

불필요한 소화기관용 약제의 처방: 다제처방의 요인

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Prescribing Superfluous Gastroprotective Agents: an Indicator of Polypharmacy

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서론: 본 연구는 불필요한 소화기관용 약제의 처방이 한국에서의 처방전 당 약물 개수를 증가시키는 것과의 연관성을 검토하고자 수행되었다.

연구방법: 연구를 위한 자료로 건강보험심사평가원의 처방전 데이터와 환자의 기타 모든 의료보험 청구데이터를 이용하였고, 두 데이터셋을 연결하여 처방전들을 소화기관용 약제의 필요성에 따라 소화기관질환 그룹, 관절염질환 그룹, 소화기관용 약제 처방이 불필요할 것으로 그 외 질환 그룹으로 구분, 분리하였다.

결과: 처방전 당 약물의 평균 개수의 분포는 세 그룹에서 비슷한 양상을 보였는데, 관절염질환 그룹과 그 외 질환 그룹의 거의 절반 이상은 한 개의 소화기관용 약제를 포함하였다. 세 그룹 모두 처방전 당 약물 개수와 처방전 당 소화기관용 약제의 개수가 1차 선형관계를 보였다. 그 외 질환 그룹에서는 처방전 당 전체 약물이 평균 6개를 넘는 경우, 적어도 한 개의 소화기관용 약제가 포함되었다. 본 연구는 불필요한 소화기관용 약제를 처방하는 것은 다제처방의 매우 유의한 예측인자임을 보였다.

결론: 향후, 약제 처방전의 질을 향상시키기 위해서는 각각의 약물을, 특히 소화기관용 약제를, 처방 시 약제의 불가피한 필요성에 대해 판단할 수 있어야 할 것이다.

□ Key words - polypharmacy, multiple medications, superfluous gastroprotective agents, drug use evaluation

Polypharmacy is operationally defined based on a definite number of multiple drugs (usually five or more) taken concomitantly by a single person.¹⁾ The prescription of more drugs than is clinically warranted raises drug-related safety issues, including duplicate medications, drug-drug interactions, medications with no apparent indication, and inappropriate dosage.²⁾ Furthermore, it has been demonstrated that polypharmacy is strongly associated with unfavorable outcomes, including poor glycemic control of diabetes and falls in patients aged over 55 years.^{3,4)}

Polypharmacy has been a particular problem in Korea over the last decade, where the average number of drugs taken by patients over 65 years old with chronic illnesses was 7.23 ranging from 1 to 27 in 2007.⁵⁾ To increase physicians' awareness of polypharmacy, the National Health Insurance Review and Assessment Agency of Korea provides feedback on the extent of polypharmacy, informing doctors of the percentage of their prescriptions that contained six or more medications. Since 2006, this information has been provided quarterly in an attempt to develop prescription evaluation programs. As a result of this review, the average percentage of polypharmacy prescriptions slightly decreased from 21.05% for the first quarter of 2006 to 19.36% and 18.92% for the same period in 2007 and 2008, respectively.⁶⁾

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The patient factors that predict polypharmacy are older adults, psychiatric disorders, and a high number of primary care visits.¹⁾ In terms of the health providers, inadequate geriatric education and incomplete knowledge regarding complicated drug therapy are the main risk factors for polypharmacy.²⁾ Some specific drug classes are associated with polypharmacy, particularly gastrointestinal, psychotropic, and cardiovascular medications.¹⁾

Gastrointestinal drugs have habitually been included by default in a large number of prescriptions in Korea in an attempt to protect the gastrointestinal tract from heartburn or gastric acid.⁶⁾ In practice, 81.6% of family physicians included gastrointestinal drugs in their prescriptions for patients with mild colds in 2002.⁷⁾ A chart review study of a large city hospital reported that 43.2% of patients presenting neither symptoms nor a history of gastrointestinal diseases were prescribed gastrointestinal drugs, such as digestive enzymes, gastrointestinal motility drugs, antacids and acid-controlling agents.⁸⁾ These findings suggest the unnecessary prescription of gastrointestinal drugs with polypharmacy in Korea. Therefore, this study was performed to examine the prescription of superfluous gastroprotective agents as an indicator of polypharmacy. The data obtained may provide a method of assessment and intervention to reduce the prescription of unnecessary and unjustified medications in Korea.

METHODS

All medical insurance claims and prescription claims submitted to one of the nine chapters of the Health Insurance Review and Assessment Service for January 2006 were obtained. Each claim has one primary diagnosis code and twenty other supplementary diagnoses entered. After assigning a new identification number to each claim, a dataset that included multiple observations per prescription was created according to the unique drug and diagnosis codes.

The compounds regarded as gastroprotective agents in this study included: H₂ antagonists or proton pump

inhibitors, gastrointestinal stimulants or digestive enzymes, antacids, anti-emetics or emetics, choleragogues, probiotics, and others corresponding to the Korean Drug Classification codes 232, 233, 234, 235, 236, 237, 238, and 239 in the year of 2006. Since the use of gastroprotective agents is required for some conditions, gastrointestinal problems and arthritis are considered in the present study. For arthritis, gastroprotective agents are used in conjunction with long-term non-steroidal anti-inflammatory drug (NSAID) therapy, which is frequently recommended in elderly arthritis patients. The codes of the Korean Standard Classification of Disease (<http://kostat.go.kr/kssc>) were used to identify prescription-claims related to diagnoses with gastrointestinal problems (K20-K31, K35-K38, K40-K46, K50-K52, K55-K63, K65-K67, K80-K87, and K90-K93) and with arthritis (M00-M03, M01-M14, M15-M19, and M20-M25).

Claims data with gastrointestinal or arthritis-relevant codes were sorted into the GI- and arthritis- prescription groups. This dataset was restructured to create an additional dataset with one observation per patient. By linking prescribing date, organization code and claims identification number, this dataset was merged with the original prescription claims dataset to filter out claims by patients with neither GI nor arthritis during the study period. These claims were assigned to the unrelated illness (UI) group. Finally, in this study, the unit of observation was a prescription. SAS was used for all data management and descriptive analysis (SAS Institute Inc., Cary, NC, USA).

RESULTS

Among the entire claims data (n=3,720,449), claims corresponding to GI, arthritis, or UI accounted for 17.42%, 7.42%, and 65.21%, respectively (Table 1). Table 1 also presents the proportion of prescriptions according to the age of patients. As expected, arthritis was rare for patients under 18 years old taking up less than 1% of the entire arthritis prescriptions. For GI problem prescriptions, prescriptions of patients aged

Table 1. Proportion of prescription claims according to age groups

Prescription groups	Age≤6	7<Age≤17	18<Age≤64	65=>Age	Total
UI	18.64%	9.85%	54.89%	16.62%	100% (65.21%)
GI problem	6.88%	6.32%	63.25%	23.55%	100% (17.42%)
Arthritis	0.11%	0.67%	44.73%	54.49%	100% (7.42%)
All	14.05%	7.91%	55.57%	22.47%	100% (100%)

UI: Unrelated Illness; Rx of patients related to neither GI nor arthritis

GI: Gastrointestinal problem

Table 2. Descriptive analyses on the number of medications and the number of gastroprotective drugs

	Number of drugs per Rx			Number of gastroprotective agents per Rx			r* (P-value)
	Mean (S.D.)	Median	Inter-Q range	Mean (S.D.)	Median	Inter-Q range	
UI	4.25 (1.7676)	4.0	2.0	0.73 (0.7656)	1.0	1.0	0.4504 (<0.0001)
GI problem	4.71 (1.6237)	5.0	2.0	2.28 (1.3980)	2.0	2.0	0.4681 (<0.0001)
Arthritis	4.14 (1.9158)	4.0	2.0	1.10 (0.9478)	1.0	2.0	0.5714 (<0.0001)
ALL	4.30 (1.7772)	4.0	2.0	1.03 (1.0892)	1.0	1.0	0.4211 (<0.0001)

UI: Unrelated Illness; Rx of patients related to neither GI nor arthritis

GI: Gastrointestinal problem

S.D.: Standard Deviation

Inter-Q range: Interquartile range

*Pearson Correlation Coefficient between number of drugs and number of gastroprotective agents per prescription

below 18 occupy about 13% (Table 1).

As shown in Table 2, the distribution of the number of medications per prescription was similar in all three groups. The number of medications per prescription was most frequently four or five, accounting for 54%, 45%, and 47% of prescriptions in the GI, arthritis, and UI groups, respectively.

The average number of gastroprotective agents per prescription was one for the arthritis and UI groups and two for the GI group (Table 2). No gastroprotective agents were noted for 7.07% (GI), 25.38% (arthritis) and 40.69% (UI) of prescriptions. In both the arthritis and UI groups, almost 50% of prescriptions included one gastroprotective agent, while 29% and 22% of GI prescriptions included one and two gastroprotective agents, respectively. The numbers of gastroprotective agents in the 99th percentile per prescription were six (GI), four (arthritis), and three (UI).

The number of medications and number of gastroprotective agents per prescription were significantly correlated in all three groups (Table 2). While all the Pearson correlation coefficients were statistically significant ($p<0.0001$), it was dominant for the arthritis group ($r=0.5714$) (Table 2).

The relationship between the number of medications and the number of gastroprotective agents per prescription was also presented in the Figure 1. In Figure 1, the GI group had a larger average number of gastroprotective agents than the arthritis and UI groups. However, except when the number of prescribed medications exceeded 13, the number of gastroprotective agents per prescription increased linearly in all three groups. If the total number of medications exceeded six per prescription, then a gastroprotective agent was included in the UI group on average.

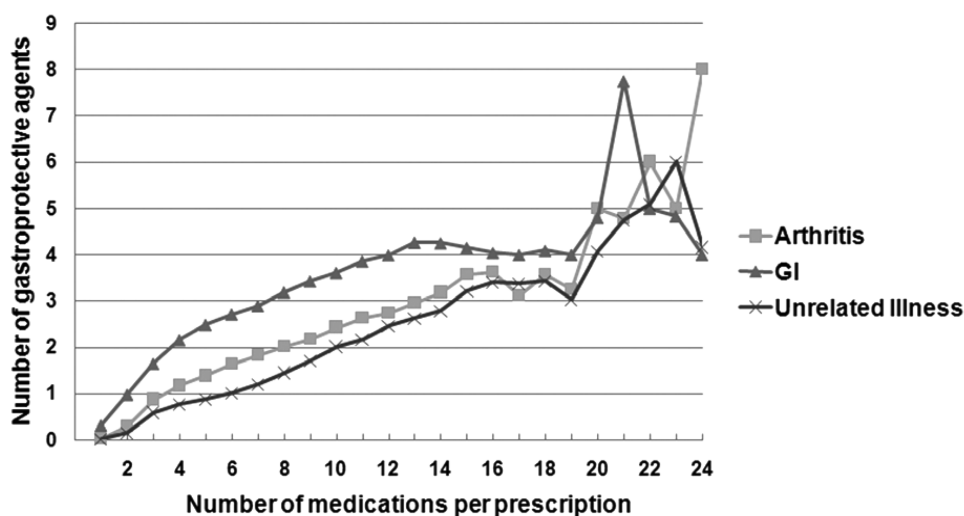


Fig. 1. Association between the number of medications and the number of gastroprotective agents per prescription for arthritis, gastrointestinal (GI) conditions and other unrelated illness.

DISCUSSION

The results of the present study indicate that the inclusion of a superfluous gastroprotective agent in a prescription is a significant predictor of polypharmacy; prescription of a gastroprotective agent was significantly and linearly correlated with the prescription of multiple drugs. These data suggest that to avoid side effects in the upper gastrointestinal system, doctors may feel compelled to prescribe superfluous gastroprotective agents when prescribing multiple drugs simultaneously. This leads to problems, as the addition of unnecessary gastrointestinal drugs without clinical evidence of their requirement can result in various adverse outcomes, such as adverse drug interactions, decreased medication compliance, detrimental health outcomes, and increased drug expenditure.⁹⁾

The results of the present study indicate that a six-drug cut-off per prescription may be critical. In the prescription group for patients who had neither gastrointestinal problems nor arthritis (GI), a gastroprotective agent was commonly included when the total number of medications exceeded six per prescription. This suggests a rationale for employing a six-drug cut-off in pharmaceutical care intervention to prevent polypharmacy and the unnecessary prescription of gastrointesti-

nal drugs. Indeed, the prescription of six or more drugs has been addressed as an indicator of polypharmacy when examining prescribing quality in prescription evaluation program of Korea although using the precise number of drugs to determine polypharmacy has not been validated.⁹⁾

In addition, this study demonstrated that gastroprotective agents may be underutilized for arthritic patients, as more than 25% of arthritis-related prescriptions included no gastroprotective drugs. Thus, pharmaceutical care intervention should consider not only the overutilization of superfluous drugs but also their correct prescription for specific disease processes to avoid underutilization.

It should be noted that the high rates of polypharmacy in Korea may be because people are familiar with traditional oriental herbal medicines as popular restorative regimens. As herbal medicines are usually prepared with a mixture of ingredients, people may be less concerned about taking a variety of medicines simultaneously.¹⁰⁾ Furthermore, the fee-for-service remuneration method and heavy workload of physicians have also been suggested as potential reasons for inappropriate prescribing habits in Korea.⁷⁾ Thus, it may be necessary for future drug policies to include performance-based reimbursement.

The results of the present study demonstrate that polypharmacy is significantly related to the inappropriate prescription of drugs. Physicians and health care providers should be made aware of the potential adverse effects of prescribing multiple drugs. Moreover, physicians must endeavor to improve the quality of prescriptions by discerning whether each drug is essential or superfluous for treatment, particularly when including gastrointestinal agents in the prescription.

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