HRP131

The Risk of Osteoporotic Fractures in Elderly Asthmatic Patients According to Prescribing Patterns of Systemic Corticosteroid in South Korea

Donghyun Pyun[1,2] and Hae Sun Suh[1,2,3,*]

1 Department of Regulatory Science, Graduate School, Kyung Hee University, Seoul, Republic of Korea; 2 Institute of Regulatory Innovation through Science (IRIS), Kyung Hee University, Seoul, Republic of Korea; 3 College of Pharmacy, Kyung Hee University, Seoul, Republic of Korea

*Corresponding author

Pharmaceutical Economics Big Data Analysis and Policy Lab

Background

- Osteoporotic fractures (OFs) are a growing concern among elderly asthmatic patients undergoing systemic corticosteroid (SCS) therapies.
- While the impact of cumulative SCS dosage on adverse events is acknowledged, there has been a lack of research on elderly asthmatic patients in South Korea.
- This study aimed to assess the incidence and risk of OFs in elderly asthmatic patients, considering the duration and cumulative dosage of SCS.

Methods

Study design: Retrospective cohort study (Figure 1)

Data source: The Health Insurance Review & Assessment Service Database from January 2015 to December 2019.

Study population: Elderly asthmatic patients who reached the risk threshold of cumulative SCS were defined as satisfying all following criteria

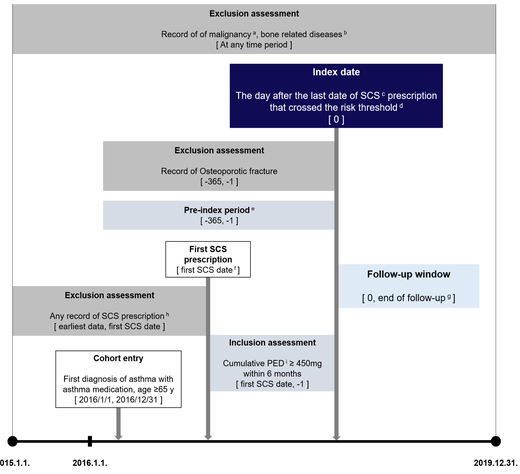
- Patients aged ≥ 65 years who had ≥1 claim of asthma medications with asthma diagnosis (ICD-10: J45-46);
- Patients exceeding a cumulative dose of 450mg prednisolone equivalents within six months;
- Patients who haven't had the fracture-related diseases (cancer, bone-related diseases) during the study period.
- High-intensity group: ≤90 days with cumulative dose >450mg
- Low-intensity group: >90 days with cumulative dose >450mg

Outcomes

- The incidence rates of OF in low-intensity group and high-intensity group
- The hazard ratio of OF for the high-intensity group compared with the low-intensity group.

Statistical analysis

- Propensity score matching method (1:1 Greedy matching) was applied to control confounders between two groups.
- After PSM, Cox proportional hazard model was used to assess the risk of OFs.
- In comparing baseline characteristics, categorical variables were assessed with chi-square tests and continuous variables were assessed with Student's t-test at a statistical significance level of 0.05.
- All analyses were conducted using SAS 9.4.2 and SAS Enterprise Guide 7.1 (SAS Institute Inc., Cary, NC, USA) via the remote analyzing system of the Health Insurance Review and Assessment Service.

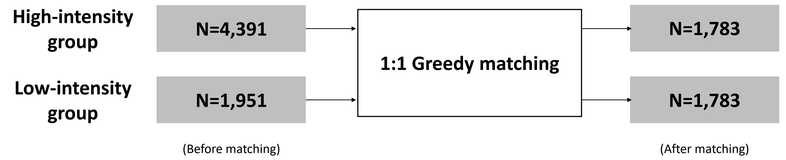


a. Any cancer without melanoma
b. Paget's disease, other disorders of bone, osteopathies in diseases classified elsewhere, other osteochondrodysplasias
c. Systemic corticosteroid (SCS)
d. Cumulative prednisolone equivalents dose ≥ 450 mg within 6 months
e. For assessing covariates: charlson comorbidity index, comorbidities, previous medication use
f. First date of systemic corticosteroid prescription after cohort entry
g. Patients will be followed until the first occurrence of any of the following: first occurrence of outcome, death, and end of study period
h. All included patients have a wash-out period of at least one year of SCS prescriptions.
i. Prednisolone equivalents

Figure 1. Study scheme

Results

The number of patients in high-intensity and low-intensity group



Baseline characteristics of patients after propensity score matching

Characteristics	High-intensity group (n=1,783)	Low-intensity group (n=1,783)	P-value
Age (years), mean (SD)	76.16 (7.03)	75.92 (7.33)	0.3276
Sex, %			
Female	892 (50.03)	885 (49.64)	0.8146
Male	891 (49.97)	898 (50.36)	
Cumulative SCS dose, mean (SD)	677.1 (399.9)	645.8 (414.8)	0.0219
CCI*, mean (SD)	3.16 (1.98)	3.11 (1.91)	0.5025

SCS, systemic corticosteroid; CCI, Charlson comorbidity index.
*Any malignancy and metastatic solid tumor were excluded from the calculation of CCI according to the exclusion criteria of this study.

Incidence rates per 1,000 person-year for osteoporotic fracture

Patient group	Total person-year	Total fractures	Incidence rates per 1,000 person- year
High-intensity group	3965.98	199	50.18
Low-intensity group	4031.66	212	52.58

Hazard ratios for osteoporotic fractures by univariate cox proportional hazard model

Patient group	Hazard ratio	95% confidence interval	P-value
High-intensity group	0.948	0.780-1.151	0.5873
Low-intensity group	1.000	1.000-1.000	

Discussion

- There was a difference in the average of cumulative dose of SCS between two groups. However, as the standardized mean difference in cumulative dose was less than 0.1, it was deemed that balance between the two groups had been achieved for this characteristic.
- Similar incidence rates of OF were observed in the high-intensity and low-intensity groups, with no significant difference in the risks of OFs between the two groups.
- This is the first study analyzing the impact of prescription patterns of SCS on the occurrence of OFs and its risks in elderly asthmatic patients in South Korea, using population-based claims data.

Conclusions

- The high-intensity group and low-intensity group showed no significant difference in the risk of OF.
- Therefore, careful consideration should be given to the occurrence of OFs in patients with both groups.
- The findings of our study can serve as a basis for studies about adverse events of SCS and contribute to health insurance planning.

Acknowledgment

- This work was a grant (21153MFDS601) from the Ministry of Food and Drug Safety in 2023.

References

1. Lee, E., Kim, A., Ye, Y.-M., Choi, S.-E., & Park, H.-S. (2020). Increasing prevalence and mortality of asthma with age in Korea, 2002–2015: a nationwide, population-based study. Allergy, asthma & immunology research, 12(3), 467.
2. Matthewman, J., Tadrous, M., Mansfield, K. E., Thiruchelvam, D., Redelmeier, D. A., Cheung, A. M., Lega, I. C., Prieto-Alhambra, D., Cunliffe, L. A., & Mulick, A. (2023). Association of different prescribing patterns for oral corticosteroids with fracture preventive care among older adults in the UK and Ontario. JAMA dermatology, 159(9), 961-969.
3. Bartlett, V. L., Dhruva, S. S., Shah, N. D., Ryan, P., & Ross, J. S. (2019). Feasibility of using real-world data to replicate clinical trial evidence. JAMA network open, 2(10), e1912869-e1912869.
4. Price, D. B., Trudo, F., Voorham, J., Xu, X., Kerkhof, M., Ling Zhi Jie, J., & Tran, T. N. (2018). Adverse outcomes from initiation of systemic corticosteroids for asthma: long-term observational study. Journal of asthma and allergy, 193-204.

Donghyun.pyun@khu.ac.kr