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Association Between Proton Pump Inhibitor Use & Dementia: A Two-Fold Approach

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Abstract

An observational study of data derived from the German Study on Aging, Cognition and Dementia (CoGA) indicates that the use of proton pump inhibitor use was associated with dementia risk (Bennamoussad, McDonald, & Lee, 2016). This is the basis of this study to explore the two-fold approach between proton pump inhibitor use and dementia. This two-fold approach will first investigate the association between dementia and proton pump inhibitor use and secondly, the proposed pathophysiology behind it. This approach can be utilized as a tool to evaluate proton pump inhibitor use and dementia for providers to provide for the clinical care of the patient. The research methods include reviewing peer reviewed journal that were obtained from PubMed, ClinicalKey, and PsycINFO. Gomza et al. (2016) found that this study participants prescribed proton pump inhibitors had a significant increase in risk of dementia. Hamzat et al. (2015) also examined the relationship between serum vitamin B12 deficiency established the plausible connection between proton pump inhibitors and the amyloid beta production in cellular and animal models. The study concluded that high total levels of homocysteine and the risk for dementia. Hyperhomocysteinemia was present in 26% of patients that were more likely to have low vitamin B12 levels and more likely to develop dementia.

Introduction

It is estimated that over 15 million patients were prescribed proton pump inhibitors with the cost estimated at $79 billion between the years of 2007 and 2011 (Bennamoussad, McDonald, & Lee, 2016).

Proton pump inhibitors are not only available via prescription, but also over-the-counter. The extent to which proton pump inhibitors are used are not really known.

Hamza et al. found 61% of patients were inappropriately prescribed proton pump inhibitors in their 440 patient study (Hamza et al., 2012).

Research Question

In elderly patients with dementia, is there a significant difference in the proportion of patients using proton pump inhibitors versus no proton pump inhibitor use?

What proposed pathophysiology links dementia to proton pump inhibitor use?

Hypothesis

Based on the results of the studies examined in this literature review, there is a significant difference in the proportion of patients with dementia who use proton pump inhibitors. The results of the CoGA (2016) study showed that 2,950 patients prescribed proton pump inhibitors had a significant increase in the risk of dementia. Hamza et al. (2015) found that the use of proton pump inhibitor use is a significant risk factor for dementia. Jung et al. (2015) used statistical analysis of twin studies that were case-controlled and found that the use of proton pump inhibitors increased the risk of any dementia compared to no proton pump inhibitor use. Gomm et al. (2016) study showed that the 2,950 patients prescribed proton pump inhibitors had a significant increase in risk of dementia (HR 1.44 [95% CI, 1.04–1.83]) compared to no proton pump inhibitor use. The study conducted by Lam et al. (2013) which stated that vitamin B12 deficiency and chronic use of proton pump inhibitors by using a review of information which found that the study participants were taking proton pump inhibitors with a clinical diagnosis of vitamin B12 deficiency. Wu and Egan et al. (2011) stated that the patients taking proton pump inhibitors related to non-users. Their study did establish a link between proton pump inhibitors and dementia that was non-based and based upon previously published studies. Alcock et al. (2015) addressed the degree of association with each proton pump inhibitor use? Yet, this study was an epidemiological study. Consequently, fundamental biological mechanisms were not explored. This study remains significant due to the association found between proton pump inhibitors and the increased risk of dementia. Both studies provide a statistical association between proton pump inhibitors and dementia. Therefore, elderly patients who are already at risk for developing dementia due to their age will have an additional risk in developing dementia if they use proton pump inhibitors chronically.

The study by Wiampiputra et al. (2018) established an increased risk of dementia among proton pump inhibitor users, however, it was performed via literature search. A total of four studies (2015–2018) were included, two of the studies were prospective observational studies that were case-controlled and used the CANTAB software to evaluate proton pump inhibitor use and dementia.

Literature Review

Research methods include reviewing peer reviewed journal that were obtained from PubMed, ClinicalKey, and PsycINFO. Gomza et al. (2016) found that this study participants prescribed proton pump inhibitors had a significant increase in risk of dementia. Hamzat et al. (2015) also examined the relationship between serum vitamin B12 deficiency and the amyloid beta production in cellular and animal models. The study concluded that high total levels of homocysteine and the risk for dementia. Hyperhomocysteinemia was present in 26% of patients that were more likely to have low vitamin B12 levels and more likely to develop dementia.

The therapies and care related to dementia diagnosis have an enormous high price association; it is estimated that in the year 2010 the worldwide cost was $654 billion (Gomza et al., 2016).

Statement of the Problem

As our national population continues to age, the diagnosis of dementia will increase.

Establishing an association between proton pump inhibitors and dementia could alter the clinician’s decision when considering risk versus benefit of treatment for sequelae and potential risks associated with proton pump inhibitors.

The information gained from this literature review would allow for clinicians to make an educated decision for treatment of diseases requiring acid lowering drugs.

References


Discussion

Applicability to Clinical Practice

Naturally elderly patients are of historic increased risk for developing dementia, thus, chronic proton pump inhibitor use should be restricted to patients with suitable indications. Attempt to prescribe the lowest effective dose and discontinue proton pump inhibitors if able to. A diagnosis of dementia requires an increase in demand for therapies and specialized care as the cumulative cognitive decline associated with dementia advances. The prevalence of dementia does increase with the normal aging of the brain and about one percent of people will have dementia at age 65. At age 90, it is estimated that one in three of the population will be diagnosed with dementia (Hamzah et al., 2015). The most important method in treating dementia is establishing a cause.

Proton pump inhibitors have been found to effectively increase gastic pH, which decreases the amount of vitamin B12 being absorbed.

Prevention or risk reduction is a priority for reducing the occurrence of dementia. If a specific cause is acknowledged, such as nutritional deficiencies, treatment can be started.

Health care providers should monitor cognitive decline and vitamin B12 levels when they have a patient on prescribing proton pump inhibitors. Providers becoming aware of the possible side effects of chronic proton pump inhibitors in the elderly is an adaptable intervention to reducing a patient’s risk of dementia.

The relationship between proton pump inhibitors and the lowering of serum B12 levels is acceptable in the treatment of patients with known B12 deficiency; however, in cases of suspected B12 deficiency, repeating the serum B12 level is necessary to rule out a B12 deficiency. If the serum B12 level was not increased, appropriate B12 testing should be obtained prior to initiating therapy.