Ann Allergy Asthma Immunol 114 (2015) 462–469

Contents lists available at ScienceDirect

Outcomes before and after treatment escalation to Global Initiative for Asthma steps 4 and 5 in severe asthma

Patrick W. Sullivan, PhD [*]; Jonathan D. Campbell, PhD [†]; Vahram H. Ghushchyan, PhD [†,‡]; and Gary Globe, PhD, MBA [§]

[*] Regis University School of Pharmacy, Denver, Colorado
[†] University of Colorado, Aurora, Colorado
[‡] American University of Armenia, Yerevan, Armenia
[§] Amgen, Inc, Thousand Oaks, California

ARTICLE INFO

Article history:
Received for publication January 8, 2015.
Received in revised form March 5, 2015.
Accepted for publication March 17, 2015.

ABSTRACT

Background: Little is known about health outcomes in severe asthma reflected by Global Initiative for Asthma steps 4 and 5.
Objective: To analyze control, risk, economic, and health resource use (HRU) outcomes associated with treatment escalation to Global Initiative for Asthma steps 4 and 5.
Methods: This was a before-vs-after retrospective cohort study of patients (12–75 years old) with asthma newly initiated to omalizumab, high-intensity corticosteroids (HICS; ≥1,000 μg/day of inhaled fluticasone equivalent or oral prednisone), or high-dose inhaled corticosteroid (HDICS; ≥500 to <1,000 μg/day of fluticasone equivalent) using 2002 to 2011 MarketScan data. Poisson regression was used to model HRU outcomes; Tobit regression was used to model medical expenditures.
Results: Of 19,227 patients, 856 initiated omalizumab, 6,926 initiated HICS, and 11,445 initiated HDICS. Use of β-agonist increased for the HDICS and HICS cohorts and decreased for the omalizumab cohort; acute care visits and oral corticosteroid use decreased during follow-up for the HDICS and omalizumab cohorts. Annual health care expenditures, polypharmacy burden, and outpatient visits were high for all cohorts and increased in the follow-up year (baseline to follow-up; general health care expenditures: omalizumab $14,071 to $34,887, HICS $12,030 to $15,557, HDICS $7,570 to $9,826; annual number of asthma prescriptions: omalizumab 11.74 to 19.46, HICS 7.8 to 12.44, HDICS 5.17 to 9.69; outpatient visits: omalizumab 26.79 to 34.06, HICS 18.78 to 21.37, HDICS 15.06 to 16.64).
Conclusion: Omalizumab use was associated with improvements in risk and control accompanied by large increases in expenditures per HRU. Patients on HDICS and HICS showed improvements in risk but worsening control and increased expenditures per HRU. Innovations in disease management and available treatment options are needed to more optimally achieve treatment goals.
© 2015 American College of Allergy, Asthma & Immunology. Published by Elsevier Inc. All rights reserved.

Introduction

Although patients with severe asthma constitute a relatively small proportion of all patients with asthma (15%), the morbidity, mortality, and costs associated with severe asthma are disproportionately high.[1–4] The Epidemiology and Natural History of Asthma: Outcomes and Treatment Regimens (TENOR) study has provided valuable information about the natural history of disease, treatment patterns, and economic outcomes in patients with severe or difficult-to-treat asthma in population data from 2001 to 2003.[5] Although this and other studies have provided valuable insight, current treatment patterns and associated economic outcomes in the severe asthma population remain poorly understood, especially vis-à-vis newer guidelines and treatments that have emerged since TENOR.

Previous guidelines from the TENOR era focused on levels of asthma severity.[6,7] Recent guidelines, such as the Expert Panel Report 3 (EPR-3) and the Global Initiative for Asthma (GINA), have focused on the goal of improving asthma control, recommending a stepwise approach to treatment with an escalation in therapy considered if asthma is poorly controlled.[8,9] In general, a patient is considered to have more severe disease if higher doses or more long-term controller medications are required to achieve control.[9] The EPR-3 recommends basing the level of severity on an assessment of impairment and risk.[9] Impairment corresponding to severe

Reprints: Patrick W. Sullivan, PhD, Regis University School of Pharmacy, 3333 Regis Boulevard, H-28, Denver, CO 80221; E-mail: psulliva@regis.edu.
Disclosure: Dr Sullivan has received consulting fees and research grants from Amgen.
Funding: Funding was provided by a research grant from Amgen, Inc.

http://dx.doi.org/10.1016/j.anai.2015.03.019
1081-1206/© 2015 American College of Allergy, Asthma & Immunology. Published by Elsevier Inc. All rights reserved.

persistent asthma would include symptoms throughout the day, frequent night-time awakening (7 times per week), use of a short-acting β-agonist several times per day, extreme interference with normal activity, and forced expiration volume in 1 second less than 60% predicted. Patients experiencing frequent exacerbations requiring oral corticosteroids also would meet the criteria for severe persistent asthma. The EPR-3 suggests that more frequent and intense exacerbations indicate greater underlying disease severity. After asthma is controlled, the EPR-3 suggests classifying patients by the lowest level of treatment required to maintain control: moderate persistent asthma corresponds to step 3 or 4 treatment and severe persistent asthma corresponds to step 5 or 6 treatment. The GINA and EPR-3 guidelines suggest that patients who have poor control on steps 1 to 3 be titrated to steps 4 to 6 (EPR-3) or steps 4 to 5 (GINA). EPR-3 steps 4 and 5 are comparable to GINA step 4 and include medium-to high-dose inhaled corticosteroids with long-acting β-agonists. EPR step 6 is comparable to GINA step 5 and includes adding oral corticosteroids with previous step therapies and considering the addition of omalizumab.

The authors are not familiar with any studies that have classified patients with severe asthma by GINA step and evaluated outcomes before and after GINA-recommended treatment escalation. The health outcomes of patients at GINA steps 4 and 5 are generally not well understood. A population-level analysis of outcomes of these patients before and after treatment escalation would provide valuable insight. The authors assumed that patients had poor asthma control in the baseline period, which necessitated an escalation to a higher treatment step to improve asthma control. Their research hypothesized that treatment escalation to GINA steps 4 and 5 would be associated with improved outcomes in an administrative claims database. In addition, their study aimed to compare outcomes associated with treatment escalation to omalizumab, oral and high-dose inhaled corticosteroids, and medium-dose inhaled corticosteroids.

Methods

Data Source

Data were from the 2002 to 2011 MarketScan Commercial Claims and Encounters Database, an integrated medical and pharmacy claims dataset originating from a selection of large employers, health care plans, and public organizations. Data through 2011 were the most recently available at the time of the study design.

Study Population

Data were extracted from the MarketScan database for individuals 12 to 75 years old (eFig 1) if they had a diagnosis of asthma in at least 2 outpatient claims with primary or secondary diagnoses of asthma (*International Classification of Diseases, Ninth Revision* code 493.xx) or at least 1 emergency department (ED) or hospitalization claim with a primary diagnosis of asthma during the pre-index year. Children younger than 12 years were excluded because omalizumab is indicated only for those at least 12 years of age. Patients were excluded if they had a diagnosis of chronic obstructive pulmonary disease (or at least 1 claim for an anticholinergic medication), emphysema, or cystic fibrosis (*International Classification of Diseases, Ninth Revision* codes 491.2, 493.2, 496, 506.4, 492.x, 506.4, 518.1, 518.2, 277.0x). All patients were required to have continuous enrollment at least 12 months before and after the index date. The index date was defined as the date of the first prescription claim with at least 28 days' supply for newly initiated therapy (omalizumab, high-intensity corticosteroids [HICS; ≥1,000 μg/day of inhaled fluticasone equivalent or oral prednisone], or high-dose inhaled corticosteroid [HDICS; ≥500 to <1,000 μg/day of fluticasone equivalent]) during the study period.

Then, individuals were categorized into 3 mutually exclusive treatment groups: (1) omalizumab; (2) HICS; and (3) HDICS. These groups were chosen to reflect treatment associated with GINA steps 4 and 5. Patients were assigned to only 1 category based on the most severe treatment category for which they met the requirements, in the following order: omalizumab > HICS > HDICS. For example, a patient who met the criteria for HICS and omalizumab was assigned to the omalizumab cohort. The following definitions were applied: (1) the omalizumab cohort included patients with any use of omalizumab; (2) the HICS cohort included patients not in the omalizumab cohort who used at least 1,000 μg/day of fluticasone powder (or dose equivalent; eTable 1) or oral prednisone (or dose equivalent); and (3) the HDICS cohort included patients not in the omalizumab or HICS cohort who used 500 to 999 μg/day of fluticasone powder (or dose equivalent). Each injection of omalizumab was assumed to be from a 28-day supply.

To best support a comparison of treatment with outcomes, the analysis was restricted to subjects on "stable therapy." Stable therapy was defined as a minimum of 3 consecutive months of therapy within the first 90 days after initiation. Because of the potential for differential timing of prescription refills within 3 months, patients were included in the HICS and HDICS stable-therapy cohorts if they had a medication possession ratio of at least 0.70 for the first 3 months (which suggests that they had medication for ≥70% of the expected 90 days).

Outcomes Measured

Outcomes included control, risk, health resource use (HRU), and expenditures: (1) annual number of β-agonist prescriptions; (2) annual number of oral corticosteroid prescriptions; (3) asthma-specific and general annual HRU; and (4) asthma-specific and general annual health care expenditures. HRU included all-cause and asthma-specific encounters. Medical expenditures reflected the amount paid to the provider. The EPR-3 includes risk as a component of asthma severity and control.[9] In these cases, risk refers to exacerbations requiring oral corticosteroids, with a larger number of exacerbations requiring oral corticosteroids corresponding to greater severity and lack of control. This study uses the number of oral corticosteroid prescriptions as a marker for risk. Use of a β-agonist was used as a surrogate of asthma control. Use of a β-agonist has been highlighted by the GINA as an important indicator of asthma control[8] and has been used successfully in administrative claims data.[10] Oral corticosteroid use and ED and inpatient visits were used as measurements of asthma risk. These are valid measurements of asthma risk that have been assessed successfully in previous studies using administrative databases.[10–14] The medical care component of the Consumer Price Index was used to inflate all costs to 2011 US dollars.

Statistical Analysis

For all unadjusted analyses, *F* statistics were used to compare statistical differences. Adjusted analyses of HRU used negative binomial regression owing to the nature of the count data. For all regression analyses, the HDICS cohort at baseline was the reference group. Each HRU outcome was regressed on HDICS at follow-up, HICS at baseline, HICS at follow-up, omalizumab at baseline, omalizumab at follow-up, and control variables. Control variables for all regressions included age, sex, geographic region, insurance type, plan type, and number of chronic conditions. The number of chronic conditions for each patient was calculated as the total number of *International Classification of Diseases, Ninth Revision* codes (excluding asthma) reported in the claims (number of chronic conditions). Each expenditure outcome was regressed on

Download English Version:

https://daneshyari.com/en/article/3191153

Download Persian Version:

https://daneshyari.com/article/3191153

Daneshyari.com