

Research Article

A Closed Loop Two Cycle Audit Assessing the Prescription Practice of Topical Antibiotics for Acute Infective Conjunctivitis in a Primary Care Department

Andreas Katsimpris^{1,2*}, Nafsika Voulgari¹, Nikolaos Georgiadis³, Stylianos Kandarakis¹

¹First Ophthalmology Department, "G.Gennimatas" Hospital, National and Kapodistrian University of Athens, Athens, Greece

²Primary Care Department of Ano Chora, Ano Chora, Greece

³Department of Family and Community Medicine, School of Medicine, National and Kapodistrian University of Athens, "Ippokrateio" General Hospital of Athens, Athens, Greece

*Correspondence author: Andreas Katsimpris, First Ophthalmology Department, "G.Gennimatas" Hospital, National and Kapodistrian University of Athens, Leof. Mesogeion 154, Athens, Greece; Email: a.katsimpris@gna-gennimatas.gr

Citation: Katsimpris A, et al. A Closed Loop Two Cycle Audit Assessing the Prescription Practice of Topical Antibiotics for Acute Infective Conjunctivitis in a Primary Care Department. Jour Clin Med Res.. 2023;4(1):1-6.

<http://dx.doi.org/10.46889/JCMR.2023.4101>

Received Date: 16-12-2022

Accepted Date: 05-01-2023

Published Date: 12-01-2023



Copyright: © 2023 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CCBY) license (<https://creativecommons.org/licenses/by/4.0/>).

Abstract

Background: The implementation of guideline recommendations for antibiotics prescription for the management of patients with Acute Infective Conjunctivitis (AIC) in primary care departments remains below par.

Objectives: To assess the impact of clinical audit on adherence to evidence-based indications for prescription of antibiotic eye drops in patients diagnosed with AIC, in the setting of a primary care practice in western Greece.

Methods: This was a closed loop two cycle audit to evaluate the current prescription practice of antibiotics for the managements of AIC. Following evidence-based indications for the prescription of antibiotics in AIC through literature search, and in combination with discussion and collaboration with the primary care doctors of our department, we formulated and implemented guidelines for the management of AIC. In the second cycle of the audit we assessed the management of patients with AIC after local implementation of the guidelines.

Results: A total of 191 cases were audited in the first cycle before the introduction of the guidelines, from 15th June 2019 to 7th March 2020, and 140 cases after, from 10th March 2020 to 20th November 2020. The compliance with the guidelines regarding antibiotics prescription was significantly improved from 12.0% to 84.6% between the first and the second cycles of audit.

Conclusion: In this study, clinical audit with locally introduction of guidelines significantly improved the prescription practice of topical antibiotics in patients with AIC in a primary care department.

Keywords: Conjunctivitis; Eye Drops; Antibiotics; Clinical Examination

Introduction

Acute Infective Conjunctivitis (AIC) is a common presentation in the primary care setting, comprising around 1% of primary care visits with some of the most common symptoms of AIC being watery, sticky and/or red eyes [1]. It is difficult to distinguish viral and bacterial AIC based only on clinical examination, due to their similarities regarding ocular signs and symptoms of patients. Moreover, medical training is usually rudimentary when it comes to ophthalmology and as a result general practice doctors may lack the confidence and knowledge to properly manage patients with AIC or eye problems in general [2]. Despite, the high diagnostic accuracy of AIC in primary care practices, several studies have found an overuse of topical antibiotic treatment by primary care physicians mainly due to the difficulty in the clinical differentiation between viral and bacterial AIC

[3-5]. As a result, almost 70% of patients with AIC presenting to primary care are prescribed antibiotics with the majority of these prescription being unnecessary or inappropriate since AIC is often self-limiting [5,6].

AIC rarely causes loss of vision and the rate of resolution in untreated cases, has been shown to be high in many randomized clinical trials [7-9]. Appropriate indications for prescribing antibiotics in patients with AIC exist [6], and should be followed by primary care practitioners in order to limit the needless use of antibiotics. According to our knowledge, there are no studies in the literature assessing the management of AIC in primary care in Greece. Therefore, we performed an audit to assess the prescription practice of topical antibiotics for AIC in the setting of a primary care department in western Greece. Moreover, we locally implemented a set of guidelines for the management of AIC and compared changes in practice before and after the introduction of the guidelines.

Materials and Methods

Study Design and First Cycle of Audit

This was a closed loop, two cycle audit and the population of the study was all the patients in our primary care department in Ano Chora, western Greece, discharged with a topical antibiotic prescription and the diagnosis of AIC from 15th June 2019 to 7th March 2020. The data regarding demographics, patient history and the details about topical antibiotic prescription were extracted from photocopies of the patients' discharge notes and prescription data kept in the practice records. Microsoft excel was used to collect patient data. The study was conducted in accordance with the regulations of Greek law and informed consent has been obtained from all participants.

Formulation of Guidelines

After performing a literature search, we formulated the guidelines for prescribing antibiotics in patients diagnosed with AIC, based on the NICE guidance for AIC and on discussion with the five general practitioners of the department. The doctors easily identified the key features of the clinical assessment and diagnosing AIC, however more discussion was needed for the treatment plan of AIC. It was agreed to prescribe antibiotics in 3 occasions: 1) in patients with purulent discharge, 2) in contact lens wearers and 3) when conjunctivitis caused by chlamydia or gonorrhea was suspected. In all these occasions referral to ophthalmology was recommended. Additionally, all the doctors were informed about the indications for urgent referral of patients with conjunctivitis to ophthalmology as recommended by NICE [10].

Implementation of Guidelines and Second Cycle of Audit

The data was presented at the meeting attended by primary care physicians of the practice. The guidelines were introduced in 8th March 2020 and they were displayed in all the examination rooms of the department. Nurses and junior doctors actively encouraged the implementation of the guidelines and senior help was available if any clarifications needed to be made regarding the management of patients with AIC. In addition, photocopies listing the indications regarding topical antibiotics use were handed to every physician and pinned to the board of doctors' office. All physicians were also prompted to reevaluate any existing topical antibiotic use for AIC in every patient. After discussion with the clinical supervisor, the audit standard was set to an 80% of the prescriptions having a clear evidence-based indication. In early December, data from the discharge notes dated from 10th March 2020 to 20th November 2020 were extracted and the differences in the prescription practice of topical antibiotics for AIC before and after the introduction of the guidelines were assessed.

Statistical Analysis

Descriptive statistics of the study population were reported as percentage values for categorical variables and as mean $\pm$ standard deviation [median (min – max)] for continuous ones. We used the two-sided Student t-test or Mann-Whitney U test for continuous variables, and the Pearson chi-square test or Fisher's exact test for categorical ones to assess the differences [and 95% confidence intervals (95% CI)] between the variables of the study population before and after the implementation of the guidelines for the management of patients with AIC. All statistical tests were two-sided and p-values less than 0.05 were considered statistically significant, while all data analyses were conducted using R (version 3.5.2, Foundation for Statistical Computing, Vienna, Austria).

Results

This audit covered 16 months from June 2019 to November 2020. In this period, a total of 331 patients were identified in the records of the department with the diagnosis of AIC, from whom 184 have been prescribed topical antibiotics (Table 1 and 2). Regarding the demographics, the difference between the mean age of the patients before and after the implementation of the guidelines was not statistically significant. Similarly, sex did not statistically differ between the two groups.

From 15th June 2019 and until 7th March 2020, a total of 158 patients were diagnosed with AIC and treated with antibiotic eye drops. However, only 19 (12%) of them had a clear indication for antibiotics prescription (Table 1). During the first cycle of audit a total of 191 patients were diagnosed with AIC, from whom 83% received antibiotics (Table 2).

From 10th March 2020, when the guidelines for the management of patients with AIC were already implemented, and until the end of the audit period, a total of 26 patients with AIC were prescribed topical antibiotics, from whom 22 (84.6%) had an indication for the prescription (Table 1). There was a statistically significant 62.6% difference (Fisher's exact test p-value < 0.001) on the percentage of proper prescription of topical antibiotics in patients diagnosed with AIC before and after the local introduction of the guidelines in our department. During the second cycle of audit a total of 140 patients were diagnosed with AIC and the percentage of patients with AIC who were prescribed antibiotics fell from 83% to 19% compared to the first cycle of the audit (Table 2). These differences reveal a marked improvement in compliance with guidelines regarding antibiotics prescription for treatment of AIC. The audit standard of 80% was met and all the general practitioners found the guidelines useful for the management of AIC.

Parameters	Values		P-value
	Before 7 th March 2020 N=158	After 10 th March 2020 N=26	
Age (years)			
Mean $\pm$ SD	45.45 $\pm$ 8.24	48.23 $\pm$ 12.04	0.14 ^a
Median (min – max)	42.00 (21 – 83)	45.00 (20 – 79)	
Age group (years), n (%)			0.14 ^b
<30	15 (9)	2 (8)	
30-39	43 (27)	3 (11)	
40-49	45 (28)	10 (39)	
50-59	33 (22)	4 (15)	
60-69	18 (11)	4 (15)	
>70	4 (3)	3 (12)	
Sex, n (%)			0.90 ^c
Women	83 (53)	14 (54)	
Men	75 (47)	12 (46)	
Indication for antibiotic prescription, n (%)			<0.01 ^b
No	139 (88)	4 (15)	
Yes	19 (12)	22 (85)	
AIC: Acute Infective Conjunctivitis; SD: Standard Deviation; a: Student's t test; b: Fisher's exact test; c: Pearson chi-square test			

Table 1: Characteristics of the patients diagnosed with AIC and treated with antibiotics (n = 184) before and after the introduction of the guidelines for the management of AIC.

Parameters	Values	
	Before 7 th March 2020	After 10 th March 2020
Patients diagnosed with AIC, n (%)	191 (100)	140 (100)
Patients diagnosed with AIC and treated without antibiotics, n (%)	33 (17)	114 (81)
Patients diagnosed with AIC and treated with antibiotics, n (%)	158 (83)	26 (19)
No clear indication	139 (73)	4 (3)
Purulent discharge	8 (4)	9 (6)
Contact lens wearer	8 (4)	11 (9)
Suspicion for chlamydia or gonorrhea	3 (2)	2 (1)
AIC: Acute Infective Conjunctivitis		

Table 2. Total number of patients diagnosed with AIC (n = 331) and the reasons for being treated with topical antibiotics before and after the introduction of the guidelines for the management of AIC.

Discussion

This audit assessed the prescription practice of antibiotics in patients with AIC after the local implementation of guidelines in a 16-month period. Our closed-loop audit led to improvements in the pharmacologic treatment of AIC and increased the confidence and knowledge of general practitioners of our department on the management of AIC.

Management of AIC in Primary Care

AIC remains one of the commonest ophthalmic conditions that physician's worldwide face in general practice accounting for approximately 1% to 2% of total visits, comprising also a significant economic burden for many countries [11]. The type and prevalence of AIC depends of many factors, such as age of the patient, geographical location and seasonality. In general, viral conjunctivitis remains the most common cause of AIC in both the adult and overall population, followed by bacterial conjunctivitis which is more common in children [6]. Apart from infectious causes of conjunctivitis, other types of conjunctivitis are toxic, cicatricial, allergic as well as secondary to neoplastic and immune-mediated diseases, which further complicates the diagnosis and treatment plan of this entity. In addition, there are several sight-threatening conditions that can mimic AIC, so it is important for primary care doctors to be able to make proper decisions regarding referral, testing and treatment. Fortunately, several algorithmic approaches and guidelines exist for differentiating urgent eye conditions from AIC, which primary care physician can easily adopt [10].

Factors Influencing the Prescription of Antibiotics in AIC and Consequences

It has been shown that the majority of patients with AIC are treated with antibiotics, although there are several factors influencing their treatment plan. First of all, patients with AIC are more common to be prescribed antibiotics if they have visited non-ophthalmologists, such as general practitioners and pediatricians [5]. Moreover, patients with lower socioeconomic status are less likely to get antibiotics prescribed for the treatment of AIC [5].

One of the most serious consequences of the excessive prescription of antibiotics is the increasing rates of antimicrobial resistance. Antimicrobial resistance imposes a significant challenge in many infectious diseases worldwide. Unfortunately data regarding antimicrobial resistance of ophthalmic pathogens remain scarce not only in Greece and but in several other countries [12]. Excessive clinical use and misuse of antibiotics for conditions other than AIC has been reported in many Greek hospitals and specifically in intensive care units [13]. There are many reasons for this condition; the Greek surveillance systems on antibiotics use lack effectiveness and reliability and they often inadequately disseminate knowledge and research information regarding antibiotics use. Additionally, due to the high number of patients attending the hospital departments in Greece, the relatively lack of shortage of doctors and the constant growth of the working hours, doctors may become overwhelmed and as a result there is often inadequate time for meaningful communication with the patient on antibiotics guidelines.

Interpretation of Our Results

When discussing with the primary care physicians of the practice, the main reason identified for the non-etiological prescription of topical antibiotic treatment was the individual's fear for possible complications when AIC was left untreated, even in the setting of clear evidence suggesting otherwise. Given that AIC severity can range from self-limiting infection to vision-threatening complications such as endophthalmitis or keratitis, physicians in our department were afraid to not prescribe antibiotics. Moreover, the fastest resolution of symptoms in bacterial conjunctivitis treated with antibiotics compared to no-treatment, promoted this behavior [14]. However, after considerate discussion and collaboration with the physicians, they were keen to change their prescription practice according to the guidelines that we introduced. The choice of antibiotics in our study was based on the findings from the clinical examination and history of the patient. In general, patients with mucopurulent discharge and contact lens wearer were treated with tobramycin ointment 3 times a day for 1 week, while from patients with suspicion of gonococcal and chlamydial conjunctivitis samples from conjunctival scrapings and/or exudative fluid were taken. If tested positive for gonorrhea and chlamydia, they were treated with intramuscular ceftriaxone 1g and azithromycin 1 orally once, respectively.

Strengths and Limitations

One of the key strengths of the study is the implications that may have for primary care. The significant difference in the prescription of antibiotics between the two cycles of our audit indicates that easy-to-follow guidelines in combination with good communication of knowledge among primary care physicians can have a favorable effect on evidence-based prescription of antibiotics in primary care. Moreover, this study makes a noteworthy contribution to the current literature, given the fact that we could not identify any study assessing the prescription practice of antibiotics in AIC in primary care, in Greece. However, several potential limitations should be taken into consideration. First of all, there are several factors affecting the delivery of care in primary care departments, like their proximity with hospitals, the number of physicians working in the department, the size of the population that the department is serving and its medical resources. As a result, the efficacy in the implementation of guidelines regarding medical issues in different primary care departments may vary as well, and it may not be keeping in line with the results from our primary care department. Moreover, our results should be interpreted cautiously due to the relatively small sample size as well the fact that our study participants may differ from the general population. Lastly, we were not able to assess the effect of the guidelines in different time points in the future, which would enable us to assess if our favorable outcomes are long lasting.

Conclusion

In summary, this primary care-based audit revealed that the implementation of local guidelines can significantly improve the prescription practice of antibiotics for the management of AIC in primary care departments. Although in our study overall compliance regarding appropriate use of antibiotics in AIC exceeded 80%, it was not perfect. Thus, the audit must be repeated after a period of time, allowing enough time for these recommendations to be established long-term in current clinical practice.

Conflict of Interest

The authors have no conflict of interest to declare.

Author Contributions

Andreas Katsimpris, Nafsika Voulgari and Nikolaos Georgiadis contributed to the conceptualization, methodology, data analysis, writing, review and editing of the manuscript. Stylianos Kandarakis contributed to the writing and editing of the manuscript. Andreas Katsimpris, Nafsika Voulgari and Nikolaos Georgiadis contributed equally to the work and should be considered co-first authors.

References

1. McDonnell PJ. How do general practitioners manage eye disease in the community? *Br J Ophthalmol*. 1988;72(10):733-6.
2. Shuttleworth GN, Marsh GW. How effective is undergraduate and postgraduate teaching in ophthalmology? *Eye (Lond)*. 1997;11(5):744-50.
3. Sheldrick JH, Vernon SA, Wilson A. study of diagnostic accord between general practitioners and an ophthalmologist. *BMJ (Clinical Research Ed)*. 1992;304(6834):1096-8.

4. Everitt H, Little P. How do GPs diagnose and manage acute infective conjunctivitis? A GP survey. *Fam Pract*. 2002;19(6):658-60.
5. Shekhawat NS, Shtein RM, Blachley TS, Stein JD. Antibiotic prescription fills for acute conjunctivitis among enrollees in a large united states managed care network. *Ophthalmology*. 2017;124(8):1099-107.
6. Azari AA, Barney NP. Conjunctivitis: a systematic review of diagnosis and treatment. *JAMA*. 2013;310(16):1721-9.
7. Everitt HA, Little PS, Smith PWF. A randomised controlled trial of management strategies for acute infective conjunctivitis in general practice. *BMJ*. 2006;333(7563):321.
8. Rietveld RP, Ter Riet G, Bindels PJE, Bink D, Sloos JH, Van Weert HCPM. The treatment of acute infectious conjunctivitis with fusidic acid: a randomised controlled trial. *The British journal of general practice: the journal of the Royal College of General Practitioners*. 2005;55(521):924-30.
9. Rose PW, Harnden A, Brueggemann AB, Perera R, Sheikh A, Crook D, et al. Chloramphenicol treatment for acute infective conjunctivitis in children in primary care: a randomised double-blind placebo-controlled trial. *Lancet*. 2005;366(9479):37-43.
10. National Institute for Health and Care Excellence (NICE). Conjunctivitis - infective: Scenario: Who should I refer to ophthalmology? [Last accessed on: January 05, 2023]
<https://cks.nice.org.uk/topics/conjunctivitis-infective/management/who-should-i-refer-to-ophthalmology/>.
11. Smith AF, Waycaster C. Estimate of the direct and indirect annual cost of bacterial conjunctivitis in the United States. *BMC Ophthalmol*. 2009;9:13.
12. Lee AE, Niruttan K, Rawson TM, Moore LSP. Antibacterial resistance in ophthalmic infections: a multi-centre analysis across UK care settings. *BMC Infect Dis*. 2019;19(1):768.
13. Miyakis S, Pefanis A, Tsakris A. The challenges of antimicrobial drug resistance in Greece. *Clin Infect Dis*. 2011;53(2):177-84.
14. Sheikh A, Hurwitz B, van Schayck CP, McLean S, Nurmatov U. Antibiotics versus placebo for acute bacterial conjunctivitis. *Cochrane Database Syst Rev*. 2012(9):Cd001211.

Journal of Clinical Medical Research



Publish your work in this journal

Journal of Clinical Medical Research is an international, peer-reviewed, open access journal publishing original research, reports, editorials, reviews and commentaries. All aspects of medical health maintenance, preventative measures and disease treatment interventions are addressed within the journal. Medical experts and other related researchers are invited to submit their work in the journal. The manuscript submission system is online and journal follows a fair peer-review practices.

Submit your manuscript here: <https://athenaeumpub.com/submit-manuscript/>