

STUDY REPORT SYNOPSIS (ABSTRACT)

Proton Pump Inhibitors (PPIs) Inappropriate Use and Economic Burden in Chinese Population

-----A Descriptive Retrospective Observational Study using CHIRA Data

Background/Rationale:

As the population using PPI continues to expand, the problem of overuse of PPIs appears gradually, and the new and severe adverse reactions increased gradually. Foreign studies have pointed out that due to the development of PPI and the combination of medications, PPI overuse is more and more severe, especially among the elderly population ^[7].

With the inappropriate use of PPIs (including non-indication use, over maximum daily dose and over maximum duration) problems have become prominent increasingly, potential adverse reactions have also been valued.

In addition, inappropriate use of PPIs drugs can expose patients to significant financial burdens during treatment. In a non-ICU cost-study of intravenous PPIs, it showed out that there would be a cost saving of \$ 26,366 and \$ 35,465 per year respectively if the use of intravenous PPIs was managed and guided ^[8]. Some domestic scholars also conducted researches on the inappropriate use of PPIs. However, all studies were based on data of a single city or several hospitals, and researches using big-data were deficient. At the same time, there is no research on the burden of inappropriate use of PPIs in China up to now.

Therefore, this study is based on the China Health Insurance Research Association (CHIRA) database to investigate the inappropriate use of PPIs in order to better understand the harm caused by the inappropriate use of PPIs.

Objectives

Primary Objective

To identify the inappropriate use of PPIs (overall, outpatient & inpatient).

1) Overall proportion of patient-times/courses used PPIs for non-indication use;

- 2) Overall proportion of patient-times used PPIs for over maximum daily doses;
- 3) Overall proportion of patient-times/courses used PPIs for over maximum duration.

Secondary Objectives

To evaluate the economic burden of PPIs inappropriate use.

- 1) Total medication expenditure of PPIs inappropriate use;
- 2) Proportion of medication expenditure due to inappropriate use in PPIs total expenditure;
- 3) Medication expenditure due to PPIs inappropriate use per visit (inpatient & outpatient).

To describe the PPIs use in outpatients and inpatients.

- 1) Prevalence of PPIs use;
- 2) Diagnosis distribution for PPIs users;
- 3) Department distribution of PPIs prescription.

Methods

Study Design

This is a descriptive retrospective observational study using CHIRA data

Data Source

This study used the sampled data of “The Survey on the Use of Drugs, Medical Equipment, and Treatments for patients with Basic Medical Insurance” owned by China Health Insurance Research Association (CHIRA). This study selected patients with PPIs prescription history and continuous records for the whole year from the database of year 2015.

Study Population

Inclusion Criteria

Patients with any kind of PPI drugs would be included. PPI drugs include omeprazole, pantoprazole, lansoprazole, esomeprazole and rabeprazole. PPIs (including oral and intravenous) was included for outpatient visits and only intravenous injections of PPIs was included for inpatient visits.

Considering the recording of the diagnosis with a very important impact on the study, the cities with a proportion of empty diagnosis records more than 30 percent (15 cities) have been excluded, cities with relative comprehensive records were finally included (27 cities) (see Appendix Table 9).

Exclusion Criteria

- 1) Outpatients with PPIs medication in January, 2015
- 2) Outpatients without diagnosis
- 3) Inpatients without intravenous PPIs medication usage
- 4) Inpatients without diagnosis and no surgery during once hospitalization.

Statistical Methods

This study mainly used descriptive statistical analysis (such as patients' gender, region, department, etc.) for categorical variables, using indicators as frequency and percentage. The indicators for descriptive statistical analysis for the continuous numerical variables (such as: total cost, unreasonable PPIs use costs) is mean value.

Results

Primary Objective

The inappropriate use of PPIs (overall, outpatient & inpatient).

Overall, inpatient and outpatient rates of inappropriate use were 78.00%, 87.60% and 72.23%. Population with age >40s was the major target of PPIs prescription together with a higher rate of inappropriate use. The males had higher rate of inappropriate use (78.15%) compared to the females (77.86%). The western area was the highest (91.86%) for inappropriate use, and middle area was with a rate of 91.14%, with the eastern area the lowest (73.76%). The tertiary class A hospitals in the first-tier city had an obvious lower rate of inappropriate use compared with tertiary class A hospitals in the second-tier cities (44.70%/48.27% VS 79.09%/72.52%). The sequence for overall inappropriate use rate from high to low was Pantoprazole (90.44%) > Lansoprazole (88.67%) > Omeprazole (76.20%) > Rabeprazole (62.65%) > Esomeprazole (61.89%).

1) Overall proportion of patient-times/courses used PPIs for non-indication use;

Overall, inpatient and outpatient rates of no indication use were 76.10%, 82.58% and 72.21%.

2) Overall proportion of patient-times used PPIs for over maximum daily doses;

Overall and inpatient rates of no indication use were 1.39% and 3.71%.

3) Overall proportion of patient-times/courses used PPIs for over maximum duration.

Overall, inpatient and outpatient rates of over-duration use were 0.93%, 2.44% and 0.02%.

Secondary Objectives

The economic burden of PPIs inappropriate use.

1) Total medication expenditure of PPIs inappropriate use;

Inappropriate use analysis cost of PPIs had been conducted from overall, outpatient and inpatient level, they are RMB 59,190,874.97, 9,049,929.62 and 50,140,945.35. Overall PPI use cost was 72,949,473.24 RMB, and among which the inappropriate use accounted for 81.14% of the total cost. Total PPIs outpatient cost was 16,958,302.31 RMB, and among which 53.37% for inappropriate PPIs use cost. Total PPIs inpatient cost was 55,991,170.93 RMB, with its 89.55% paid for inappropriate PPIs use.

2) Proportion of medication expenditure due to inappropriate use in PPIs total expenditure;

Proportion of medication expenditure due to inappropriate use in overall, outpatient and inpatient are 81.14%, 53.37% and 89.55%.

3) Medication expenditure due to PPIs inappropriate use per visit (inpatient & outpatient).

Medication expenditure due to PPIs inappropriate use per visit in inpatient and outpatient are 618.55 and 81.44.

The PPIs use in outpatients and inpatients.

1) Frequency of PPIs use;

The frequencies of PPIs use are 246392, 92541, 153851 in overall, inpatient, outpatient.

2) Diagnosis distribution for PPIs users;

The top diseases with higher inappropriate uses was the highest in gastritis (21.44%), followed by tumor (7.10%), hypertension (6.86%), and coronary heart disease (6.08%). Among top 20 diseases with high inappropriate use in inpatient intravenous PPIs, tumor accounted for the highest inappropriate use rate (nearly 19.00%), followed by coronary heart disease (9.32%), gastritis (6.75%) and hypertension (6.33%).

4) Department distribution of PPIs prescription.

Except for the unknown category, the top 3 departments with higher non-indication rates were department of intensive medicine (48.29%), internal medicine (46.96%) and the emergency department (44.00%). Radiation therapy division had the lowest rate of 27.12%.

Conclusions

1. Overall, inpatient and outpatient rates of inappropriate use were 78.00%, 87.60% and 72.23%. Proportion of patients with PPIs prescription was higher in inpatient visits compared to outpatient visits. However, the difference wasn't obvious between male and female. Eastern area has relatively low inappropriate use rate compare with the western and middle are. Pantoprazole has the highest inappropriate use rate and Esomeprazole has the lowest inappropriate use rate.
2. Most of the cost for PPI use are inappropriate use especially for inpatient. Over 80% cost of each PPIs use was inappropriate use cost, and for inpatient it rose to nearly 90%.
3. Totally, the highest inappropriate uses was gastritis which covered more than 20% of the inappropriate use. The highest inappropriate use of inpatient intravenous PPIs is tumor which accounted for nearly 20%.
4. The top department distribution of PPIs prescription are intensive medicine, internal medicine and the emergency department.