Minimal Use of Antibiotics for Acute Respiratory Tract Infections: Validity and Patient Satisfaction

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Abstract

Background Antibiotics have been overused for acute respiratory tract infections (ARTIs) and the recent guidelines have emphasized limiting their use.

Objective To clarify the exact rate of antibiotic use and patient outcomes and satisfaction, under strict adherence to the guideline proposed by the American College of Physicians.

Design Prospective cohort observational study.

Setting Primary care clinics in Japan.

Patients 783 patients diagnosed with ARTIs from October 2004 to April 2005, aged 15-64 and without any underlying disease.

Measurements Scores of symptoms and patient satisfaction at the 5th, 8th and 15th day of their initial visit, when treatment had been initiated according to that strategy.

Results In 691 non-influenza patients, comprising 554 (80%) cases of nonspecific upper respiratory tract infection (A), 90 (13%) of acute pharyngitis (C) and 36 (5%) of acute bronchitis (D); the rates of antibiotic use were 5% [0.2%; (A), 9%; (B), 36%; (C), 3%; (D)] initially and 2% [2%; (A), 0%; (B), 1%; (C), 3%; (D)] subsequently. For the remaining 92 influenza patients, no antibiotics were prescribed, though oseltamivir was prescribed in 89 (97%). Within 7 days, more than 90% of all patients felt improved and expressed their satisfaction with the treatment. Furthermore, no patients needed emergency room visits or hospital admission.

Limitations Only patients who gave informed consent were enrolled.

Conclusions Adhering to the guideline, antibiotic use could be limited to only 5-7% of non-influenza ARTIs-mainly acute pharyngitis-without any problems and with a high degree of patient satisfaction.

Key words: antibiotics, primary care, common cold

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Introduction

Antibiotics have been overused for colds, upper respiratory tract infections and bronchitis in most countries and the growing resistance to them has been of considerable concern (1). Guidelines and position papers (2-6) have been proposed to restore the situation, and the prescription rates for antibiotics have been declining, but not to a satisfactory level (7).

The reason for prescribing antibiotics in general practice seems to be not so much scientific as it is social and cultural (8-10). Patients and families have a poorly informed image of antibiotics (11-14) and they insist on the doctor prescribing them even for acute respiratory infections, most of which are caused by viruses. Non-clinical factors such as geographic location, race, the physician’s specialty, health insurance schemes, etc. seem to be associated with antibiotic prescriptions (14) and physicians also often decide to use them with relatively less evident clinical findings such as fatigue, fever, and yellow sputum (15). Furthermore, some general physicians frequently prescribe antibiotics to prevent

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Patients and Methods

Patients (15-64 years of age), who visited the clinics of 5 general practitioners (GP); Y.K. (Hyogo), Y.T. (Kumamoto), Y.T. (Hiroshima), K.M. (Saitama), and Y.M. (Nara), during the period October 2004 to April 2005, and who were diagnosed as having ARTIs (onset within 7 days) and without underlying diseases, were consecutively enrolled, with a maximum of 200 patients for each GP. First, the patients were classified based on their predominant clinical features as one of 4 types: A) nonspecific upper respiratory tract infection (common cold): having acute respiratory symptoms in the absence of a predominant symptom; B) acute rhinosinusitis: having prominent nasal and sinus symptoms; C) acute pharyngitis: having prominent acute sore throat; and D) acute bronchitis: having prominent acute cough. (2) Thereafter, they were treated according to the principles of the appropriate antibiotic use for ARTIs proposed by the American College of Physicians (ACP) clinical practice guideline, indicating that patients were to be prescribed antibiotics only if they fell into group B) accompanied by facial pain or tenderness, or C) suspected of group A β-hemolytic streptococcus infection (rapid antigen test positive or more than 3 of the Centor criteria; tonsillar exudates, tender anterior cervical lymphadenopathy, absence of cough, and history of fever), hemi-lateral tonsillitis, peritonsillar abscess, or D) unable to exclude pneumonia. Other than these, antibiotics were exceptionally prescribed in cases where the doctor deemed it to be particularly necessity. The anti-neuraminidase drug oseltamivir was permitted for use in patients also diagnosed as having influenza with antigen detecting kits or clinico-epidemiological prediction.

There was a total enrollment of 783 patients (aged 39 ± 13 years, males 348, females 435), of whom 92 were clinically diagnosed as having influenza. Questionnaires on the 5th day of their initial visits and then sent to K. T. at Kobe City General Hospital (KCGH) after they were completed. Care was taken not to disclose any personal information other than an identification number on the card. Questionnaires completed on the 8th and 15th days, together with the patient’s enrollment data, were sent in confidence by the 5 GPs to K.T., who stored and analyzed the data without knowledge of the patient’s identity.

The research protocol was approved by the Institutional Review Board of KCGH and all of the patients enrolled gave written consent to be involved in the study. The 5 GPs involved are all fellows of the Japanese Society of Internal Medicine and 4 of them are fellows of the ACP.

Results

There was a total enrollment of 783 patients (aged 39 ± 13 years, males 348, females 435), of whom 92 were clinically diagnosed as having influenza. Questionnaires on the 5th day received 590 (76%) responses, on the 8th day 552 (71%), and on the 15th 313 (40%). The main reason for the marked decline in responses on the 15th day was that we were reluctant to interview all patients after they had fully recovered. There were no responses to any of these 3 questionnaires from 65 (8%) patients (Fig. 1). The percentages of the 4 types of disease among the 691 non-influenza patients were as follows: 554 (80%) cases of non-specific upper respiratory tract infection (A), 11 (2%) of acute rhinosinusitis (B), 90 (13%) of acute pharyngitis (C) and 36 (5%) of acute bronchitis (D) (Table 1). Before their initial visits to the GPs, the maximum temperature and duration of fever for those diagnosed as non-influenza were 37.0
±0.8°C and 2.3±1.5 days, respectively. Antibiotics were initially prescribed in 35 cases (5%): 1 (0.2%) from category (A), 1 (9%) from (B), 32 (36%) from (C) and 1 (3%) from (D), in which exceptional out-of-guideline use was seen in the two cases in (A) and (D), the reason for which was to decrease the patient’s anxiety in (A) and to treat predicted Mycoplasma infection from a family member in (D). On subsequent visits, they were prescribed in 14 cases (2%): 12 (2%) of (A), 1 (1%) of (C), and 1 (3%) of (D). Of these 14 cases, 6 (43%) had antibiotics prescribed until 4 days after the initial visits, 5 (36%) until 7 days after, and 3 (21%) until 14 days after. Among the patients with initial antibiotics use, the most frequent diagnosis was acute pharyngitis (91%) and among those of subsequent use, nonspecific upper respiratory tract infection (86%). The reasons for subsequent antibiotic use were persistence of symptoms even without validation of bacterial involvement (9/14, 64%), clinical judgment of secondary bacterial bronchitis (2/14, 14%), primary or secondary bacterial sinusitis (2/14, 14%) and secondary bacterial tonsillitis (1/14, 7%). At their initial visit, the prescribed antibiotics comprised penicillins (22/35, 63%), new-macrolides (11/35, 31%), and others (2/35, 6%), while on the subsequent visit they comprised penicillins (6/14, 43%), new-macrolides (5/14, 36%), and others (3/14, 21%). No patients needed emergency room visits or admission but 11 (1.6%) visited other offices.

Among patients diagnosed as having influenza, those who
Table 1. Enrolled Patients with Acute Respiratory Tract Infections*

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-influenza</td>
<td>554</td>
<td>11</td>
<td>90</td>
<td>36</td>
</tr>
<tr>
<td>Initial antibiotics use</td>
<td>1 (0.2)*</td>
<td>1 (9.1)</td>
<td>32 (35.6)</td>
<td>1 (2.8)*</td>
</tr>
<tr>
<td>Subsequent antibiotics use</td>
<td>12 (2.2)</td>
<td>0 (99)</td>
<td>1 (1.1)</td>
<td>1 (2.8)</td>
</tr>
<tr>
<td>Influenza</td>
<td>77</td>
<td>1</td>
<td>2</td>
<td>12</td>
</tr>
<tr>
<td>Oseltamivir prescription</td>
<td>75 (97.4)</td>
<td>1 (100)</td>
<td>2 (100)</td>
<td>11 (91.7)</td>
</tr>
<tr>
<td>Initial antibiotics use</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Subsequent antibiotics use</td>
<td>2 (2.7)</td>
<td>0</td>
<td>0</td>
<td>0</td>
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</tbody>
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A: Non-specific upper respiratory tract infection, B: acute rhinosinusitis, C: acute pharyngitis, D: acute bronchitis. (*) denotes percentages in each category.

* Antibiotics were prescribed exceptionally outside the guideline in these two cases.

Figure 4. Patient satisfaction scores for treatment evaluated by (a) non-influenza and (b) influenza patients. Vertical axis indicates number of patients who evaluated their particular degree of satisfaction on the 5th, 8th and 15th day after their initial visit. The number for the 15th day is rather small because questionnaires were not given to patients who had fully recovered.

The outcome of our treatment under the principles of appropriate antibiotic use was evaluated as shown in Fig. 2. In non-influenza patients, the symptom scores of “better” and “much better” were 445 (85%) on the 5th day, 445 (94%) on the 8th day, and 297 (97%) on the 15th day, and in influenza patients, those of “better” and “much better” were 100% throughout the period. Cough and phlegm were the most frequent remaining symptoms while rhinorhea was second for non-influenza, but almost no symptoms remained on the 8th day for cases of influenza treated mostly with oseltamivir (Fig. 3). The non-influenza patients who rated their satisfaction with the treatment as “very well-satisfied” and “well-satisfied” were 251/399 (63%) on the 5th day, 345/396 (87%) on the 8th, and 227/239 (97%) on the 15th. Such rates for the influenza patients were 53/71 (75%) on the 5th, 69/71 (97%) on the 8th, and 33/33 (100%) on the 15th day (Fig. 4).

Discussion

Our study showed that by adhering to the ACP guideline, only about 5% of non-influenza ARTIs, most of which were acute pharyngitis, needed antibiotics initially and that within 7 days most of the symptoms were relieved and about 90% of patients were satisfied with the strategy. For patients with influenza, a strategy of oseltamivir and no antibiotics produced rapid symptom reduction and significant patient satisfaction.

In data reported recently (7, 18-20), the antimicrobial prescription rates for ARTIs decreased from the early 1990’s to 2000, but not to an appropriate level. Cantrell et al (18) reported that those in ambulatory care settings might have still accounted for more than 60% in 1996. In community-based outpatient practice, Steinman et al (7) showed that 22% of adult patients were still prescribed broad-spectrum antibiotics for a narrowly defined subset of ARTIs, where antibiotic therapy is nearly always inappropriate, only
Guidelines such those of the ACP describe a theoretical lack of necessity for antibiotics; however, considering the persistently high rates of antibiotic use, such guidelines have not yet been fully accepted either by patients or physicians in the clinical setting. Therefore, it will be important to educate both parties realistically about the policy of reducing antibiotics for ARTIs. Gonzales et al (16) introduced a combination of patient and clinician interventions using educational materials for adults with uncomplicated acute bronchitis, which reduced antibiotics treatment safely. Macfarlane et al (24) produced an information leaflet supported by verbal advice, which reassured patients and shared their uncertainty about prescribing antibiotics and thus reduced antibiotic use in patients with acute bronchitis. Harris et al (25) showed that a combination of patient and provider educational interventions could reduce antibiotics use from 58% to 24% in patients with acute bronchitis and from 14% to 1% in patients with nonspecific upper respiratory tract infections. In the present study, we were able to reduce antibiotics prescriptions to a minimum level and with a high degree of patient satisfaction, perhaps partly thanks to the enthusiastic efforts of the participating GPs in educating their patients. Our data, which indicates the minimum and target rates of antibiotic use for ARTIs, should be both informative and useful for the education of patients and physicians.

Some limitations exist in this study. We were unable to perform a randomized control study because of difficulties in setting controls for usual antibiotic use. Therefore, we performed a prospective cohort observational study, which, however, had selection bias by enrolling only patients who could give their consent for the study. Another limitation is that not every patient could be followed at the same interval and 8% of the patients dropped out in total.

This study shows the minimum antibiotics use for ARTIs adhering to the guideline. It could be useful in promoting a policy of reducing injudicious antibiotic use for ARTIs. For aged populations and high-risk patients with certain chronic diseases, however, we should not forget that they are excluded from the guideline.

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We regret that one of our coauthors, Dr. Yoshikazu Tasaka, passed away unexpectedly on February 11th 2007. We all greatly appreciate his dedication to this paper and also his influential career as a model of primary care physician.

References


