Segment IV: Final Project

Pamela Teves

FSNU 315

Brandman University

Dr. Long Wang

4/28/2019

Segment IV: Final Project

i. Introduction and Definition:

In 2001, Nod2, the first gene linked to Crohn's disease (CD) was discovered; Nod2 distinguishes infectious molecules and stimulates a resistant response (Crohn's & Colitis Foundation, 2019). CD is an unrelenting inflammatory disease of the gastrointestinal tract. CD most commonly affects the ileum and colon" (Nelms, 2016, p.380). There is no cure for CD, only a cycle of physical deterioration and relief. This particular disease was selected for its' sudden prevalence within my work environment. Analysis was conducted through examination of statistical information, peer-reviewed journals, medical terminology (which was necessary for personal understanding), case studies, nutritional interventions, diagrams, and dietary alternatives. Extensive results were found, dates narrowed to more recent journals, and finally reviewed. Using the internet and Brandman Library, the following terms were searched: Crohn's disease, diet modification, medication, side effects, interventions, statistics, Nod2, therapies, and gastrointestinal tract.

ii. Epidemiology:

Much of the epidemiology information is linked between Ulcerative Colitis (UC) and Crohn's Disease (CD). This research distinguished the primary difference being that UC is the inflammation of the colon, while CD could occur anywhere from the mouth to the anus. Collectively and for logistical reasons, the two diseases are referred to as Irritable Bowel Syndrome (IBS). In 2015, it was estimated that at least 3.1 million adults in the U.S. had been diagnosed with IBD, with CD affecting almost 800,000 of them (Healthline, n.d.). During the

period of 2003 to 2013, the hospitalization rate of CD patients increased from 44.2% to 59.7% (CDC, n.d. p. 3). Currently, Canada has the highest incidence of CD in the world, with China, unfortunately, making great strides in recent decades (Zhou, 2019.) Investigations of incidences of CD include a compilation of data on many factors of the human population. Genetics is a logical starting point. If a person is related to someone who has the disease, the likelihood of developing CD is at least 10 times greater. The odds increase to 30 times greater if the relative is a sibling (Crohn's & Colitis Foundation, 2019). Race and ethnicity also contribute to the possibility, with both whites and African Americans of European descent topping the list. Age of diagnosis ranges from 15 years to 30 years. Though male and female appear to have equal standing in developing IBD, females are dominant in the CD category. Environmental factors are a bit troubling. Smokers have twice the chance of developing CD. IBD appears to be largely a disease found in industrialized populations, specifically the U.S. and Europe. CD is more common in urban than rural areas, and in northern versus southern conditions (Crohn's & Colitis Foundation, 2019). Though a dietary link does not specifically exist, the role nutrition plays within the disease has been extensively speculated upon. "A typical Western diet, which is low in fruit and vegetables and high in processed foods and fat" (Franqui, 2019, p. 32) is one such suggestion. The avoidance of certain foods can lessen the complications associated with flare-ups. Studies persist worldwide, as scientists and scholars seek understanding and solutions.

iii. Etiology:

CD is caused by swelling in the digestive tract, which leads to abdominal pain, fatigue, fever, severe diarrhea, weight loss, fistulas, blood in the stool, mouth sore, anal fissure, malnutrition, and in some cases, cancer (Mayo Clinic, n.d.). CD can also manifest itself in inflammation of skin, eyes, joints, the liver or bile ducts, and delayed growth or sexual

development in children (Crohn's & Colitis Foundation, 2019). It is a relapsing disorder, which can appear to resolve, only to flare-up later. No particular test to diagnose CD exists, but blood and fecal tests, as well as colonoscopy exams, CT scans, MRIs, Capsule endoscopy, and balloon-assisted enteroscopy can assist the medical professional in diagnosing CD (Crohn's & Colitis Foundation, 2019). Treatments using anti-inflammatory medications, antibiotics, and immune system suppressors provide relief for some patients enduring CD. In some pediatric and/or severe situations, a combination of Enteral Nutrition (EN) via oral or feeding tube, and both psychological and psychiatric supports can be implemented. A preponderance of diet plans exists, which implemented accurately and under medical supervision, offer a pre-emptive benefit. Dietary nutritional therapy, through lifestyle changes and diet modifications, can also reduce the risk of intestinal blockage, by inevitably altering the stool size and frequency. Surgery can be a short-term solution, one that is utilized by nearly half of the CD patients (Mayo Clinic, n.d.). Effectively dealing with CD is a combination of lifestyle changes, medical knowledge, attention to detail, and diligence.

iv. Anatomy and Physiology:

CD is sometimes confused with its cousin Ulcerative Colitis (UC), whose inflammation is focused primarily on the colon. To understand CD's vast reach, one must first trudge through the specifics of the digestive tract and its mission. The digestion process actually begins before food enters the mouth; the nose inhales aromas, activating saliva which will assist in breaking down vital nutrients. Food then enters the mouth, where teeth break down particles into small enough pieces to enter the esophagus which acts as a transport to the stomach. In the stomach, the food is broken down further and processed into chyme before being released into the small intestine, which is comprised of the duodenum, jejunum, and ileum. Most maceration occurs

within the small intestine. Enzymes from the pancreas and bile from the gall bladder mix with chyme, digesting and absorbing nutrients. Undigested matter then moves to the large intestine which consists of the cecum, the colon and the rectum. After all necessary water has been absorbed, the excess is compressed into tight bundles for waste disposal through the anus. At any place within the complex digestive tract, irritation can occur, but most commonly within the ileum and colon (Nelms, 2016, p. 380).

The body is versatile, ever-changing, and resilient. That which does not readily benefit the body causes physical reactions, as the body fights to expel unwanted adversaries. This is often demonstrated through abdominal pain and diarrhea. In the case of CD, there are many factors which can elicit a natural, biochemical response. "Genetics, the intestinal microbiome and environmental factors," (Franqui, 2019) are all contributors. These environmental factors include, but are not limited to, geographic location, smoking, nonsteroidal anti-inflammatory (NSAID) drugs, antibiotics, and contraceptive pills. The intestinal microbiome is a multifaceted community of bacteria that lives within the digestive tract of humans; they are sometimes referred to as gut flora, gut microbiota, or gastrointestinal microbiota. Though the NOD2 gene is important in developing CD, an environmental factor is still necessary. Void of a cure, a lifetime of dietary restrictions is required to ensure a level of management of a disease that can lead to weight loss and malnutrition. "Food avoidance is more common in active stricturing CD patients" (Zhou, 2019, p.3.1). These intestinal strictures can be either inflammatory or fibrotic. Strictures slow or block movement through the gastrointestinal tract and can lead to hospitalization or surgery.

v. Pathophysiology:

"In medical care, restoration of normal fluid status is often the first priority in reestablishing homeostasis" (Nelms, 2016. p.126). Recreating a strong link also requires additional mineral, vitamins, and sodium levels. During the period of distress, "chronic inflammation from T-cell activation leading to tissue injury is implicated in the pathogenesis of Crohn disease" (Ghazi, 2018). The subsequent release results in injury to the intestines. This internal inflammation manifests in ulcers, which the immune system cannot turn off without surgery or medication. CD affects other parts of the body, as well. It causes joint pain, osteoporosis, skin problems, liver inflammation, mouth ulcers, eye problems, and anemia (Mechanisms in Medicine, 2012).

vi. Conclusion:

A variety of elimination diets exist which, in theory, should reduce the possibility of an EN intervention. They include specific-carbohydrate, Low-FODMAP, Gluten-free, Low-residue, lgG4-targeted exclusion, and Paleo diets (Franqui, 2019, p. 35). The plans vary by patient and physician, but each follow an exclusionary protocol. Causes and symptoms are as divergent as the patients, but triggers include dairy, nuts, fruits and vegetables, coffee, alcohol, fried food, popcorn, red meat, gluten, spicy foods, seeds, and whole grains. (George, 2018). These triggers can prove extensive to both the body and the checkbook. A 10-pound bag of all-purpose flour costs roughly $4.00, compared to $11 for a 2-pound bag of almond flour. Regardless of the diet plan, a meticulous food log is beneficial for both the patient and all professionals who participate in the nutritional intervention (Nelms, 2016, p. 27). This is also vital when reintroducing previously prohibited foods. Above all, the recommendation is that dealing with intolerant foods is an individual experience and the principle is "*If it hurts, don't do*

it" (Zhou, 2018, p.3.1).

vii. Lessons Learned:

This project was a time-consuming, highly informative experience. The in-depth dive into a specific chronic disease offered me insight into what others endure on a regular basis. Perhaps endure is the wrong word. What others deal with in the daily management as their bodies deteriorate, unable to effect change, no matter the effort. Despite the extensive work, I appreciated the assignment. Nutrition is very complex, with each morsel building on the morsel that was ingested previously. A more inquisitive approach to nutrition is in my immediate future, though I am quite cognizant that there are many things which are beyond my control. My best effort is all that I can do. As for researching and then evaluating sources, time and patience served me best. As did "Copy/Paste," into a separate file, relevant citations, abstracts, diagrams, and any other information that could have confused me at a later point in the process. I did struggle with the straight-forward, direct nature of science, but in retrospect, it was appropriate and beneficial.

References

CDC: Center for Disease Control and Prevention (n.d.) Inflammatory Bowel Disease. Retrieved from https://www.cdc.gov/ibd/data-statistics.htm

Crohn's & Colitis Foundation (2019). About the Epidemiology of IBD. Retrieved from https://www.crohnscolitisfoundation.org/resources/epidemiology.html

Franqui, N. R., & Hewlings, S. J. (2019). Enteral nutrition and dietary modification in adult and paediatric Crohn's disease: a systematic review. *Gastrointestinal Nursing*, *17*(1), 32–38. https://doi-org.libproxy.chapman.edu/10.12968/gasn.2019.17.1.32

George, K. (2017) Active Beat. Retrieved from: https://www.activebeat.com/diet-nutrition/crohns-disease-diet-7-foods-to-avoid/7/

Ghazi, L. (2018) Med scape. Retrieved from: https://emedicine.medscape.com/article/172940-overview#a3

Healthline (n.d.). Crohn's Disease: Facts, Statistics, and You. Retrieved from https://www.healthline.com/health/crohns-disease/facts-statistics-infographic#1

Mayo Clinic (n.d.) Crohn's Disease. Retrieved from https://www.mayoclinic.org/diseases-conditions/crohns-disease/diagnosis-treatment/drc-20353309

Mechanisms in Medicine (October 16, 2012) What is Crohn's Disease [Video file]. Retrieved from: https://www.youtube.com/watch?v=k0kRSF80PJ0

Nelms, M., Sucher, K. P., & Lacey, K. (2016). *Nutrition therapy and pathophysiology* (3rd ed.). Boston, MA: Cengage learning

Svolos, V., Hansen, R., Nichols, B., Quince, C., Ijaz, U. Z., Papadopoulou, R. T., … Gerasimidis, K. (2019). Treatment of Active Crohn's Disease with an Ordinary Food-based Diet That Replicates Exclusive Enteral Nutrition. *Gastroenterology*, *156*(5), 1354–1367. https://doi-org.libproxy.chapman.edu/10.1053/j.gastro.2018.12.002

Zhou, Y. Q., Xu, R. Y., & Wan, Y. P. (2019). The role of dietary factors in inflammatory bowel diseases: New perspectives. *Journal of Digestive Diseases*, *20*(1), 11–17. https://doi-org.libproxy.chapman.edu/10.1111/1751-2980.12686