

Use of proton pump inhibitors and the risk of hospitalization for infectious gastroenteritis

Yingxi Chen¹, Bette Liu², Kathryn Glass¹, Wei Du¹, Emily Banks¹ and Martyn Kirk¹

¹ Australian National University, Canberra, Australian Capital Territory, Australia

² University of New South Wales, Sydney, New South Wales, Australia



Study highlights

- A dose-response relationship was observed between PPI use and risk of infectious gastroenteritis hospitalization
- There was no difference in risk by type of PPI

Introduction

Proton Pump Inhibitor (PPI) use has been associated with bacterial gastroenteritis¹. Less is known about the effects of different types and doses of PPIs on infectious gastroenteritis hospitalization. The aim of this study was to quantify the association between PPI use, type and dose and infectious gastroenteritis hospitalization in a population-based cohort of middle-aged and older adults.

Methods

Prospective study of 38,019 concession card holders followed up over 6 years in the Sax Institute's 45 and Up Study. Data from the baseline questionnaire were linked to prescription medication, hospitalization, notifiable disease, cancer registry and death data from 2006-2012. Associations between PPI use and gastroenteritis hospitalization were examined using Cox regressions with age as the underlying time variable.

Results

Among 38,019 participants, the median age was 69.7 years and 57.3% were women. Compared to non-users, current PPI users were more likely to be older, and have a higher BMI. PPI use was significantly associated with infectious gastroenteritis hospitalization (aHR 1.4, 95% CI: 1.2-1.5). Among current users, a dose-response relationship was observed between the average daily dose dispensed per day and infectious gastroenteritis hospitalization ($P_{\text{trend}} < 0.001$). There was no difference in risk by type of PPI. Recent use of H₂ receptors was not associated with gastroenteritis hospitalization.

Figure 1. Crude incidence and hazard ratios of participants admitted to hospital with infectious gastroenteritis, 45 and Up Study, 2006-12

Characteristics	Cases/ person-years	Incidence (95%CI) (1,000 person- years)	HR**(95%CI)	HR**
PPI user categories				
Non-users	584/61,893	9.4 (8.7-10.2)	1.0	
Former users	168/13,491	12.5 (10.7-14.5)	1.2 (1.1-1.5)	
Current users	1,230/78,611	15.6 (14.8-16.5)	1.4 (1.2-1.5)	
H₂ receptor antagonist use				
No	1,879/146,004	12.8 (12.3-13.4)	1.0	
Yes	106/7,992	13.3 (11.0-16.0)	0.9 (0.7-1.1)	
Recent antibiotic use				
No	1,263/107,668	11.7 (11.1-12.4)	1.0	
Yes	719/46,328	15.5 (14.4-16.7)	1.0 (1.0-1.1)	
Sex				
Female	1,184/88,838	13.3 (12.6-14.1)	1.0	
Male	798/65,158	12.2 (11.4-13.1)	0.9 (0.8-0.9)	
Region of residence				
Cities	953/61,040	15.6 (14.7-16.6)	1.0	
Inner regional	652/58,226	11.2 (10.4-12.1)	0.8 (0.7-0.9)	
Outer regional/remote	377/34,730	10.9 (9.8-12.0)	0.8 (0.7-0.9)	
Cancer in previous 5 years*				
No	1,755/142,353	12.3 (11.8-12.9)	1.0	
Yes	227/11,643	19.5 (17.1-22.2)	1.5 (1.3-1.7)	
History of chronic bowel problems				
No	1,664/143,898	11.6 (11.0-12.1)	1.0	
Yes	318/10,098	31.5 (28.2-35.1)	2.2 (1.9-2.5)	

*Exclude non-melanoma skin cancer
HR** Adjusted for PPI use, attained age, sex, region of residence, self-rated health, BMI, cancer in previous 5 years, history of chronic bowel problems.

Table 2. Hazard ratios of gastroenteritis hospitalization according to dose and type of PPI, 45 and Up Study, 2006-12

Characteristics	Participants with chronic bowel problems			Participants without chronic bowel problems		
	Rate#	HR** (95%CI)	P _{trend}	Rate#	HR** (95%CI)	P _{trend}
Average daily dose (DDD)			<0.001			<0.001
Non-users	22.1	1.0		9.4	1.0	
≤0.5	25.2	1.2 (0.8-1.9)		10.8	1.1 (0.9-1.3)	
0.5-1	37.5	1.7 (1.2-2.2)		14.3	1.4 (1.3-1.6)	
>1	45.1	2.0 (1.4-2.8)		15.9	1.5 (1.3-1.8)	

Rate# /1,000 person-years

Conclusions

Given the widespread use of PPIs, particularly among the elderly, clinicians should be aware of this risk when considering PPI therapy, and use the lowest effective dose for patients with appropriate indications.

Reference

1. Hassing RJ, Verbon A, de Visser H *et al*. Proton pump inhibitors and gastroenteritis. *Eur J Epidemiol*. 2016. In press.

Corresponding author: Yingxi Chen
yingxi.chen@anu.edu.au