Physician adherence to acute rhinosinusitis antibiotic treatment guidelines

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ABSTRACT

Antibiotic treatment guidelines promote proper diagnosis and treatment and optimize antibiotic treatment, minimizing both antimicrobial resistance to antibiotics and financial expenditure. This study aimed to investigate whether community physicians and emergency department (ED) physicians diagnose and treat acute rhinosinusitis according to accepted guidelines. This was a retrospective study of medical records and referrer letters of patients admitted to the medical center between 2014 and 2015. Physician adherence to antibiotic guidelines regarding indication, type and duration of treatment was assessed. Overall, the study included 84 patients diagnosed with acute rhinosinusitis and admitted to the ED. Fewer than 20% of doctors treating patients with rhinosinusitis at our institution followed the current recommended guidelines. In most cases, the type of treatment administered by ED physicians and by community physicians complied with the guidelines (90% and 96%, respectively, p=0.564). The duration of treatment prescribed by the ED physicians aligned with the guidelines in 37.7% of the cases. There was insufficient compliance with acute rhinosinusitis treatment guidelines among all treating physicians in this study, which was characterized by excessive antibiotic treatment. Therefore, ways to increase understanding and adherence to clinical guidelines, and to provide optimal settings in the clinics to carry out the guidelines should be investigated.

Significance of this study

What is already known about this subject?
- Antibiotic treatment guidelines promote proper diagnosis and treatment.
- By that, they also optimize antibiotic treatment.
- These minimize both antimicrobial resistance to antibiotics and financial expenditure.

What are the new findings?
- There was insufficient compliance with acute rhinosinusitis treatment guidelines among all physicians in this study.
- It is marked by excessive antibiotic treatment.

How might these results change the focus of research or clinical practice?
- Ways to increase awareness and adherence to clinical guidelines should be investigated.
- Healthcare managements should provide optimal settings in the clinics to carry out the guidelines.

INTRODUCTION

Acute rhinosinusitis (ARS) is defined as inflammation of the paranasal sinuses, most often the maxillary sinuses, caused by viruses or bacteria, that persists for fewer than 4 weeks. ARS is a common outpatient infection, responsible for over 3 million outpatient visits annually in the USA. While 75% of patients with ARS receive an antibiotic, only about one-third with sinus symptoms have a confirmed bacterial pathogen in sinus fluid.[1 2]

Clinical practice guidelines to manage infectious disease enable effective and standardized diagnosis and treatment, prevention of disease complications and judicious use of antibiotics. Such guidelines are important, since increased use of antibiotics and following resistance to them has become a global problem that affects public health.[3 4] As a consequence, there are ongoing attempts to encourage physicians to prescribe antibiotics only when indicated. The level of physician compliance with diagnostic and treatment guidelines may depend on the type of physician expertise.[5 6]

This study focused on the physician adherence to the American Family Physicians and American Academy of Otolaryngology–Head and Neck Surgery Foundation guidelines for diagnosis and treatment of ARS, which form the basis of the guidelines in many countries, including where this study was conducted.[1 2] Comparisons were made between community physicians who refer patients to the hospital and emergency department (ED) physicians.

The research hypothesis was that there is a difference of compliance to the clinical guidelines among community physicians and ED physicians regarding the diagnosis of and antibiotic treatment prescribed for ARS.

MATERIALS AND METHODS

Study design and setting

This was a retrospective analysis of medical records of our 725-bed referral hospital, and

of referral letters from community physicians. All patients who were admitted to the ED with the diagnosis of ARS between April 2014 and June 2015 were included in the analysis.

The medical system in our country encourages patients to approach community physicians first, be they family physicians or other specialty physicians. In case of an emergency, patients can refer directly to an ED. In order to determine whether antibiotics were prescribed according to the guidelines, the medical records and referral letters were reviewed for documentation of the clinical symptoms, including purulent rhinitis, nasal congestion, headache, fever, cough, decreased sense of smell, earaches, and duration of symptoms. Findings in the physical examination that were included were secretion from the nasal cavity and postnasal drip.

The dependent variables were: (A) an indication of treatment, (B) type of treatment given, and (C) duration of treatment. The independent variables were: (A) place of work (community/ED), (B) specialty and experience, and (C) patient age and sex.

Cases in which no antibiotic was prescribed, due to absence of relevant clinical symptoms and physical findings, and cases in which an antibiotic was prescribed due to relevant findings, were classified as treatment according to guidelines.

Statistical analysis

Quantitative data were described using averages and SDs, median and range. Qualitative data were described using frequency and percentage. The adherence of community physicians versus specialists and interns to antibiotic was compared using the Fisher's exact test. The degree of congruence between the community physicians and the ED physicians in treating according to the guidelines was described using the accuracy index. Wilcoxon signed-rank test was used to compare community and ED physician compliance with treatment type and duration guidelines. A significance value <5% was considered significant. A two-sided significance value is displayed.

RESULTS

Subjects

Data were collected from the medical files of the 84 patients admitted to the ED due to an ARS diagnosis, of which 60 were referred by community physicians. The characteristics of patients and physicians are presented in table 1. Most patients were male (60%) and in their third and fourth decades (62%).

Table 1 Characteristics of patients with acute rhinosinusitis and treating physicians

Patient characteristics	n (%)
Total	84 (100)
Gender	
Male	50 (59.5)
Female	34 (40.5)
Age (years)	
0–20	13 (15.4)
21–40	52 (61.9)
41+	19 (22.6)
Community and ED physicians	
Family	34 (56.7)
Pediatricians	7 (11.7)
Otolaryngologist	8 (13.3)
Internal	7 (11.7)
General practitioner	4 (6.7)
Seniority of community physician	
Intern	11 (18.3)
Specialist	49 (81.7)
Number of years of ED training	
0–3 years	48 (57.2)
4–6 years	33 (39.2)
Specialist	3 (3.6)

ED, emergency department.

Compliance with indication for antibiotic treatment guidelines

The percentages of patients diagnosed and treated according to guidelines, by age group, are described in figure 1. In all age groups, the physicians did not adequately adhere to the guidelines.

Of the 60 referral letters from community physicians, 31 (51.6%) had data on whether or not an antibiotic was prescribed. Only in a minority of cases was the duration of symptoms considered a necessary condition for the provision of treatment both among community physicians and among ED physicians (9% and 16%, respectively).

Duration of symptoms is a major factor included in diagnostic evaluations, yet the vast majority of both community physicians and emergency physicians did not follow the guidelines (figure 2).

Compliance with guidelines regarding the type and duration of treatment

In 31 cases, antibiotic treatment was given by community physicians. The type of treatment was documented in 20 referral letters. In most cases, the type of treatment given by ED and community physicians was as recommended by the guidelines (90% and 96%, respectively; Wilcoxon signed-rank test, p=0.564). There was a high correlation between ED and community physicians in determining the type of treatment according to guidelines—in 85% of cases (figure 2). The types of antibiotics given by community and ED physicians were similar (figure 3).

Due to the fact that the duration of treatment was not specified in almost half of the referral letters mentioning prescription of antibiotics, this issue could not be addressed in the context of community physicians. The compliance rate regarding the duration of treatment among ED physicians was 37.5% (figure 2).

The vast majority (79.8%) of ED physicians adhered to the guidelines, and almost all of them (96.1%) recommended treatment according to the guidelines, regardless of seniority.

While the type of antibiotic generally complied with the ARS treatment guidelines, in the majority its administration was unjustified because the criteria for diagnosis of bacterial ARS were not met.

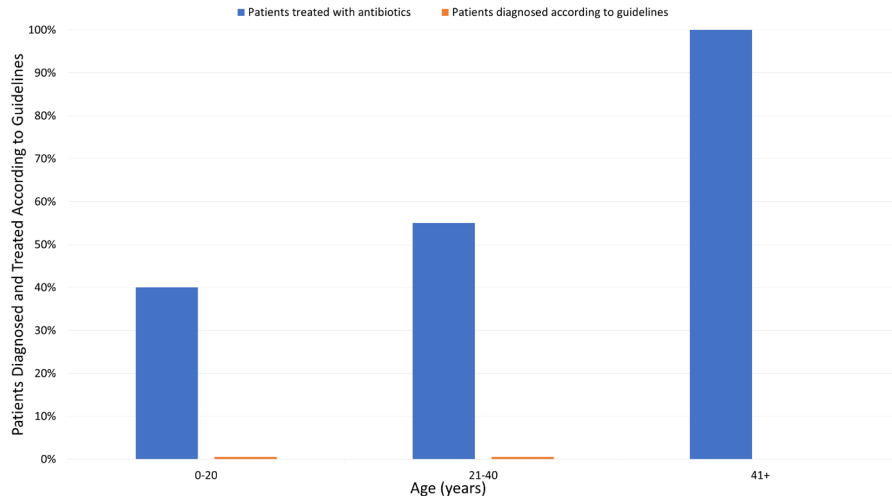

Figure 1 Percentage of patients diagnosed and treated according to the American Family Physicians and American Academy of Otolaryngology–Head and Neck Surgery Foundation guidelines, by age group. In the majority of cases in all age groups, treatment guidelines were not followed.

DISCUSSION

Summary of main findings

Clinical practice guidelines of infectious diseases delineate standardized diagnosis and treatment protocols and optimize antibiotic treatment. Our group has previously reported on a lack of compliance of community physicians with the acute pharyngitis diagnosis and antibiotic treatment guidelines, which is characterized by excessive antibiotic treatment.[7] The present study investigated the compliance of community physicians with rhinosinusitis diagnosis and treatment guidelines. The diagnosis and treatment of ARS are based on clinical findings.[2 8 9] Most cases (97%) of ARS are due to viral infection, hence, prescribing antibiotics should follow clear indications based on history and physical findings.[1 2] Duration of symptoms is an important criterion in the diagnosis of bacterial rhinosinusitis. The longer the duration of symptoms, the higher the probability of a bacterial rather than a viral pathogen; thus, treatment options and the need for antibiotics are directly derived from this variable in patient history. Unfortunately, this information did not appear in most medical files. Fewer than 20% of doctors treating patients with rhinosinusitis at our institution followed the current recommended guidelines. Even a lower percentage of compliance was observed among community physicians. In other words, in most cases, there was no indication for antibiotic prescription by community or ED physicians. This may be due to lack of familiarity with the guidelines, or may reflect patients' demands for prescription medications, even when they are not indicated.[10 11]

As for the type of treatment, adherence of community and ED physicians to the guidelines was very high—90% and 96%, respectively (Wilcoxon signed-rank test, p=0.564). Compliance of treatment duration prescribed by community physicians cannot be addressed as almost half of the

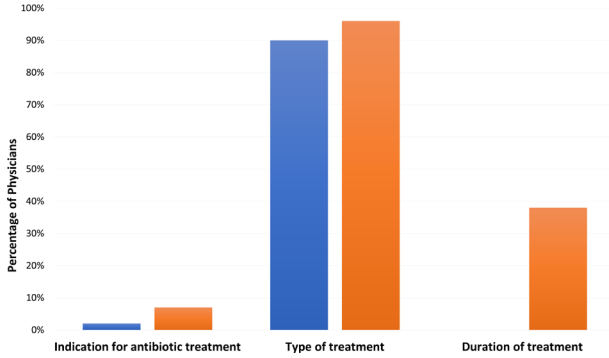

Figure 2 Adherence to various elements of acute rhinosinusitis treatment guidelines among community versus emergency department physicians. While the type of antibiotic given to most patients diagnosed with acute rhinosinusitis was according to the guidelines, the indication and duration of antibiotic treatment was not. Blue bars—community clinic physicians. Orange bars—emergency department physicians.

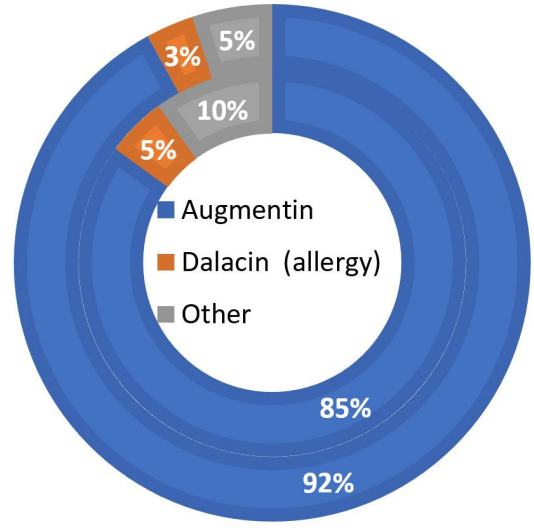

Figure 3 Distribution of the type of antibiotics given by community and emergency department physicians. There is a similarity in the types of antibiotics that are prescribed in acute rhinosinusitis.

referral letters mentioning treatment with antibiotics did not specify the duration of treatment. The overall compliance with guidelines concerning the duration and type of treatment among ED physicians was low (37.5%).

The response rate regarding indication of treatment according to the guidelines was found to be low. The vast majority (79.8%) of ED physicians adhered to the guidelines, regardless of seniority. The type of treatment provided by the community physicians aligned with the guidelines in 90% of cases, therefore, there is no significant difference between physicians with different types of specializations. Similarly, almost all ED physicians (96.1%) suggested treatment according to the guidelines, regardless of seniority. These might imply that hospital ED protocols are followed rigorously, or that senior physicians supervise the recommendations of junior physicians meticulously. Although both community and ED physicians generally followed the guidelines regarding the type of treatment prescribed for ARS, in most cases, diagnosis was inaccurate, and antibiotic was unnecessary.

Comparison with existing literature

Several studies published by different groups from around the world reported excessive antibiotic treatment in various infectious diseases, particularly of the upper respiratory system. A retrospective study conducted in 2008–2010 in the Netherlands, which included over 2500 patients with respiratory tract infection, reported almost half of the patients were given antibiotics that were not indicated. For ARS, more than half of patients were prescribed antibiotics unnecessarily.[12]

A prospective study conducted in Spain between January 2007 and March 2008, which involved 2610 patients with upper respiratory tract infection, showed that in 62% of rhinosinusitis cases, antibiotics were prescribed unnecessarily.[13] Similar rates were noted in a retrospective cohort study conducted in Michigan, USA, between 2005 and 2006, in which antibiotics were given unnecessarily in 66% of rhinosinusitis cases.[14]

In contrast, a cross-sectional study conducted in Denmark and Iceland between 2008 and 2009, which included 1428 patients examined by community physicians for upper respiratory infectious diseases, showed unnecessary antibiotic treatment of rhinosinusitis in 16.4% of cases in Denmark and 4.1% of cases in Iceland.[15]

In a study conducted in Israel in 2015, which included 6.6 million patients who visited community physicians due to infectious diseases, 3% of the referrals were due to rhinosinusitis.[16] The highest rate of rhinosinusitis was among patients aged 9–44 years. The study also showed that rhinosinusitis was an uncommon diagnosis at ages younger than 19 years (2%–18%). In addition, it showed that antibiotics were prescribed to 55%–57% of adult cases (older than 19) with the diagnosis of sinusitis. In contrast to the studies above, we demonstrated a higher rate of unnecessary antibiotic administration.

The different rates of unnecessary prescription of antibiotics for the treatment of rhinosinusitis are likely due to physician and population education with regard to adherence to guidelines and the clinical implications of unnecessary antibiotics. The discrepancy in the rate of antibiotic treatment according to the guidelines between our study and the studies cited above may have been the result of lack of documentation of the duration of symptoms in the medical records, a major criterion in the diagnosis of bacterial rhinosinusitis.

Strengths and limitations

Only a small percentage of patients seen by community physicians are referred to the medical center. Therefore, patients referred to the hospital do not necessarily represent patients not referred to the hospital. Second, many referral letters did not specify whether treatment was given, its type and duration, which may have skewed our results.

This may be due to a lack of familiarity of the guidelines among community physicians regarding sinusitis diagnosis and treatment. Medical documentation has a critical impact on the continuum of treatment. The treatment provided by the ED physicians is greatly influenced by the treatment provided previously in the community.[7] The inadequate reporting of treatment given in the community makes it difficult for ED physicians to properly decide on treatment, which may lead to complications and unnecessary administration of antibiotics.[7]

Implication for research and practice

Deviation from ARS diagnosis and treatment guidelines may result in excessive antibiotic treatment and following resistance to antibiotics. Despite sound scientific evidence, the physician's personal preferences often prevail clinical decision-making.[17]

Our study also noted insufficient medical record documentation, perhaps due to lack of knowledge with the guidelines. Therefore, actions should be taken to increase adherence to guidelines, to educate and highlight their importance and the possible complications and risks resulting from the injudicious use of antibiotics, improve reporting methodology, and to provide proper settings to follow the guidelines.

CONCLUSIONS

There is a lack of compliance with ARS diagnosis and treatment guidelines, which is characterized by injudicious antibiotic use. Therefore, ways to improve knowledge and compliance to clinical guidelines, and to provide conditions in the clinics to fulfill the guidelines should be investigated.

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