62.1%, respectively (95% CI, 0.3—15.6). Higher bacteriologic eradication rates were observed in the ITT population (76.8% vs 67.5%, respectively; 95% CI, 0.16—0.20) and in the microbiologically valid population (91.5% vs 81.0%, respectively; 95% CI, 0.4—22.1). Multivariate analyses further confirmed the clinical cure benefit (OR 1.49; 95% CI, 1.08—2.04) and clinical success (OR 1.57; 95% CI, 1.02—2.41) of short-course moxifloxacin compared with standard therapy in patients with AECB.

Short-course therapy with gemifloxacin has also been investigated. A randomized, double-blind study was conducted to compare 5-day oral gemifloxacin (320 mg qd) with 7-day oral levofloxacin (500 mg qd) in 360 patients. Gemifloxacin proved at least as effective as levofloxacin, with clinical success rates at follow-up (days 14–21) in the PP population of 88.2% for gemifloxacin and 85.1% for levofloxacin. Success rates at the long-term follow-up (days 28–35) were 83.7% and 78.4%, respectively.

A 5-day course of gemifloxacin (320 mg qd) was compared with 7 days of clarithromycin (500 mg bid) in a randomized, double-blind study of 712 patients with AECB. Clinical success rates were 85.4% and 84.6% for the gemifloxacin and clarithromycin groups, respectively, and bacteriological success rates were 86.7% and 73.1%, respectively. The long-term health outcome of AECB recurrence also favored short-course gemifloxacin. Significantly more patients receiving gemifloxacin remained free of AECB recurrence after 26 weeks compared with those receiving clarithromycin (71.0% vs 58.5%, respectively; P = 0.016).

Outcomes of antimicrobial therapy: speed of recovery and relapse

Recovery after an exacerbation is influenced by the severity of the exacerbation and the patient’s history of exacerbations, including frequency of previous exacerbations. Median recovery time after an episode is 6 days for lung function and 7 days for symptoms. However, recovery time may be considerably longer, as only 75% of patients return to baseline peak flows 35 days after the exacerbations have resolved. If the patient has not improved after the first course of antibiotics, a second course is indicated. Table 2 presents factors associated with an increased risk of recurrence of AECB.

When compared with standard therapy that involves long-duration treatment (>7 days) with non-fluoroquinolone regimens, 5-day fluoroquinolone therapy also
shows an association with more rapid symptom resolution, faster rate of recovery, lower relapse rate, and prolonged relapse time intervals.28,29

Clinical studies have demonstrated improvements in speed of recovery and relapse rate in AECB with short-course fluoroquinolone therapy. In a study comparing 5-day moxifloxacin therapy with 7-day ceftriaxone in 476 patients, moxifloxacin was associated with lower relapse rates (23.3% vs 28.3%; \( P > 0.05 \)) and shorter hospitalization (137 days shorter than the control group treated with ceftriaxone in inpatient plus day-hospital settings), resulting in greater cost savings.29

The MOSAIC study also showed significantly improved long-term outcomes in AECB with short-course fluoroquinolone therapy. Median times to new exacerbations in patients who did not require further antibiotics were 131.0 days (mean = 132.8 days) in the moxifloxacin group, and 103.5 days (mean = 118.0 days) with standard therapy, the difference was statistically significant (\( P = 0.03 \)).32 Additionally, a life-table analysis of time to the first composite event (treatment failure, and/or new exacerbations, and/or further antibiotic treatment) demonstrated a significant difference favoring moxifloxacin for up to 5 months of follow-up (\( P = 0.03 \)) (Fig. 1).32 For the elderly and patients with >3 exacerbations in the previous year, the difference was significant for 9 months in favor of moxifloxacin.42

Evidence from previously conducted Spanish studies also indicates that recovery from AECB is faster in patients treated with 5-day fluoroquinolone therapy.46,47 Time to recovery was 20% shorter in one study, suggesting that return to work or other activities could be hastened with such treatment.46 In another study, 70.3% of patients treated with a 5-day course of moxifloxacin recovered within 5 days or less, compared with 44.4% of those treated with co-amoxiclav or 49.7% treated with clarithromycin (\( P < 0.0001 \)).47 Moxifloxacin appeared to provide a protective effect against slow recovery as compared with co-amoxiclav (OR 0.34; 0.26–0.45) and clarithromycin (OR 0.41; 0.31–2.85).47 In trials which compared real-life treatment of AECB with moxifloxacin tablets to oral macrolides, azithromycin, clarithromycin or roxithromycin, 5-day moxifloxacin provides faster relief of symptoms and higher recovery rates with comparable safety and tolerability profiles (Fig. 2).48

The Gemifloxacin Long term Outcomes in Bronchitis Exacerbations (GLOBE) study compared 5-day gemifloxacin (320 mg qd) and 7-day clarithromycin (500 mg bid) on the time for recovery of health status, as measured by St. George’s Respiratory Questionnaire (SGRQ) scores, following an AECB.31 In 438 patients, the SGRQ scores did not differ significantly between the two treatment groups at baseline. However, the difference widened progressively after treatment, and at 26 weeks, the SGRQ score was 4.6 units (95% CI, 9.1–0.1) lower in the gemifloxacin group, suggesting that gemifloxacin may have a greater impact than clarithromycin on the recovery of health status in patients with AECB.31

Table 2 Risk factors associated with increased recurrence of AECB.

- Frequent purulent exacerbations.
- Poor underlying lung function.
- Lengthy duration of chronic obstructive lung disease.
- Chronic corticosteroid administration.
- Use of supplemental oxygen.
- Significant cardiac disease.
- Malnutrition.

Figure 1 Life-table analysis of time to the first composite event (treatment failure, and/or new exacerbation, and/or any further antibiotic treatment) stratified according to the time of the last exacerbation prior to randomization to moxifloxacin or standard therapy.27 Reproduced with permission from Wilson R, Allegra L, Huchon G, et al. Short-term and long-term outcomes of moxifloxacin compared to standard antibiotic treatment in acute exacerbations of chronic bronchitis. Clin Drug Invest 2004; 125:953–64.

Figure 2 Improvement rate over the first 10 days of observation. Mean duration until improvement in moxifloxacin-treated patients was 3.2 days compared with 4.5 days in macrolide-treated patients. The difference of 1.2 days was statistically significant (\( P < 0.0001 \)).44 Reproduced with permission from Schaberg T, Möller M, File T, Stauch K, Landen H. Real-life treatment of acute exacerbations of chronic bronchitis with moxifloxacin or macrolides: a comparative post-marketing surveillance study in general practice. Clin Drug Invest 2006; 26:733–44.
Conclusions

It is important to determine that an exacerbation is due to bacterial infection before prescribing antibiotic therapy, as 40–60% of exacerbations are related to bacterial infections. The goals of therapy include rapidly resolving patients’ symptoms, preventing relapse, prolonging the time between exacerbations, interrupting the cycle of recurrent infection, and reducing the extent of lung damage. The most important decision is antibiotic choice. Guidelines stratify patients by risk factor and disease severity, and thus help improve selection of an appropriate antibiotic and reduce treatment failures.

Studies of a variety of antimicrobial classes have demonstrated that a shorter duration of therapy provides comparable clinical outcomes to a standard, longer dosing duration. In addition, short-course treatment regimens may improve patient compliance, decrease the risk of adverse events, lower costs, and possibly reduce the pressures that drive antibiotic resistance. Research conducted on short-course fluoroquinolone therapy supports its use. Furthermore, short-course, high-dose fluoroquinolone therapy also demonstrates more rapid symptom resolution and faster recovery rates than traditional therapy using non-fluoroquinolones for standard treatment durations. A 5-day regimen for AECB has been approved by the US FDA for both moxifloxacin (400 mg qd) and gemifloxacin (320 mg qd). However, gemifloxin 320 mg therapy has not been recommended by the Committee for Medicinal Products for Human Use (CHMP) of EMEA. The demonstrations that 5-day fluoroquinolone therapy is better than 7-day macrolide/β-lactam therapy, and that 5-day fluoroquinolone therapy is not worse than 7-day or 10-day fluoroquinolone (when stratified by severity), support the recommendation of short-course, 5-day fluoroquinolone therapy as a treatment option for patients with AECB.

Overall, short-course antibiotic therapy in exacerbations of COPD and bronchitis is at least as effective as traditional standard therapy in clinical success and microbiological eradication rates. Additionally, short-course therapy is associated with favorable safety and tolerability, and lowered risks of adverse events as compared with standard, longer duration treatment. Moreover, in comparison with long-duration non-fluoroquinolone treatment regimens, short-course fluoroquinolone therapy also improved speed of recovery, decreased relapse rate, prolonged recurrence intervals, reduced hospitalization, shortened hospital stay, and exhibited a beneficial impact on the long-term course of the underlying chronic bronchitis or COPD. Short course treatment is not recommended for patients with severe lung disease that may have pseudomonas infection.

Conflict of interest

Antonio Anzueto has been consultant and speaker for Bayer-Schering-Pharma, Schering-Plough, Pfizer, Boehringer Ingelheim, GlaxoSmithKline, Dey, Ortho-McNeill, and AstraZeneca. Marc Miravitlles has been consultant and speaker for Bayer-Schering-Pharma, Pfizer, Boehringer Ingelheim, GlaxoSmithKline, and AstraZeneca.

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