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Review Article

Gallbladder Stone Disease and its Relation to Dietary Intake

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Abstract

Gallstone disease is the most common gastrointestinal disorder affecting the biliary system. Its complications are caused by inflammation, infection, or ductal obstruction. Gallbladder stone disease is one of the major surgical problems in several populations and it accounts for many hospital admissions and surgical interventions. Gallstones represent a major problem in many countries, including Saudi Arabia. Studies in Saudi Arabia showed changes in dietary habits contribute to disease. Studies reported that risk of gallstone increased after intake of refined sugars and fat especially trans fatty acids, margarine and oil. There are many risk factors for gallstone such as family history, older age, female gender and obesity. Diet is the major risk factor that it affects the type of gallstone but this factor can be modified. The objective of this report is to review the literature and report on the latest findings regarding Gallbladder stone disease, its relation to dietary intake and put strategies to decrease the frequency of disease.

Keywords: Gallbladder; Disease; Intake

Introduction

In the United States, approximately 10–15% of the adult population has gallstones, with approximately one million cases presenting each year. There is great variability regarding the worldwide prevalence of gallstone disease. Gallstones represent a major problem in many countries, including Saudi Arabia. Gallstone disease may not be symptomatic until there are complications.

Deposition of hard fatty or mineral in the gallbladder leads to Gallstone disease. Most patient with this disease experiences no symptoms. When stones block part of biliary system cause irritation of gallbladder and complications such as pancreatitis and jaundice and cholecystitis. There are three types of stones, cholesterol, Pigment and mixed. Cholesterol gallstones is higher prevalence than pigment gallstones. Diet affected the type of gallstone formation. Studies reported that Consumption of fried foods and animal lipid increased risk of cholesterol gallstone formation, while intake of carbohydrate increase risk of pigment gallstones formation. suggesting diet influenced the type of gallstone formation [1,2,5].

Review of Literature

Deposition of hard fatty or mineral in the gallbladder leads to Gallstone disease. In this disease, the stones block part of biliary system and cause irritation of gallbladder and complications. This disorder can cause life threatening conditions if their symptoms or complications left without treatment [9].

Natural history and clinical features Gallstones are often discovered incidentally during abdominal ultrasonography and remain asymptomatic in nearly 80% of cases. After diagnosis, the risk of developing pain or complications is low; 1–4% per year, with only 10% and 20% of patients developing symptoms within 5 years and 20 years, respectively. The typical symptom of cholesterol gallstone disease is a steady pain called biliary "colic". The pain is usually severe, intermittent, starts abruptly without fluctuations, and reaches a peak within 1 h in two-thirds of patients. The symptoms tend to resolve gradually over 1–5 h, and those lasting for longer (more than 5 h) should raise suspicion of complications (ie, acute cholecystitis) [16].

Gallstones formed when there are much cholesterol and other substances in the bile which form crystals and changed to hard stones in the gallbladder. Gallstones also formed when the gallbladder does not empty properly. Biliary system consists of gallbladder, which stores and secretes bile, and the bile ducts, which conduct bile from the liver to the gallbladder (Hepatic ducts) and from the gallbladder to the intestine (Common bile duct). Also Cystic duct which takes bile to and from the gallbladder. Bile is a viscous fluid secreted from the liver stored in the gallbladder and released into duodenum when fatty foods enter the duodenum. It emulsifies fats in the intestine and forms compounds with fatty acids to facilitate their absorption. Chief constituents of bile are Cholesterol, Bile salts and Bilirubin: which is the main pigment derived from hemoglobin release from RBC destruction.

Causes of Gallstones formation

The gallbladder can develop only one large stone or hundreds of small stones, or a combination of the two. Gallstones formation in not related to single reason. Cholesterol stones formed when the liver produces much cholesterol in the bile which form crystals and changed to hard stones in the gallbladder. Pigment stones they differ in their chemical composition and colored (black and brown) by the presence of bilirubin, the pigment in RBCs. They are composed of bilirubin polymers or calcium salts. These stones formed because of changes in bile components or due to inability of gallbladder to empty normally. Pigment stones are associated with Chronic hemolysis in conditions such as sickle cell disease, thalassemia, cirrhosis. Mixed stones composed of cholesterol and salts. These types are the most common. Gallstones formation become more common with older age, female gender, overweight and diabetic people [13,18].

Symptoms of gallstones

This disease doesn't cause any symptoms in most patients. The most common symptoms include, abdominal pain after eating a fatty meal, Pain in the abdomen and back which is generally infrequent but severe.

Complications Complications of gallstone disease are inflammations of the gallbladder (cholecystitis), the biliary tract (cholangitis), and the pancreas (biliary pancreatitis). Persistent pain, fever, and jaundice indicating acute cholangitis are known as Charcot's Triad [4]. Obstructive jaundice occurs when gallstones blocked the bile flow to the intestine, bile spills into the blood causing yellow skin and dark urine [8]. Biliary colic Colic is pain that usually occurs in the upper middle or right side of the upper abdomen due to contraction of gallbladder after meals. Gallstones go to bile duct to the intestines causing pain for a few minutes to several hours. Cholecystitis means (Gallbladder Inflammation) which occurs as a result of irritation of gallbladder by stones. This condition produces pain in the upper abdomen, nausea and vomiting. Cholangitis means Inflammation of the bile duct, occur when the bile ducts blocked and infected with bacteria from the small intestine. Pancreatitis means inflammation of the pancreas due to stones at the lower end of the duct. Gallstone ileus means obstruction of small or large intestine with gallstones. These complications often require urgent treatment in hospital, but preventive surgery is rarely advisable.

Factors influencing gallstone disease include Female gender, Pregnancy, Older age, Family history, Obesity and visceral fat distribution, Diabetes, drugs (lipid-lowering, oral contraceptives, estrogens), Rapid weight loss [10,20].

Diagnoses of Gallstones

The first investigation is usually an ultrasound study, a painless and relatively simple test that is highly accurate in locating stones in the gallbladder. Further investigation may be needed if complications occur, or if stones in the bile duct are thought likely. For example, ERCP (endoscopic retrograde cholangiopancreatography) may be needed to locate and remove bile duct stones. In ERCP, a flexible tube called an endoscope is passed through the oesophagus and stomach into the small bowel, dye is injected into the bile duct and then x-rays are taken.

Treatment options of gallstones

Medical treatment may not be necessary unless the gallstones present symptoms. Treatment depends on the size and location of the gallstones, but may include:

- **Medications Treatment:** Some drugs can dissolve gallstones but this treatment is only rarely given, due to side effects and a variable success rats [3]. Treatment of disease involves narcotic pain relievers or antispasmodic agent or pain control with none steroidal anti- inflammatory drugs. However, comparison studies have shown that NSAIDs (none steroidal anti- inflammatory drugs) provide faster and more effective pain relief. The patient should fast as part of the conservative management of biliary colic and to avoid the release of endogenous cholecystokinin.
- **Surgical Treatment:** Cholecystectomy, usually laparoscopic, is recommended for most patients with symptomatic gallstones to remove the stones from the bile duct or the entire gallbladder [6,7].

- Lithotripsy is a machine shatters stones by sound waves and used for people with small stones [19].
- **Dietary treatment:** Limiting or eliminating fatty foods and dairy products is recommended. Previous studies reported that risk of gallstone was positively associated with intake of meat, energy, fat and saturated fat, but negatively associated with intake of vegetable and fiber. Nutritional exposure to western diet, i.e., increase intake of fat, refined carbohydrates and decrease in fiber content is a potent risk factor for development of gallstones. Dietary calcium decreases cholesterol saturation of gallbladder bile by preventing the reabsorption of secondary bile acids in the colon. So that intake of calcium inversely associated with gallstone prevalence. Ascorbic acid reduces lithogenic risk in adults that it influences α hydroxylase activity in the bile. Coffee components decrease cholesterol crystallization in bile due to stimulation cholecystokinin release. Coffee consumption inversely correlated with gallstone prevalence. [12-15,17].

Natural therapies to Prevent Gallstones

- **Flush of gallbladder:** A good way to keep the gallbladder flushed is by taking the juice of half a lemon with ¾ oz of olive oil and an 1/8 tsp of garlic once a day. Later in the day, finish the juice of the lemon. Black seed oil is also suggested as a dietary supplement to help flush gallbladder to help prevent the buildup of sludge. The recommended dosage of blackseed oil for the treatment of gallstones is 250g of ground black seed, 250g of pure honey, and 1 teaspoon of black seed oil mixed thoroughly with half a cup of hot water. Taking of this dose on an empty stomach in the morning is effective.
- **Lecithin:** Naturalists and herbalists recommended that lecithin granules help in dissolving gallstones. The recommended dosage is two to three tablespoons daily.
- **Turmeric:** The main ingredient in Turmeric is cur cumin which is antioxidant and anti-inflammatory. It improves the solubility of bile, making bile and its compounds, including those that form gallstones, easier to dissolve.
- **Raw Beetroot Juice, Pear Juice, and Apple Juice:** Cutting down on food consumption for a couple of days and add raw beetroot juice, pear juice, and apple juice to diet reduce gallbladder discomfort. Beet juice is especially helpful because it also helps cleanse the liver. It was found that consumption of 2 tablespoons of Olive oil with fresh lemon juice and Fresh applesauce mixed with shredded raw beets is effective in prevention the recurrence of gallstone symptoms [11].

Conclusion and Recommendation

Gallbladder stone disease (cholelithiasis) which is the most common disorder affecting the biliary system may often be asymptomatic. Some people with this disease developed symptoms such as pain, infection and inflammation. These symptoms cause more serious and life-threatening complications if untreated. Diet is the cheif risk factor for disease but it can be modified. So, the present study highlight some dietary changes to help with symptoms of gallstones and prevention of disease. The present report concluded that there is no specific diet for treating symptoms of gallstones. Most people who have symptoms of gallstones will have their gallbladder removed by an operation called cholecystectomy. However, eating a low-fat diet is likely to reduce symptoms while patients are waiting for the operation, as the gallbladder will not be stimulated to release bile into the small intestine. If the patient find that any particular foods trigger the onset of the pain then try to avoid eating those foods until removing of gallbladder. Natural therapies are effective to Prevent Gallstones. After operation there is no need to follow any particular diet, although of course it is always a good idea to eat as healthily as possible.

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