Gastroenteritis: Literature Review

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6/25/2021

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Gastroenteritis is a common gastrointestinal infection disease which is occurring diarrhea and vomiting. It is essential not only for the child but also for older adults because of the morbidity and mortality. The diseases can result from many pathogens or toxins such as viral, bacterial, parasitic, and foodborne toxins (Capriotti, 2020). According to Capriotti (2020), more than 100 million cases of gastroenteritis are reported per year. Gastroenteritis occurs with the inflammation of the mucus membrane of the gastrointestinal tract, which causes watery diarrhea, and it can be contagious. As a result, patients become dehydrated, which can be fatal and leads to death, especially if they are immunocompromised, pregnant, infant, or older adults. Therefore, the earlier diagnosis of gastroenteritis can improve the effectiveness of treatment for the infected patient and prevent from spreading disease. Moreover, it is also essential to understand the effective treatment and care plan for gastroenteritis based on their different causes. In this paper, we will discuss the cause, treatment, and implication of gastroenteritis.

A Randomized Trial Evaluating Virus-Specific Effects of a Combination Probiotic in Children with Acute Gastroenteritis

Every year, gastroenteritis effects on children’s life and cause death. The most prevalent cause of gastroenteritis in children is known as rotavirus. Even though there is a vaccine for rotavirus, rotavirus still shows the highest mortality rate (Freedman et al., 2020). Also, different types of viruses and bacteria can cause acute gastroenteritis. In the study, stool specimen is used to detect the pathogen, and participants are randomly assigned into a probiotic treatment group

and placebo group (Freedman et al., 2020). This study focuses on the effectiveness of probiotics on acute gastroenteritis.

Key Points

In the United States, more than 48 million acute gastroenteritis cases are reported in children younger than five years old. In addition, the death rate is reported about 500,000 every year (Freedman et al., 2020). Viral gastroenteritis does not have specific treatment options. However, patients are encouraged to receive supportive care, rehydration therapy, preventive care, and probiotics (Freedman et al., 2020). In order to validate the effectiveness of probiotics in acute gastroenteritis, a total of 886 children participated in this double-blind study.

Assumptions

The high mortality rate associated with rotavirus is caused by loss of body fluid from diarrhea. Freedman et al. (2020) state that probiotic agents are recommended to acute gastroenteritis patients with diarrhea according to international clinical guidelines. The researchers connect the idea that probiotics could effectively treat acute gastroenteritis, although bacteria itself cannot treat the virus. The study differentiates the probiotic treatment and types of the pathogen, also analyzes the data by characteristics such as age, sex, vaccination status, and duration of illness (Freedman et al., 2020).

Deficit/Conclusion

The author’s reasoning for this study is that children are recommended to take probiotics in the clinical area, and the author tried to validate the effectiveness. Unfortunately, the

effectiveness of probiotics on acute gastroenteritis is not confirmed through this study (Freedman et al., 2020). The study focuses on reduced symptoms and amount pathogens, but the result does not show the relationships between probiotics and treatment of gastroenteritis (Freedman et al., 2020). During the hospital stay, the patient can save treatment and insurance costs by not receiving probiotic treatment. However, the study has the limitation that the specimen collection is not fully provided by participants (Freedman et al., 2020). Also, the different types of probiotics could be effective in improving a child's immune system. Even though the study shows no evidence of administering probiotics in gastroenteritis, it can impact the child's gut microbiota to become a healthy environment to overcome the diseases.

Nationwide Epidemiologic Study of Norovirus-Related Hospitalization Among Japanese Older Adults

Older adults are more vulnerable to norovirus than younger adults. It can lead older adults to have symptoms like vomiting and diarrhea and lead to death due to aspiration while vomiting (Ohfuji et al., 2019). Ohfuji et al. (2019) conduct a study to find the relationship between norovirus gastroenteritis in older adults and the death rate in Japan. This study targeted older patients and collected the data from 4194 hospital departments between 2012 and 2014 (Ohfuji et al., 2019).

Key Points

Older adults are likely to be infected with acute gastroenteritis due to norovirus between fall and winter. This virus can cause mild diarrhea and vomiting to death in older adults (Ohfuji et al., 2019). According to Ohfuji et al. (2019), the medical expenses and death rates related to the hospitalization for norovirus in older adults were high in 2016. This study was conducted in

Japan. This country is becoming an aging county due to the low fertility rate, and the aging population is rapidly increasing (Ohfuji et al., 2019). Therefore, the health of older adults is vital to maintain the population and development of a society.

Assumptions

The author is focusing on older adults and norovirus-related acute gastroenteritis. Ohfuji et al. (2019) state that most of the data about infectious gastroenteritis can be obtained from the National Epidemiological Surveillance of Infectious Diseases in Japan. However, it says those data were collected from pediatric hospital departments (Ohfuji et al., 2019). It is because acute gastroenteritis is a common illness among infants and children. So, the author focuses on estimating the number of older adults who are infected by norovirus.

Deficit/Conclusion

The older than 60 years old patients were selected for the study between 2012 and 2014 (Ohfuji et al., 2019). The study found that the number of hospitalized patients due to norovirus was recognized as between 15,700 and 31,800 every year. Also, the annual mortality rate was recognized as 1.38-1.58 (Ohfuji et al., 2019). The result does not support the author's thinking because the conducted data was somewhat different from the present study in Japan. The author received responses 1325 out of 4184, and it is only 31.7% because of the lack of responses from the hospital department (Ohfuji et al., 2019). Moreover, even though older adults are admitted to the hospital the norovirus testing is not conducted routinely. Hence, it is hard to define which virus causes gastroenteritis in older adults. Also, the hospitalized patient has a different underlying illness, so it is hard to connect the norovirus and mortality rate. Even though the

study shows unclear results, it is crucial to think about many older adults are infected and hospitalized due to the norovirus.

Association Between Acute Gastroenteritis and Continuous Use of Proton Pump Inhibitors During Winter Periods of Highest Circulation of Enteric Viruses

Patients who suffer from gastroesophageal reflux disease (GERD) are treated with proton pump inhibitors to regulate acid synthesis. Frequent use of proton pump inhibitors (PPI) can cause adverse effects, including vitamin B12 deficiency, infection, and kidney disease (Vilcu et al., 2019). Acute gastroenteritis is known as stomach flu that occurs nausea, diarrhea, and vomiting. Acute viral gastroenteritis is frequently observed in the winter due to low humidity and makes it easy to spread the disease. The incidence of acute gastroenteritis related to continuous PPI use is not well defined through the study. In this study, they collected the data from the patients receiving PPI therapy and developing acute gastroesophageal at the same time to find the relationship (Vilcu et al., 2019).

Key Points

Proton pump inhibitors are necessary to treat gastroesophageal reflux disease. However, it may change the microflora of the gastrointestinal and affect the patients' immune system. As a result, it can cause many adverse effects. The author mentioned that the many studies between bacterial enteric infections caused by *Clostridium difficile* and PPI use had been reported (Vilcu et al., 2019). However, there are fewer studies reported between viral gastroenteritis and PPI use. The author focuses on that the enteric viruses are more infectious in winter, so the data was collected in the 2015 and 2016 winter seasons.

Assumptions

Viral gastroenteritis is more reported during the winter, indicating that our immune system may become more vulnerable in the winter. The author connected the idea that patients who have continuous treatment by a proton pump inhibitor may have more chance of being infected by viral gastroenteritis (Vilcu et al., 2019). Also, the author chooses those two years, 2015 and 2016, because the highest incidence of acute gastroenteritis was reported in the winter season. In order to define the association between viral gastroenteritis in winter and proton inhibitor pump uses, approximately 11,404,661 patients' databases were used for this study (Vilcu et al., 2019).

Deficit/Conclusion

The study results indicate that the patients who received proton pump inhibitor (PPI) therapy are more at risk of viral infections than those who do not receive PPI therapy (Vilcu et al., 2019). About 11,404,661 patients' database was used and divided into two groups; PPI users and non-PPI users. The incidence of viral gastroenteritis shows that the PPI group was 1.81 times higher than the non-PPI group (Vilcu et al., 2019). This result indicates that using proton pump inhibitor treatment can cause viral gastroenteritis infection in the patient. In other words, proton pump inhibitor use may be the risk factor for viral infections. Any treatment could have an adverse effect, and it may not be effective for all the patients. Therefore, it is vital to assess the patient and find the adverse effect to provide the best care in the hospital.

Conclusion

In this paper, three different articles related to acute gastroenteritis were discussed. Among the different types of acute gastroenteritis, those articles studied viral gastroenteritis. As a result, the probiotics were ineffective in treating viral gastroenteritis even though children are

encouraged to take the probiotics. Also, the incidence of norovirus related to the mortality rate in older adults in Japan was not clearly indicated due to a lack of data. Lastly, other treatments such as proton pump inhibitors which regulate the acid synthesis can increase the risk of viral gastroenteritis.

Those articles do not indicate the treatment plan or improved patients' signs and symptoms of acute gastroenteritis. However, it is helpful to think about the nursing practice to prevent the disease or improve patient care. For example, probiotics are recommended to the child even though they cannot cure gastroenteritis. It is hard to define the relation between norovirus and mortality rate in older adults, but older adults are indeed vulnerable to acute gastroenteritis. The patient outcomes can be improved by focusing not only on one factor, but the nurse should think about the entire patient's history, disease, and other symptoms.

All of those are related to the patient's immune system. For example, children's immune systems might not be fully developed, and probiotics could help make their immune system healthier. In addition, several risk factors make older adults vulnerable to infection, such as poor nutrition, alcohol, chronic conditions, and tobacco use. Thus, nursing practice can be improved by thinking about patient's diseases, risk factors, and the adverse effect of the treatment. Moreover, now we know that PPI can be the risk factor of viral gastroenteritis, so we can connect those two when providing nursing care.

According to Freedman et al. (2020), there was a lack of evidence between probiotics and acute gastroenteritis. Even though there is no specific treatment for acute gastroenteritis, those researches are helpful to find the connection between disease and treatment. The study from Ohfuji et al. (2019) indicates a lack of evidence to define the gastroenteritis caused by norovirus.

However, if these factors, such as chronic disease or adverse effects, are controlled, we could get more specific relationships between diseases and older adults.

Overall, it is difficult to treat the disease and find the causes in the patient. However, those studies are essential to prove the hypothesis by linking the underlying disease and treatment. Also, if the researchers and health professionals cooperate in gathering the data, the result would be more effective. Thus, it can be improving patient care in hospital settings.

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