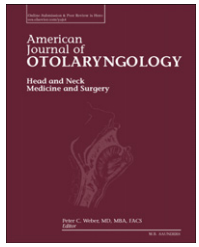
Available online at www.sciencedirect.com

ScienceDirect

www.elsevier.com/locate/amjoto



Provider and patient drivers of ototopical antibiotic prescription variability

Matthew G. Crowson, MD, Kristine C. Schulz, MPH, DrPH, Debara L. Tucci, MD, MS, MBA*

Division of Otolaryngology-Head & Neck Surgery, Duke University Medical Center, Durham, NC

ARTICLE INFO

Article history:
Received 13 April 2015

ABSTRACT

Objective: To determine if providers prescribe more affordable topical antibacterial therapy for patients who are economically disadvantaged or come from economically disadvantaged communities.

Study design: Prescription drug database review.

Setting: Large academic hospital network.

Subjects and methods: Ototopical prescription records of 2416 adults and children presenting with acute and chronic otologic infections from 2009 to 2013 were reviewed. Prescription, patient, provider, and institution variables including diagnosis, prescription type, demographics, health insurance status, healthcare provider type and setting were analyzed.

Results: Otitis externa and acute otitis media were the most common diagnoses. Non-OHNS (Otolaryngology-Head and Neck Surgery) providers served 82% of all patients. OHNS providers prescribed proportionally less fluoroquinolone, and more brand-name antibiotics compared to non-OHNS providers. Adults were more likely to receive a non-fluoroquinolone antibiotic and a generic prescription versus pediatric patients. Patients who self-identified as 'white' ethnicity received proportionally more fluoroquinolone prescriptions than patients who identified as 'non-white,' but there was no difference in provider type. The proportion of fluoroquinolone prescriptions was significantly higher in patients from low-poverty counties, however poverty level was not associated with patients seeing a particular provider type. The majority of our patients had commercial insurance, followed by Medicaid. Medicare patients had the lowest proportion of fluoroquinolone antibiotic prescriptions, and were less likely to receive fluoroquinolone prescriptions versus commercial insurance. Non-insured patients received proportionally more generic versus brand prescriptions than insured patients.

Conclusion: Our results indicate potential provider, patient demographic, and financial factors producing considerable variability in the prescribing patterns for topical antibiotics for common otologic infections.

* *Corresponding author at:* Duke University Medical Center, 2301 Erwin Road, Division of Otolaryngology-Head & Neck Surgery, Durham, NC, USA 27710. Tel.: +1 603 306 1182.

E-mail address: matthew.crowson@dm.duke.edu (M.G. Crowson).

http://dx.doi.org/10.1016/j.amjoto.2015.07.001
0196-0709/

1. Introduction

Otologic infections are among the most common disorders seen by both practicing otolaryngologists and head and neck surgeons (OHNS) as well as primary care providers. Topical antibiotic eardrops are the most cost-effective and best first-line therapy for these conditions [1]. The three main classes of ototopical antibacterial agents in use today include aminoglycoside (e.g. tobramycin, gentamicin), fluoroquinolone (e.g. ciprofloxacin, ofloxacin), and polymyxin combination products (e.g. corticosporin-neomycin, bacitracin, polymyxin B and hydrocortisone). The ototopical sales market in the United States is worth about $310 million dollars through the generation of 7.5 million prescriptions annually [2]. The cost of these agents is borne by insurers who reimburse medication costs and patients who pay outright or remit required co-payments to the pharmacy. The cost of individual prescriptions is not uniform, as one center reported ranges of $30–$100 for brand corticosporin and brand fluoroquinolone prescriptions, respectively [3].

An emerging field of research within the area of pharmaceutical utilization is the study of geographic, or regional variation in healthcare utilization and spending. The regional variation of opiate prescriptions and outpatient antibiotic prescribing has been studied previously [4,5]. This research has shown that there are significant differences in the prescribing patterns of opiate analgesics as well as antibiotics. Within otolaryngology, regional variations in chronic rhinosinusitis (CRS) have been studied [6], as have the patterns of antibiotic use for acute otitis media in European children [7]. In one study, the authors found that a significantly higher proportion of visits for CRS in the southern United States involved African Americans; in the northeast significantly fewer diagnostic services were provided or ordered and providers were significantly less likely to order or renew more than three medications at the clinic visit [6].

An investigation focusing on the variation in provider prescribing practices coupled to topical antibiotic treatments for otologic infections, patient demographic and socioeconomic factors has yet to be published in the United States. At the provider level, such an analysis may highlight potential differences in provider or institution prescribing practices as it relates to the use of these agents in management of otologic infections. The financial burden for patients is also intimately linked to the socioeconomic factors relevant to illness and medical care, and consideration of this burden is critical for ensuring patients are able to afford the care prescribed. The objective of this study is to determine if variation exists in the prescription of topical antimicrobial drops for acute and chronic ear infections and if providers prescribe more affordable topical therapy for patients who are economically disadvantaged or come from economically disadvantaged communities.

2. Material and methods

2.1. Patients and cultures

This study was completed with the approval of the institutional review board. The study population included 2416 adults and children presenting with acute and chronic otologic infections from 2009 to 2013 to a provider through convenience sampling. The first time prescription at the first patient encounter for the otologic infection was analyzed for each patient. The provider centers included three general hospitals, one pediatric hospital, and nine primary clinics throughout North Carolina. Emergency department and urgent care clinic data were not collected. Inclusion criteria included first appointment with a provider, all ages, any ototopical antibiotic type, and all otologic disease diagnoses. Exclusion criteria included patient follow-up or subsequent appointments.

2.2. Review of provider, patient demographic, diagnosis and antibiotic variables

A database review of patient demographics, diagnosis type and frequency, provider type, drug group class and specific agent was completed. Patient demographics extracted included age, gender, race class (white, non-white, declined), patient home county density designation (metro (urban), non-metro (small urban, rural)), and patient home county poverty level (high, low). Patient home county designation was determined from the 2013 United States Department of Agriculture Rural-Urban Continuum Codes. Patient home county poverty level was determined by taking the median of the North Carolina poverty level (19.3%) with high designated as greater than 19%, and low less than 19%. Patient otologic diagnoses were tabulated. Provider type was delineated by clinic type (primary care, urgent care, non-OHNS specialist, OHNS). Drug type was categorized as class (fluoroquinolone, non-fluoroquinolone, steroid only), and specific agents were tabulated (ciprofloxacin-dexamethasone, ofloxacin, ciprofloxacin-hydrocortisone, fluocinolone, ciprofloxacin, neomycin-polymyxin-hydrocortisone, and neomycin-colistin-hydrocortisone-thonzonium). Prescription entries were classified as generic and brand when specifically designated by a provider. Patient health care insurance status was collected. Insurance types were categorized as commercial (all private paying payors), Medicare, Medicaid, self-pay, no insurance and 'other' (state agency, veterans affairs, children's aid). The 'other' group was comprised of primary health insurance types with low frequency that did not warrant separate category generation.

2.3. Statistical analysis

Analyses were completed using the SAS JMP Pro 11 statistical package (Cary, NC). Two-by-two contingency tables were created, and Fisher's exact tests were performed on all variables tabulated. Accompanying p-values were reported with statistical significance fixed at $p = 0.05$. Patients who had insufficient data were excluded from statistical analysis.

3. Results

3.1. Patient population

A total of 2416 patients who received an ototopical medication for an otologic condition as a 'new,' or first-time presentation to either a non-OHNS provider or an OHNS provider were identified. The mean age was 29.9 years old