PROTON PUMP THERAPY AND ACUTE GASTROENTERITIS


A great deal of evidence has linked the use of proton pump inhibitors (PPIs) to an increased risk of *Clostridium difficile* infection [1]. In addition, accumulating evidence indicates that administration of PPIs is associated with acute infectious gastroenteritis of a variety of causes.

In a prospective study of 38,019 patients with a mean age of 69.7 years in Australia, Chen and colleagues identified 1982 incident cases of gastroenteritis that led to hospitalization during 2006–2012. This represented a crude rate of 12.9 episodes per 1000 person-years. PPI use was associated with a significantly increased risk of hospitalization due to acute gastroenteritis, as evidenced by an adjusted hazard ratio of 1.4 (95% confidence interval [CI], 1.2–1.5). Further strengthening the relationship, examination of the average daily dose found evidence of a dose-response relationship. In contrast to the risk attributable to PPI therapy, there was no evidence of increased risk of gastroenteritis-related hospitalization with H2 receptor antagonist use. As has previously been reported, PPI use was associated with an increased risk of *C. difficile* infection, as well as of *Salmonella* and *Campylobacter* infection.

Prag and colleagues performed a retrospective case control study evaluating the potential role of PPI therapy in the development of norovirus infection. A total of 192 case-control pairs from 3 hospitals in Sweden were evaluated. Most cases occurred during epidemic years and the mean ages of cases and controls were 79.8 years and 79.6 years, respectively. Cases and controls were resident on the same wards and were also matched by age, gender, and admission date. Cases had onset of symptoms during hospitalization and the median duration of hospital stay prior to diagnosis was 5 days. PPI therapy, recorded at the time of admission, was associated with a significantly increased risk of norovirus infection (odds ratio, 1.73 [95% CI, 1.07–2.81]; P = .02).

Gastric acid represents an important defense against gastrointestinal pathogens, and the irreversible inactivation of the gastric H+K+ ATPase pump by PPIs disrupts this barrier and has a significant effect on the microbiome. It appears that the effect may put patients at risk for infection by a variety of gastrointestinal pathogens.

Reference


THE INTIMATE AND 2-WAY RELATIONSHIP BETWEEN PATIENT AND HOSPITAL MICROBIOMES


Lax and colleagues surveyed the evolving diversity of bacteria colonizing patients, staff, and environmental surfaces of a newly opened University of Chicago hospital. Sites surveyed were 10 patient rooms as well as 2 nursing stations on a hematology-oncology floor and a surgical floor. Sampled surfaces included floors, faucets, bedrails, keyboards, and pagers. Patients’ axillae, inguinal folds, and nares were sampled.

Surveillance began 2 months before the hospital became operational and continued for 12 months after. All rooms allowed visitors. Each was cleaned daily with a quaternary ammonium solution and terminally with a 1:1000 bleach solution. A total of 6523 samples were collected and at least 5000 16S rRNA amplicons were generated from each.

During construction and immediately prior to opening, there was limited environmental microbial diversity but with an abundance of *Acinetobacter* and *Pseudomonas*. Immediately upon the hospital becoming operational, however, these decreased in numbers and were replaced by normal skin organisms including *Corynebacterium*, *Staphylococcus* and *Streptococcus*. In addition, other species achieved a relative degree of abundance, including *Enterococcus*, unclassifiable *Enterobacteriaceae*, *Finegoldia*, *Rothia*, *Prevotella*, and *Sphingomonas*. Unfortunately, *Propionibacterium* could not reliably be detected with the primer set used in this study.

A relatively stereotypical sequence occurred with each new admission to a room in which, during the first day, microbial flora was transferred from hospital surfaces, such as bed rails, to the patient, but by day 2, movement of flora was in the opposite direction, from patient to room surfaces. As a consequence, the initial surface flora was very rapidly overwhelmed by the patient's surface microbiome. One perhaps surprising finding was that receipt of systemically administered antibiotics had minimal to no impact on the skin microbiome. Metagenomic analysis, performed on 92 samples, found that antibiotic resistance genes were more abundant on room surfaces than on the skin of the resident patient.

“House dust” carries a large number of organisms, including ones associated with human skin. This is not surprising...
since it is estimated that an individual sheds as many as 500 million epithelial cells each day. This model of dispersal, together with direct contact, could account for the findings in this study that elucidate the complex ecological interplay of environment with skin of patients.

**CASE VIGNETTE: PSEUDO-DELUSIONAL PARASITOSIS? GONGYLONEMA INFECTION**


A 37-year-old male rural resident of the southeastern part of the state of Georgia began having what he described as recurring “zig-zagging blister”-like sensations in his buccal mucosa, each lasting several days. Four months later he began experiencing intermittent nausea and vomiting. Three months after the onset of these symptoms, using a needle, he removed a thin hairlike object from his buccal mucosa which he placed in a jar and brought it to his local hospital emergency department (ED). His differential diagnosis on discharge from the ED included delusional parasitosis, but he was referred to an infectious disease consultant. The patient reported to the consultant that he stored grains for consumption and that he had noted that there had been many flying roaches in his yard and his home.

Examination of the object he had extracted from his buccal mucosa identified it as *Gongylonema pulchrum*. He was advised to exterminate his trailer and was given a 3-day course of albendazole with rapid resolution of the nausea and vomiting. However, the buccal mucosal sensation recurred 2 weeks later and he once again extracted *G. pulchrum* from under his tongue. A 30-day course of albendazole was prescribed and he had no subsequent recurrences over 2 years of follow-up.

Only 60 cases of human infection with this nematode have been reported; this is the second case from Georgia. *Gongylonema* is an infection of domestic cattle and other animals who acquire it by feeding on insects, and humans acquire it by accidental ingestion of parts of beetles or cockroaches. Larvae burrow into the mucosa of the upper gastrointestinal tract and eventually migrate to tissues of the oral cavity, where they form a serpiginous tract in the submucosa. It should be noted that the nausea and vomiting reported by the patient in this case report is not a usual feature of this infection.

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