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Reduced Likelihood of Multiple Hospitalizations in Patients Newly Diagnosed with Allergic Rhinitis Who Receive Intranasal Corticosteroids

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REVISED ABSTRACT

RATIONALE: Given that 1) asthma research with administrative claims data often characterizes asthma severity and control in terms of frequency of asthma-related hospitalizations, and 2) allergic rhinitis (AR) and asthma may represent a shared continuum of airway inflammation, we examined an administrative claims database to assess whether treatment with intranasal corticosteroids (INS) among patients with newly diagnosed AR mitigates asthma morbidity.

METHODS: This 12-year (6/1997-7/2009) retrospective matched cohort study of Florida Medicaid enrollees selected patients aged ≥12 years newly diagnosed with AR. Two cohorts were created: 1) an INS cohort for whom the first INS fill was preceded by an AR diagnosis and followed by ≥3 years of continuous enrollment, and 2) an AR control group for whom no INS claims were filled. INS patients were matched (1:3) to controls on age at first AR diagnosis, sex, race/ethnicity, and comorbidities 1 year before the first AR diagnosis or INS fill (or equivalent date for controls). Current Procedural Terminology codes identified hospitalizations, National Drug Codes identified INS and International Classification of Diseases, 9th edition, identified diagnoses.

RESULTS: Among all enrollees (N=7,524,231), there were 8,341 patients aged ≥12 years with newly diagnosed AR who had sufficient data for follow-up analyses. The majority were female (N=6,890; 82.6%). The racial/ethnic composition was 48.7% (N=4,062) White, 19.8% (N=1,647) Black, 19.8% (N=1,650) other, and 11.8% (N=982) Hispanic. Age at initial AR diagnosis was 12-29 years for 31.3% (N=2,615), 30-49 years for 40.2% (N=3,355), and ≥50 years for 28.4% (N=2,371). A total of 2,617 INS patients were matched to 5,724 controls. In the 3 years following INS initiation, the INS cohort was 45.6% less likely to experience ≥2 asthma-related hospitalizations than matched controls (OR 0.544, 95% CI 0.340 to 0.870, p=0.010). Similarly, in the 4 years following INS initiation, the INS cohort was 39.2% less likely to experience ≥2 asthma-related hospitalizations than were matched controls (OR 0.608, 95% CI 0.402 to 0.921, p=0.018).

CONCLUSIONS: Treatment of AR with INS may mitigate the risk of multiple asthma-related hospitalizations.

BACKGROUND

- AR is a highly prevalent chronic disease that negatively affects productivity and quality of life and increases the likelihood of developing comorbid conditions, including asthma.[1]
- The unified airway model posits a bidirectional relationship between upper and lower respiratory diseases whereby effective treatment of upper airway disease (AR) can modify the severity of lower airway disease (asthma), and vice versa.[2]
- INS are effective, first-line therapy for AR[3] and may improve asthma control and reduce the occurrence of costly asthma exacerbations in patients with concomitant AR and asthma.[4-6]
- The purpose of this study was to determine whether optimal treatment of INS in patients with newly diagnosed AR would reduce the morbidity of asthma, as assessed by the frequency of asthma-related hospitalizations.

METHODS

FLORIDA MEDICAID DATABASE. 1997-2009 Florida Medicaid, HIPAA-compliant claims data include patient demographics, diagnoses (ICD-9), and health care resource use (CPT/HCPCS and NDC) by service dates.

SELECTION CRITERIA. Aged ≥12 years; ≥1 paid AR claim (ICD-9 477.0, 477.8, 477.9); initial AR diagnosis preceded by 12 months without any AR diagnosis; ≥1 INS fill following rather than preceding index AR diagnosis; ≥2 years of continuous enrollment following first INS fill; and ≥3 years of continuous enrollment following match date. A diagnosis of comorbid asthma was not required for eligibility.

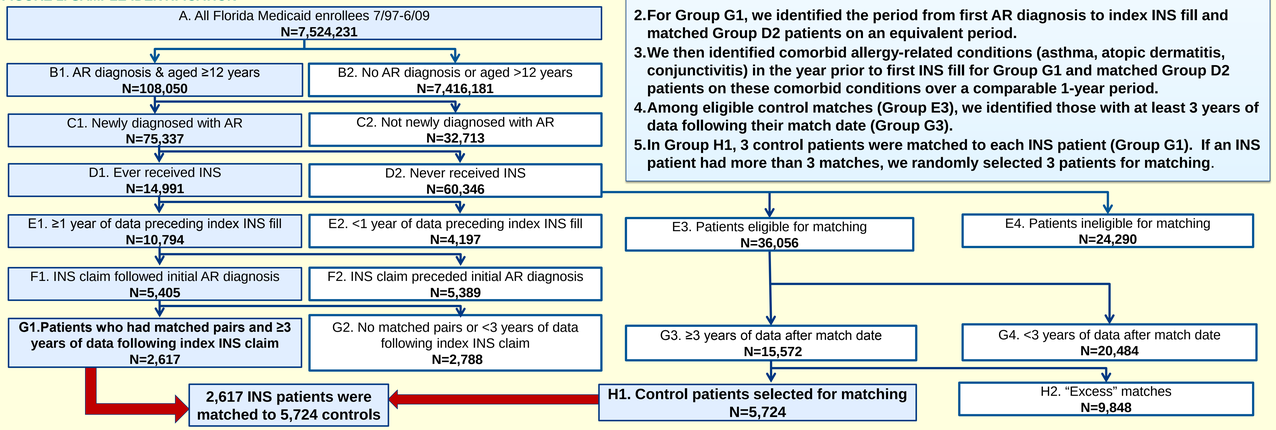
STATISTICAL ANALYSIS. Patients who received INS were matched 1:3 to controls who did not receive INS on age at initial AR diagnosis; sex; race/ethnicity; Charlson Comorbidity Index 1 year prior to the index AR diagnosis; and diagnoses of asthma (ICD-9 493), atopic dermatitis (ICD-9 691.8), and conjunctivitis (ICD-9 372) during the year before the index INS claim (or comparable period for controls). Logistic regression examined the likelihood of multiple (≥2) asthma-related hospitalizations (ICD-9 493) during the 3 and 4 years following INS initiation.

RESULTS

SAMPLE SELECTION

- Available for matching were 2,617 patients aged ≥12 years, newly diagnosed with AR, who initiated *de novo* INS and had ≥3 years of data following INS initiation (Figure 1).
- Among the 15,572 controls eligible for matching who had ≥3 of years data from the match date, 5,724 were matched using a 1:3 ratio of INS patients to controls.

FIGURE 1. SAMPLE IDENTIFICATION



MATCHING PROCEDURES

1. Patients were matched on:
   - Sex
   - Race/ethnicity
   - Allergic disease comorbidity 1 year prior to index INS fill (or comparable period)
   - Age at first AR diagnosis (±6 months)
   - Charlson Comorbidity Index 1 year prior to index AR diagnosis
2. For Group G1, we identified the period from first AR diagnosis to index INS fill and matched Group D2 patients on an equivalent period.
3. We then identified comorbid allergy-related conditions (asthma, atopic dermatitis, conjunctivitis) in the year prior to first INS fill for Group G1 and matched Group D2 patients on these comorbid conditions over a comparable 1-year period.
4. Among eligible control matches (Group E3), we identified those with at least 3 years of data following their match date (Group G3).
5. In Group H1, 3 control patients were matched to each INS patient (Group G1). If an INS patient had more than 3 matches, we randomly selected 3 patients for matching.

SAMPLE CHARACTERISTICS

•The matched INS (N=2,617) and control (N=5,724) cohorts had similar baseline characteristics (Table 1).

TABLE 1. PATIENT CHARACTERISTICS AFTER MATCHING

CHARACTERISTICS		INS (N=2,617)	Control (N=5,724)	P value
Female, n (%)		2,150 (82.2)	4,740 (82.8)	0.465
Race/Ethnicity, n (%)				
	White non-Hispanic	1,245 (47.6)	2,817 (49.2)	0.082
	Black non-Hispanic	498 (19.0)	1,149 (20.0)	
	Hispanic	317 (12.1)	665 (11.6)	
	Other	557 (21.3)	1,093 (19.1)	
Age at initial AR diagnosis, n (%)				
	12-17 years	298 (11.4)	628 (11.0)	0.306
	18-29 years	497 (19.0)	1192 (20.8)	
	30-39 years	578 (22.1)	1,264 (22.1)	
	40-49 years	477 (18.2)	1,036 (18.1)	
	50-59 years	370 (14.1)	819 (14.3)	
	≥60 years	397 (15.2)	785 (13.7)	
Charlson Comorbidity Index before initial AR diagnosis, n (%)				
	0 (minimal)	1,864 (71.2)	4,145 (72.4)	0.260
	>0 (moderate to severe)	753 (28.8)	1,579 (27.6)	
Allergy-related comorbidity, n (%)				
	Asthma	258 (9.8)	498 (8.7)	0.092
	Atopic dermatitis	1 (0.04)	1 (0.02)	0.529
	Conjunctivitis	52 (2.0)	92 (1.6)	0.217

LIKELIHOOD OF MULTIPLE ASTHMA-RELATED HOSPITALIZATIONS

- As shown in Table 2, in the 3 years after INS initiation, patients who received INS were 45.6% less likely to have ≥2 asthma-related inpatient stays than were their matched control counterparts (OR 0.544, 95% CI 0.340 to 0.870, p=0.010).
- In the 4 years after INS initiation, patients who received INS were 39.2% less likely to have ≥2 asthma-related inpatient stays than were their matched control counterparts (OR 0.608, 95% CI 0.402 to 0.921, p=0.018).

TABLE 2. LIKELIHOOD OF MULTIPLE ASTHMA-RELATED HOSPITALIZATIONS FOR INS VERSUS CONTROL PATIENTS

3 YEARS FOLLOWING INS INITIATION (AMONG PATIENTS WITH ≥3 YEARS OF FOLLOW-UP DATA)

Asthma-related Hospitalizations	INS (N=2,617)	Control (N=5,724)	Odds Ratio	95% CI	P value
0-1, n (%)	2,595 (99.2)	5,636 (98.5)	Ref	0.340 to 0.870	0.010
≥2, n (%)	22 (0.8)	88 (1.5)	0.544		

4 YEARS FOLLOWING INS INITIATION (AMONG PATIENTS WITH ≥4 YEARS OF FOLLOW-UP DATA)

Asthma-related Hospitalizations	INS (N=2,394)	Control (N=4,501)	Odds Ratio	95% CI	P value
0-1, n (%)	2,364 (98.8)	4,409 (98.0)	Ref	0.402 to 0.921	0.018
≥2, n (%)	30 (1.2)	92 (2.0)	0.608		

CONCLUSIONS

- This study suggests that treatment of newly diagnosed AR with INS can reduce the morbidity of AR, specifically the likelihood of multiple asthma-related hospitalizations.
- These findings corroborate those of previous retrospective studies reporting that pharmacological treatment of AR reduces the risk of asthma-related hospitalizations and emergency department visits.[4-6]
- One case-control study reported a 44% lower risk of asthma-related hospitalization in patients with concomitant AR and asthma who received INS.[4]
- Despite the benefits of INS, a recent analysis of U.S. managed care claims data found that only about 1/3 of health plan members who were prescribed a medication for the treatment of AR were receiving INS.[7]
- Given the superior efficacy of INS for treating symptoms of AR and its potential for reducing the exacerbation of asthma symptoms, increasing utilization of INS may be critical to improving control of respiratory disease.
- Limitations of this study include its retrospective nature, which precludes definitive conclusions regarding causality; the possibility that groups may have differed on variables that were not controlled for by matching procedures; and the inability to generalize findings beyond the patient population of Medicaid enrollees.

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