

## Effect of Nutrients Causing Lithogenicity of the Bile in Gall Bladder Stone Formation and Liver Flushing with Olive Oil and Lemon Juice

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**Abstract:** Cholelithiasis is found in 10 – 15 % of the adult population on an average, with majority of the affected individuals being asymptomatic, almost more than 80 %. The prevalence of gallstones is related to many factors, including age, gender and ethnicity. Aim of the study the effect of liver flushing with olive oil and lemon juice on the lithogenicity in gall bladder stone formation. Gall bladder stone is detected by an ultrasonography scan. After detection, patient is given 100 ml olive oil and 10 ml lemon juice daily in fasting for 12 days followed by an interval of 3 days repeated for 3 cycles and then the ultrasonography scan is repeated. Size of stone and presence or absence of sludge before and after 3 cycles of 12 days, each followed by an interval of 3 days of experimentation is compared. Maximum number of subjects – 31 subjects out of 50 showed an absence of gall bladder stones after the flushing procedure. 8 subjects out of 50 showed a decrease in the size of gall bladder stones after the flushing procedure. 4 subjects out of 50 showed no change in the size of gall bladder stones after the flushing procedure. Size of the gall bladder stone is important in conservative management of gall stones by liver flushing technique. There is no correlation between the presenting symptoms like abdominal pain, nausea or vomiting and loss of appetite and the effectiveness of the liver flushing technique in the conservative management of gall bladder stones.

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### I. Introduction

Cholelithiasis is one of the commonest diseases affecting the gastrointestinal and hepatobiliary system. “Cholelithiasis is found in 10 – 15 % of the adult population on an average, with majority of the affected individuals being asymptomatic, almost more than 80 %<sup>1</sup>. Approximately 1 to 2 % of asymptomatic patients will become symptomatic leading to cholecystectomy on an annual basis,” which makes cholecystectomy by the open or laparoscopic methods one of the most commonest surgeries performed by surgeons worldwide. The prevalence of gallstones is related to many factors, including age, gender and ethnicity. Various predisposing conditions leading to the development of gall bladder stones are obesity, pregnancy, fatty and oily mixed diet, Crohn’s disease, terminal ileal resection, gastric surgery, hereditary spherocytosis, sickle cell disease, and thalassemia which are all associated with an increased risk of developing cholelithiasis<sup>2</sup>. Women are thrice more likely to develop gall bladder stones than men, and first-degree relatives of patients with gall bladder stones have a two-fold greater prevalence<sup>3</sup>. A gall bladder cleanse, also called a gall bladder flush or a liver flush; is one of the latest conservative methods for removal of gall bladder stones from the body. A liver flush involves consumption of a combination of olive oil and lemon juice for a course of ten or more days alongwith dietary restrictions. Research shows that the liver flushing treatment helps in breaking up gall bladder stones and stimulates the gall bladder to release them in stool. The large and repeated doses of olive oil in liver flushing preparations have a laxative effect, and patients who have been administered a liver flush have reported to find lumps that look like gall bladder cholesterol stones in their stool after the procedure.

### II. Material And Methods

This prospective study was carried out on patients of Department of General Surgery at MGM Medical College & Hospital, Navi Mumbai from May 2017 to October 2018. A total 50 subjects were included in this study.

**Study Design:** Prospective study

**Study Location:** This was a tertiary care teaching hospital based study done in Department of General Surgery at MGM Medical College & Hospital, Navi Mumbai.

**Study Duration:** May 2017 to October 2018.

**Sample size:** 50 patients.

**Sample size calculation:**  $4Z\alpha^2P(1-P)/W^2$

**Subjects & selection method:** The study population was drawn from patients who presented to MGM Medical College & Hospital, Navi Mumbai Surgical OPD.

**Inclusion criteria:**

- Males or females over the age of consent in India, or having clear parental consent.
- All patients coming to MGM Hospital, Navi Mumbai
- Able and willing to give consent and follow study instructions.

**Exclusion criteria:**

- Gall bladder diseases other than cholelithiasis
- Cholelithiasis in pregnant/nursing females
- Cholelithiasis in cardiac disease patients

**Procedure methodology**

- The biochemical investigation to detect the serum levels of amino acids glycine and phosphatidylcholine.
- After detection, patient is given 100 ml olive oil and 10 ml lemon juice daily in fasting, for 12 days and then the ultrasonography scan and biochemical investigation is repeated.
- Size of stone and presence or absence of sludge before and after 3 cycles of 12 days of experimentation.
- Follow up: Minimum after 6 weeks.

### **III. Result**

**I.** Age distribution was youngest subject included in study – 10 years and oldest subject included in study – 78 years. Mean age of subjects included in study – 44.1 years. Maximum subjects included in the study were from the 21 – 40 years age group. Minimum subjects included in the study were from the < 20 years age group.

**II.** Gender distribution, preponderance of females over males amongst the subjects included in the study – 31 females out of a total of 50 subjects.

**III.** All the subjects included in the study had presented with complaints of abdominal pain, and was the chief presenting symptom at the time of presentation to the hospital.

**IV.** Maximum number of subjects had presented with abdominal pain in the right hypochondrium region – 31 out of a total of 50 subjects. Diffuse pain was seen in 14 patients and 7 patients was having pain in epigastric region.

**V.** 21 out of a total of 50 subjects had presented with complaints of nausea or vomiting. 29 out of a total of 50 subjects did not have any complaints of nausea or vomiting.

**VI.** 13 out of a total of 50 subjects had presented with complaints of loss of appetite. 37 out of a total of 50 subjects did not have any complaints of loss of appetite.

**VII.** 7 out of a total of 50 subjects had presented with tenderness on abdominal examination. 43 out of a total of 50 subjects did not have tenderness on abdominal examination on presentation.

**VIII.** 18 subjects out of a total of 50 had gall stones of the size < 5 mm. 18 subjects out of a total of 50 had gall stones of the size 5 - 10 mm. 11 subjects out of a total of 50 had gall stones of the size 10 - 15 mm.

**IX.** 6 subjects out of a total of 50 were non-compliant and did not follow-up after registering for the study.

**X.** Maximum number of subjects - 32 subjects out of a total of 50 had decreased serum glycine values < 122 micromol/litre before the flushing procedure. 3 subjects out of a total of 50 had normal serum glycine values 122 – 322 micromol/litre before the flushing procedure. 9 subjects out of a total of 50 had increased serum glycine values > 322 micromol/litre before the flushing procedure.

**XI.** Maximum number of subjects – 24 subjects out of a total of 50 had serum phosphatidylcholine values in the equivocal range 0.8 – 1.2 Index Units before the flushing procedure. 16 subjects out of a total of 50 had serum phosphatidylcholine values in the negative range < 0.8 Index Units before the flushing procedure. 4 subjects out of a total of 50 had serum phosphatidylcholine values in the positive range > 1.2 Index Units before the flushing procedure.

**XII.** Maximum number of subjects – 27 subjects out of a total of 50 had decreased abdominal pain after the flushing procedure. 11 subjects out of a total of 50 did not present with abdominal pain after the flushing procedure.

**XIII.** Maximum number of subjects – 31 subjects out of 50 showed an absence of gall bladder stones after the flushing procedure. 8 subjects out of 50 showed a decrease in the size of gall bladder stones after the flushing procedure. 4 subjects out of 50 showed no change in the size of gall bladder stones after the flushing procedure.

**XIV.** Maximum number of subjects - 32 subjects out of a total of 50 had increased serum glycine values after the flushing procedure, as compared to serum glycine levels before the flushing procedure. 12 subjects out of a total

of 50 had decreased serum glycine values after the flushing procedure, as compared to serum glycine levels before the flushing procedure.

**XV.**Maximum number of subjects - 33 subjects out of a total of 50 had increased serum phosphatidylcholine values after the flushing procedure, as compared to serum phosphatidylcholine levels before the flushing procedure. 11 subjects out of a total of 50 had decreased serum phosphatidylcholine values after the flushing procedure, as compared to serum phosphatidylcholine levels before the flushing procedure.

#### **IV. Discussion**

From the sample size of 50 patients, majority of the patients studied were females in the age bracket of 21 – 40 years and then in the age bracket of 40 – 60 years. All of the patients usually presented with symptoms of pain abdomen, either in an acute fashion or intermittent bouts of pain, usually in the right hypochondrium. Some patients have associated symptoms of nausea, vomiting and loss of appetite. On clinical examination, tenderness is found in a few patients, most commonly present in the right hyperchondrium. Demonstration of Murphy's sign is clinically important, to differentiate between biliary colic and an attack of acute cholecystitis - deep inspiration is inhibited by pain on deep palpation. The number and especially the size of the stone found in the gall bladder has an important bearing in the liver flushing method used in the conservative treatment of gall bladder stones. This study indicated that there is correlation between the size of gall bladder stone for effectiveness of the liver flushing technique. Smaller stone sizes, less than 15 millimetres are more likely to decrease in size or disappear on liver flushing therapy, which includes the ingestion of a specific amount of olive oil and lemon juice for a specified time duration. "Sies et al. conducted a study showing the effect of liver cleansing regimen<sup>4</sup> on patients which consisted of an intake of apple and vegetable juice without food, followed by the consumption of olive oil and lemon juice over several hours, which resulted in the passage of green, semi-solid stools which was due to the action of gastric lipases on the triacylglycerols that make up olive oil, yielding long chain carboxylic acids, primarily oleic acid. This was followed by the saponification into large insoluble micelles of potassium carboxylates from lemon juice known as soap stones." "Dekkers<sup>5</sup> et al. conducted a study which reported that the contact of apple juice with gall stones lead to the softening of gall stones due to the contact of the chemical present in apple juice, which primarily occurred due to the saponification or softening of gall stones leading to the passage of stones." "Ellis et al. indicated in their study that Rowachol helps in the dissolution of gall bladder stones.<sup>6</sup> Rowachol is a proprietary preparation containing six plant monoterpenes like menthol, menthone, pinene, borneol, camphene, cineol and base of olive oil that stimulates the liver for bile production and inhibits the formation of cholesterol crystals in bile. Clinical trials suggested that treatment with Rowachol resulted in the partial or complete dissolution in 29 % of patients included in the study. Stones disappeared in 37 % of the patients within one year and in 50 % of the patients within two years." "The National Cooperative Gallstone Study had indicated that complete dissolution was observed in only 13.5 % of patients after two years in which chenodeoxycholic acid was given singularly at a dose of 750 milligrams per day.<sup>6</sup> This study concluded that a combination of medium-dose chenodeoxycholic acid and Rowachol is an economical and effective method for dissolution of gall stones as compared to high doses of chenodeoxycholic acid alone." In our literature, we could not find any correlation between the age or sex of the patient and the effectiveness of the liver flushing technique, whereas there are numerous studies that have indicated the prevalence of gall bladder stones in middle-aged women who consume a fatty and oily mixed diet. There is no correlation between the presence of comorbidities in a patient like hypertension, diabetes mellitus, bronchial asthma or tuberculosis or the history of gastrointestinal or hepatobiliary surgeries in the past with the effectiveness of the liver flushing technique. In our study, it was observed that the ingestion of olive oil and lemon juice caused an increase in the serum levels of amino acids glycine and phosphatidylcholine after the liver flushing procedure as compared to the serum levels of amino acids glycine and phosphatidylcholine before the flushing procedure due to the fact that olive oil and lemon juice constitute minute but significant amounts of these specific amino acids, glycine and phosphatidylcholine, which in turn are helpful and beneficial in flushing out small-sized gall bladder cholesterol stones. "There have been numerous other studies like Savage et al.<sup>7</sup> which have indicated an adjuvant herbal treatment for the dissolution of gall stones, Bhalotra et al.<sup>8</sup> and Issacs et al.<sup>9</sup> which have indicated the effectiveness of liver and gall bladder flushing but to no specific conclusion."

#### **V. Conclusion**

Size of the gall bladder stone is important in conservative management of gall stones by liver flushing technique. There is no correlation between the presenting symptoms like abdominal pain, nausea or vomiting and loss of appetite and the effectiveness of the liver flushing technique in the conservative management of gall bladder stones. Age, gender, presence of comorbidities and presence of smoking or alcohol consumption do not play a role in the effectiveness of the liver flushing technique.

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