



## EFFECT OF NUTRIENTS CAUSING LITHOGENICITY OF THE BILE IN GALL BLADDER STONE FORMATION AND LIVER FLUSHING WITH OLIVE OIL AND LEMON JUICE .

<b>Dr Varshil Doshi</b>	Post Graduate Resident Jnuimsrc.
<b>Dr Natwar Lal Vyas</b>	Head And Professor Of The Department Jnuimsrc.
<b>Dr Praveen Mathur</b>	Associate Professor And Unit Head Jnuimsrc.
<b>Dr Rahul Solanki</b>	Assistant Professor, Jnuimsrc.

**ABSTRACT** **Background:** Gall bladder cleanse, also called gall bladder flush or liver flush; is one of the latest conservative methods for removal of gall bladder stones from body. In liver flush method, a specified dosage of olive oil with lemon juice is given to the patient for at least ten days besides some dietary restrictions. **Aims And Objectives:** To study the effect of nutrients on gall bladder stone formation and causing lithogenicity of bile in and liver flushing with olive oil and lemon juice. To study the effect of liver flush therapy with olive oil and lemon juice on the formation of stones in gall bladder. **Materials And Methods:** This is a prospective study, in tertiary health center from September 2022 to June 2023. The study got approved via the Institute Ethics Committee. Consent both Written and informed of total 50 patients were obtained from all patients before being enrollment into the study. Pre-flushing and post-flushing ultrasonography and biochemical investigations were done. **Results:** Maximum age group patients were of 21-40 years. 62% were females. Pain in right hypochondrium, epigastric region and dyspepsia was present in 62% patients, which was found to be decreased in 61% of patients after the flushing procedure. Size of calculus found on ultrasonography was mostly less than 10 millimeters, which was found to be absent in 70% of patients & decreased in 18% of patients after the flushing procedure. 72% of patients had increased serum glycine values and 75% of patients had increased serum phosphatidylcholine values after the flushing procedure. **Conclusions:** The patients having stones < 10 millimeters are more likely to decrease or disappear on liver flushing therapy. Size of the gall bladder stone is important in conservative management of gall stones by liver flushing technique.

**KEYWORDS :** Nutrients, bile salts, lemon juice and olive oil effects.

### INTRODUCTION

Gall stone disease is one of the commonest diseases which affects the GIT 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 2 to 3% 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 commonest surgeries performed by surgeons worldwide.

The prevalence of gallstones is related to many factors, including age, gender, and ethnicity. Predisposing conditions leading to the high risk of formation of gall bladder stones consist of obesity, pregnancy, fatty and oily mixed diet, Crohn's disease, terminal ileal resection, gastric surgery, hereditary spherocytosis, sickle cell disease and thalassemia<sup>2</sup>. Females are thrice more likely to develop gall bladder stones than males, 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 along with 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 stools after the procedure.

The olive tree, botanically named as *Olea europaea*, has a fruit and oil that is extracted by compression techniques and has a diverse range of remedial and gastronomic advantages. Olive oil is also a major component of the Mediterranean diet along with a high consumption of vegetables. The main active components of olive oil are oleic acid, phenolic derivatives and squalene<sup>4</sup>. Extra virgin olive oil has the maximum concentration of phenolics which have antioxidant properties. Antioxidants are believed to confer health benefits like lesser chances of cardiovascular mortality as well as overall mortality. Extra virgin olive oil is the purest form of olive oil, which is extracted using natural methods and standardized for purity<sup>5</sup>.

A raw lemon, without peel, 70 grams weighing on an average, provides approximately 20 calories, protein, fat, carbohydrate inclusive of fiber and sugar and majority of the daily vitamin C requirement. Besides, lemons also contain small amount of thiamine, riboflavin, iron, magnesium, phosphorus, potassium, copper, vitamin B6, pantothenic acid, calcium and manganese<sup>6</sup>.

Glycine and taurine are the only amino acids that are found in the natural form and do not have synthetic variants. Glycine is an organic compound that acts as a precursor to proteins, making it an ideal building block for various substances. It acts as a neurotransmitter with an inhibiting action in the nervous system. Glycine along with taurine can act as an anxiolytic agent in the body and are commonly found in bile. It also has many advantageous roles in the body such as the detoxification of liver and eliminate toxins that the body is constantly exposed to viz as chlorine, lead, and cadmium.

Taurine is also vital in the conjugation of bile acids which help regulate the flow of bile, promote the digestion of the fatty food and eliminate the bad cholesterol from the body. Glycine and taurine also help in keeping bile in the liquefied state, which leads to a decrease in the formation of cholesterol stones.

Bile acids should be present in an adequate amount as lower concentrations can make the bile inefficient and sluggish in consistency. This sticky bile is called biliary sludge. Biliary sludge can lead to deterioration of liver and gall bladder function predisposing to the formation of gall bladder stones. Excessive bile salts disrupt the function of gall bladder in digestion leading to chronic diarrhea. Since glycine and taurine are key elements in the formation of bile salts in the liver and bile, it is essential that the body has an abundance of these two amino acids<sup>7</sup>.

### MATERIALS AND METHODS

**Study Design:** Prospective study

**Study Conducted At:** Jaipur national university institute for medical sciences and research center, Jaipur Period of study: September 2022 to June 2023

**Sample Size:** 50 cases

The study was approved by Institutional Ethics Committee and patients were included in the study after a written, valid, and informed consent and after fulfilling the inclusion and exclusion criteria.

**Inclusion Criteria**

Males or females above 18 years (age of consent) in India, or having parental consent below 18 years .  
All patients coming to JNU Hospital, Jaipur  
Patients 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

**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 presented with associated symptoms of nausea, vomiting, dyspepsia and loss of appetite.

On clinical examination, tenderness is found in a few patients, most commonly present in the right hypochondrium and epigastric region.

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 shows a clear correlation between the size of gall bladder stone and effectiveness of the liver flush therapy. Smaller stone sizes, less than 10 millimeters 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>8</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>9</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.

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.

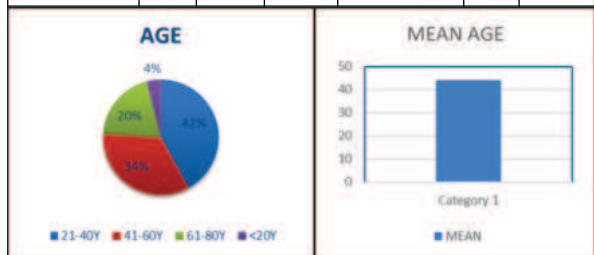
This is due to the fact that olive oil and lemon juice constitute minute but significant amounts of these specific amino acids, glycine and phosphatidylcholine, which in turn are helpful and beneficial in flushing out small-sized gall bladder cholesterol stones.

There have been numerous other studies like Savage et al<sup>11</sup>, which have indicated an adjuvant herbal treatment for the dissolution of gall stones, Bhalotra et al<sup>12</sup>, and Issacs et al<sup>13</sup>, which have indicated the effectiveness of liver and gall bladder flushing but to no specific conclusion.

**RESULTS**

	Normal	Increased	Decreased		Increased	Decreased
Pre Treatment Glycine	73%	20%	7%	Post Flushing Glycine	73%	27%
Pre Treatment Phosphatidylcholine	55%	9%+	36%-	Post Flushing Phosphatidylcholine	75%	25%

Size Of Calculus	36% (1-5mm)	36% (6-10mm)	22%(10-15mm)	6%(>15mm)	Post Flushing	2%	18% Decreased 9% No Change 71% Absent
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**CONCLUSION**

The study showed that patients having stones < 10 millimeters are more likely to decrease in size or disappear on liver flushing therapy.

Size of the gall bladder stone is important in conservative management of gall stones by liver flushing technique.

The study showed no correlation between effectiveness of liver flush therapy in the conservative management of gall bladder stones due to its antioxidant and anti-inflammatory properties .

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