SECTION 5. INTERNAL DISEASES

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5.1 Nutrition programs for prevention and treatment of the cardiovascular diseases

An estimated 31% of the total deaths worldwide are caused due to cardiovascular diseases (CVD's) and stroke. The most contributing factor for their development is the condition called atherosclerosis.

Cardiovascular diseases are increasing in the current times. Healthy, fit and stress-free lifestyle is the key to quality living. But the question is, what are we doing for it? A pill to take is easier than to quit upon our favorite food. As said by Dr. Gregor, these pills have little value than what a healthy diet can do for us. Low fat and plant-based diet have the power to reverse the cardiovascular disease and increase the lifespan more effectively than what these pills can do. But the good part here is, unlike most other diseases, cardiovascular diseases need not depend solely on drugs for their treatment or prevention, they can be reversed with plant based, fresh vegetable diet. This was proven by Dr. Ornish by his experiment. 48 patients with moderate to severe coronary heart disease were randomized to an intensive lifestyle change group (Vegetarian diet with 10% fat, exercise, stress management training and smoking cessation) out of which 35 completed the 5-year follow-up quantitative coronary arteriography. Experimental group patients made and maintained comprehensive lifestyle changes for 5 years, whereas control group patients made more moderate changes. In the experimental group, the average percent diameter stenosis at baseline decreased 1.75 absolute percentage points after 1 year and by 3.1 absolute percentage points after 5 years. In contrast, the average percent diameter stenosis in the control group increased by 2.3 percentage points after 1 year and by 11.8 percentage points after 5 years. Twenty-five cardiac events occurred in 28 experimental group patients vs 45 events in 20 control group patients during the 5-year follow-up. So, it proves that atherosclerosis improves with lifestyle changes compared to medications.

Another example is when, Former President of United States, Bill Clinton spoke to the nation about the benefits of his revolutionary heart health program based on a diet created by Dr. Caldwell Esselstyn. Following a plant-based diet like the diet in Dr. Esselstyn's groundbreaking book Prevent and Reverse Heart Disease, President Clinton was able to lose twenty-four pounds and improve his heart function. In an interview with Wolf Blitzer, he credited his health to Dr. Esselstyn, in dramatically improving cardiovascular health and treating heart disease rather than its symptoms

The conventional American diet is becoming more popular and spread even in the developing countries. The more fat we take in, there is more deposition of cholesterol. Since all animal cells manufacture cholesterol, all animal-based foods contain cholesterol in varying amounts. Major dietary sources of cholesterol include red meat, egg yolks and whole eggs, liver, kidney, giblets, fish oil, and butter. These can lead to excessive cholesterol in the body which gets accumulated in the arteries leading to atherosclerosis (plaques deposits in arteries). These deposits (plaques) can reduce blood flow through arteries, which can cause complications, such as angina, myocardial infarction and stroke. To reduce cholesterol levels, we need to reduce our intake of trans fat, which comes from processed foods and naturally from meat and dairy; saturated fat, found mainly in animal products and junk foods. In 2016, the United States Department of Agriculture Dietary Guidelines Advisory Committee recommended that Americans eat as little dietary cholesterol as possible.

Another study in the Great Britain was conducted by Francesca L Crowe. A total of 44,561 men and women living in England and Scotland of whom 34% consumed a vegetarian diet at baseline, were part of the analysis. Incident cases of Ischemic heart disease were identified through linkage with hospital records and death certificates. Serum lipids and blood pressure measurements were available for 1519 non cases, who were matched to Ischemic heart disease cases by sex and age. Ischemic heart disease risk by vegetarian status was estimated by using multivariate Cox proportional hazards models.

After an average follow-up of 11.6 y, there were 1235 Ischemic heart disease cases (1066 hospital admissions and 169 deaths). Compared with nonvegetarians,

vegetarians had a lower mean BMI, non-HDL-cholesterol concentration, and systolic blood pressure. Vegetarians had a 32% lower risk of Ischemic heart disease than nonvegetarians, which was only slightly attenuated after adjustment for BMI and did not differ materially by sex, age, BMI, smoking, or the presence of IHD risk factors. It was concluded that vegetarian diet was at a lower risk of causing Ischemic heart disease.

Similarly, the coronary heart disease had to be studied through different countries with different diet so the Seven Countries Study began in 1958, and 12 763 men aged 40 to 59 years were examined for risk factors for coronary heart disease. These men formed 16 cohorts in 7 countries: The United States, Finland, the Netherlands, Italy, Greece, the former Yugoslavia, and Japan. In addition to a physical examination, information on biological risk factors (e.g., serum cholesterol, blood pressure, and anthropometric measurements) was collected and an ECG was taken. In small random samples of each cohort, information on diet was collected by use of 7-day food records. The risk factor surveys were repeated after 5 and 10 years, and mortality data were collected up to 25 years. In that period, ≈6000 men died, and coronary heart disease was the underlying cause of death in 1500 men. All dietary data were coded in a standardized way in 1986 and summarized in 16 major food groups.16 Around 1960, the consumption of milk, potatoes, butter, and sugar products was very high in Finland. A similar but lower consumption pattern was observed in the Netherlands. Fruit, meat, and pastry consumption was high in the United States. Cereal and wine consumption was high in Italy, and bread consumption was high in the former Yugoslavia. In Greece, the consumption of olive oil and fruit was high, and the Japanese diet was characterized by a high consumption of fish, rice, and soy products. The average consumption of animal food groups, with the exception of fish, was positively associated with 25-year coronary heart disease mortality rates, and vegetable food groups showed an inverse association.

Plant cells synthesize cholesterol as a precursor for other compounds, such as phytosterols and steroidal glycoalkaloids, with cholesterol remaining in plant foods only in minor amounts or absent.

There are negligible chances of plaque formation with sufficient fiber intake which overall decreases the risk of cardiovascular diseases. The benefit of fiber diet is not only in prevention of the cardiovascular disease but also in reversing it, if occurred. Interventional studies of plant-based diets have shown that about 90 percent reductions in angina attacks occurs within just a few weeks of this diet. Plant based diets are not only safer, known and cheaper but also a prevention as well as treatment mechanism for our body.

Dietary interventions are first-line therapy for coronary heart disease prevention and treatment. Increasing scientific evidence suggests that the traditional Mediterranean diet may reduce the risk of cardiovascular disease. The cardiovascular benefits of this whole-diet approach may outweigh those of typically prescribed low-fat diets. The burden of coronary heart disease is enormous, and nutritional approaches that optimize cardiovascular health are essential. Clinical trial evidence supporting the role of the Mediterranean diet in cardiovascular health is presented with an emphasis on the physiological effects of omega-3 fatty acids. The Spanish PREDIMED trial included 7447 participants at high cardiovascular risk allocated to 1 of 3 diets: a MedDiet supplemented with EVOO, a MedDiet supplemented with mixed nuts, or a control diet (advice to reduce all subtypes of dietary fat). The trial was planned for 6 years, but it stopped early after intervention for 4.8 years, as recommended by the Data and Safety Monitoring Board following stopping rules established a priori in the protocol.11,48,137,138 The incidence of CVD (MI, stroke, or cardiovascular death, totaling 288 events) in the MedDiet groups was lowered by ≈30% when compared with the control diet. PREDIMED is a landmark study and it remains to date as the largest dietary intervention trial to assess the effects of the MedDiet on cardiovascular disease prevention.

The rate of cases of inflammatory bowel diseases are increasing day by day and leading to gastrointestinal discomfort even after following treatment. It can affect an individual in a variety of ways from symptomatically pain, nausea, flatulence to decrease in working efficiency and mood imbalance as well. So, the most common

question asked is what do I eat for a healthy, painless gut preventing inflammatory bowel diseases.

Necessary studies have been carried out linking high fat diet like meat progressing to gastrointestinal problems, whereas as dietary fiber, carbohydrates and fruits have been found to be protective. There have been cited a number of reasons for this fact. One reason why specifically animal protein was associated with triple the risk of inflammatory bowel disease, but plant protein was not, is because it can lead to the formation of toxic bacterial end product, hydrogen sulfide. Hydrogen sulfide is a poison that has been implicated in ulcerative colitis. It's production in the bowel increases the risk of irritable bowel, inflammatory bowel disease, and eventually, colorectal cancer. Hydrogen sulphide is mainly produced by sulfate-reducing bacteria which are generally normal commensals of the bowel. Sulfate and sulfite serve as food preservatives and antioxidants in the production of bread, meat, wine and dried fruits. Dietary supplement chondroitin and food additive carrageenan also contain sulfate. It was observed that higher dietary intake of these foods lead to higher incidence of UC. Hydrogen sulphide inhibits butyrate oxidation. Colon epithelium are getting 70% of its energy from the butyrate derived from intestinal substrates fermentation of non-starch polysaccharides by colon bacteria. That is the reason why energy deficiency is often connected with the prevalence of UC.

One such study done by M A Chapman 1, M F Grahn, M A Boyle, M Hutton, J Rogers, N S Williams in role of butyrate in inflammatory bowel syndrome was as follows.

Triplicate biopsy specimens were taken at colonoscopy from five regions of the large bowel in 15 sufferers of ulcerative colitis. These patients all had mild or quiescent colitis as assessed by clinical condition, mucosal endoscopic and histological appearance. The rate of oxidation of glucose, glutamine, and butyrate through to carbon dioxide was compared with that in biopsy specimens from 28 patients who had no mucosal abnormality. Butyrate was the preferred fuel source for the colon mucosa followed by glutamine and then glucose. There was no regional difference in the rate of utilization of these metabolites. In the group with colitis the rate of butyrate

oxidation to carbon dioxide was significantly impaired compared with that in normal mucosa. The rate of glucose and glutamine utilization were not significantly different between normal and colon mucosa. These data confirm that in quiescent ulcerative colitis there is an impairment of butyrate oxidation.

Another reason for development of Inflammatory bowel can be infection with Yersinia. Yersinia can live in the intestines of animals including pigs, cows, sheep, horses, dogs, cats, rodents and birds as well as humans. When animals are slaughtered and butchered for food, bacteria from an animal's intestines may contaminate the meat that we consume. Common sources of infection are undercooked pork and other meats.

In treating the Inflammatory bowel disease, the basic 'triple' therapy (5-aminosalicylates, corticosteroids, azathioprine) and nutrition have maintained their central role in the management of patients with inflammatory bowel disease over recent decades. However, excluding the animal fat out of the diet speeds up the process even better than medication therapy itself. High fat intake after successful treatment by medication can undone all the benefits of treatment and onset of symptoms again. Hence the fat free diet plays a vital role in prevention as well as cure of inflammatory bowel disease. The Nutrition therapy is acceptable, cost effective and free from adverse effects. Dietary intervention studies have shown that enteral therapy, with defined formula diets, helps children with Crohn's disease and reduces inflammation and dysbiosis. Soluble fiber is the best way to generate short-chain fatty acids such as butyrate, which has anti-inflammatory effects. Addition of vitamin D and curcumin has been shown to increase the efficacy of IBD therapy. There is compelling evidence from animal models that emulsifiers in processed foods increase risk for IBD.

Also, there is very strong evidence supporting the use of certain probiotics and prebiotics in the therapy of ulcerative colitis. Prebiotics are non-digestible food ingredients that selectively stimulate favorable bacterial growth and/or promote activity of a limited number of health-promoting bacteria, hence benefiting the host. Probiotics are specific live microorganisms which, when ingested in sufficient amounts, can promote health in the host. When probiotics and prebiotics are combined in one product to achieve synergistic effects they are usually called synbiotics.

Probiotics and prebiotics achieve their therapeutic effect in IBD through many different mechanisms. By increasing the production of short-chain fatty acids, they may lower the pH of the colonic environment and thus inhibit the growth of potentially pathogenic microorganisms.

A study carried out by, Jason K Hou 1, Bincy Abraham and Hashem El-Serag in which nineteen studies were included, encompassing 2,609 IBD patients (1,269 Crohn's disease (CD) and 1,340 ulcerative colitis (UC) patients) and over 4,000 controls. Studies reported a positive association between high intake of saturated fats, monounsaturated fatty acids, total polyunsaturated fatty acids (PUFAs), total omega-3 fatty acids, omega-6 fatty acids, mono- and disaccharides, and meat and increased subsequent CD risk. Studies reported a negative association between dietary fiber and fruits and subsequent CD risk. High intakes of total fats, total PUFAs, omega-6 fatty acids, and meat were associated with an increased risk of UC. High vegetable intake was associated with a decreased risk of UC.

Fats, meat and poultry are important sources of n-6 Polyunsaturated fatty acids, which subsequently increases the risk of inflammatory bowel disease. Prospective studies on European cohorts, mainly including middle-aged adults, suggest that a diet high in protein from meat and fish is associated with a higher risk of inflammatory bowel disease.

Concluding, Research suggests that people who eat primarily plant-based diets tend to have a lower body mass index (BMI) and lower rates of obesity, diabetes, and heart disease than those who eat meat. Hence, plant-based diet is the choice we make for our body maybe not immediately but slowly and steadily for a qualitative and hospital free life.