

## Study the Chemical Composition of Gallstone and its Relationship to Acute Cholecystitis

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### Abstract

All over the world cholelithiasis is a main reason of morbidity. Gallstones are public between the general people; many people are ignorant of their presence because they not commonly cause symptoms. The detached of this revision was to conclude the chemical conformation of gallstones and any relationship between the composition of the stone and initiation of acute cholecystitis. For 50 patients (13 males and 37 females), the chemical composition of gallstones was tested. (46 %) of the sample are in age groups (40-50) years old. A seventy four of study participants were female. In 50 gallstone, cholesterol stones 27 (54 %), mixed stone 20 (40 %) and pigment stones was 3 (6 %). The modifier of female: male was (5.3:1). The studying shown that Cholelithiasis occurrence in the age group 40-50 (23 cases) is maximum follow them 13, 9 and 5 cases for age groups 30-39, 51-61 and 62 years old and more respectively. About 62% of patients with cholelithiasis have acute cholecystitis Conclusion: In Al-Kut city cholesterol gall stones is great incidence as associated to mixed & pigmented gall stones and most patients with cholelithiasis have acute cholecystitis

**Keywords:** Gall stone, Cholelithiasis, Cholesterol, Bilirubin, Calcium.

### Introduction

Generally many people are suffered from symptoms of gall stones, but because of mildness some of these symptoms and other asymptomatic many people are neglect their presence. Gallstones are made in the gallbladder and biliary territory [1]. It is the chief reasons for amount of higher digestive medical mortalities [2]. These stones can form anywhere inside the biliary tree [3]. Any disturbances in the equilibrium like the cholesterol precipitation, crystal formation, impaired entero- hepatic circulation of bile acids, super saturation of bile and damaged gallbladder function can leads to stone formation [4].

The gall bladder can contains hundreds of small stones or single stone [5]. There are three types of gall stones (cholesterol, pigmented or mixed stones) permitting to their chemical composition [6]. Cholesterol, bile pigment and calcium the important biochemical components of gallstones [7]. Cholesterol stones are forms about 90% cholesterol. While the brown or black

stones (Pigment stones) contain about 90% bilirubin and the stones which are form from variable quantities of cholesterol, bilirubin and other materials such as calcium phosphate, calcium carbonate and calcium palmitate [8, 9]. Cholesterol stones are the stones which have more than 50% cholesterol; about 70% to 80% of gallstones are within this type. Formation of these stones is happened when bile becomes oversaturated with cholesterol, due to increased secretion of cholesterol from the liver or there is reduction of bile salt or lecithin [10].

This oversaturation of cholesterol can product from an extreme concentration of cholesterol in bile, or a deficit of substances that save cholesterol soluble in solution (i.e., bile salts and phospholipids), or a permutation of the two reasons [11]. There are many factors which can lead to stone formation and these include, dietary habits, overweight, sex, multiparty, hematological disease increasing age and family history of

gallstone disease [12]. Obese person is more prone for stone formation due to his liver produces more cholesterol [10].Gallstone chemical examination provides important indications for the source, a etiology, and the metabolic origin of its formation, and might tell us that the inflammation of the gall bladder correlates with the chemical composition of the stone [9].In our study some patient present with acute or chronic cholecystitis and others asymptomatic.

**Material and Methods**

After cholecystectomy, gall stones existed and collected from 50 patients with cholelithiasis, at Al-Zahra education hospital, Kut, Iraq, from July 2017 into December 2017. Randomly were selections of persons they have stones in their gall bladder, without consideration to age or gender. All patients were with suggestive of gall stone, having a past of pain in the higher quadrant and epigastric areas from the past 3 - 6 months or indigestion. For gall stone detection a belly ultra-sonography is the typical investigation test [12]. In a pestle and mortar the stones

were powdered. 30 mg of stone crushed was thawed in 3 ml chloroform in a test tube to determine the total cholesterol and bilirubin [13]. For 2 minutes the tube was saved in boiling water bath. the stone solution which gained was used for designation of cholesterol and bilirubin . When not in use the stone solution was saved at 2-8 0C. All kits employ in this study were produce by Biolabo 02160, Maizy, France. By enzyme assay the total cholesterol and bilirubin were designation of using kit type AT-80106 and AT-80403 correspondingly [11] [12].

30 mg stone powder was thawed in 3 ml of 1N HCl in a graduated 10 ml tube to designation of phosphate, calcium ion, and its final volume was complete 10 ml with D.W. For one hour the tube was kept in boiling water bath. The solution as a result got was saved at 2-8 0C. Determination of calcium was done by the method described by (AGAPPE) spectrophotometrically and absorbance was measured at 578 nm [14].

**Results**

Table 1: Division of study sample by their personality

Characteristics		No.	%
Age (years)	29-39	13	26.0
	40-50	23	46.0
	51-61	9	18.0
	>62	5	10.0
Gender	Male	13	26.0
	Female	37	74.0
Total		50	100

This table reveals that the (46%) of the sample are within age groups (40-50) years

old. A seventy four of study participants were female Figure (1 and 2).

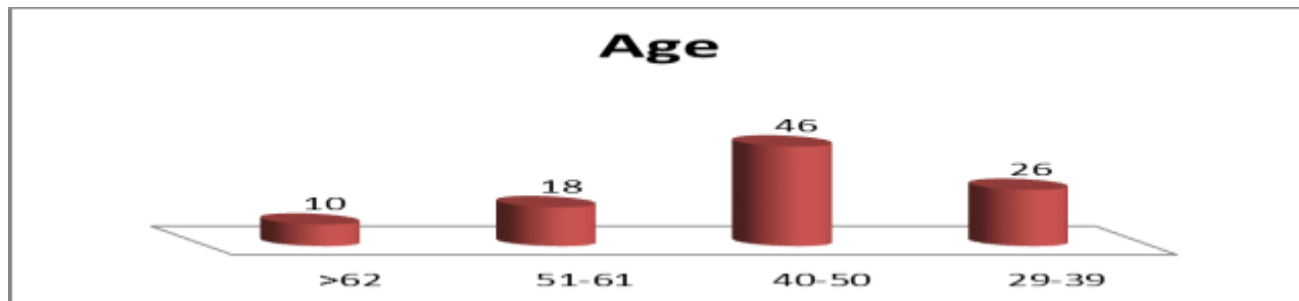


Figure 1: Sample Age

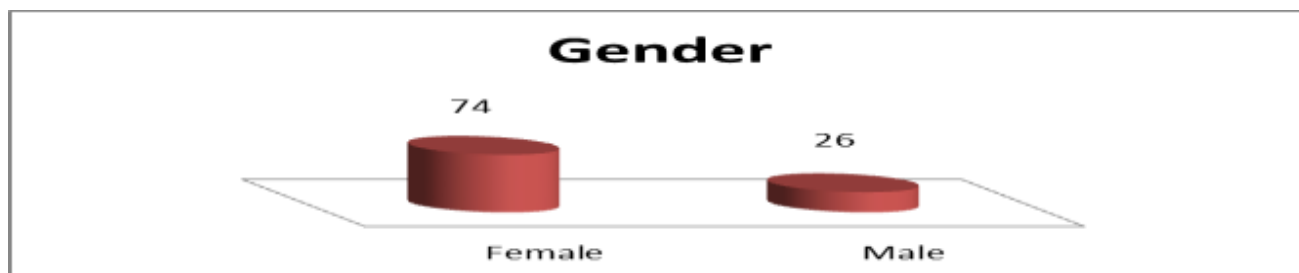


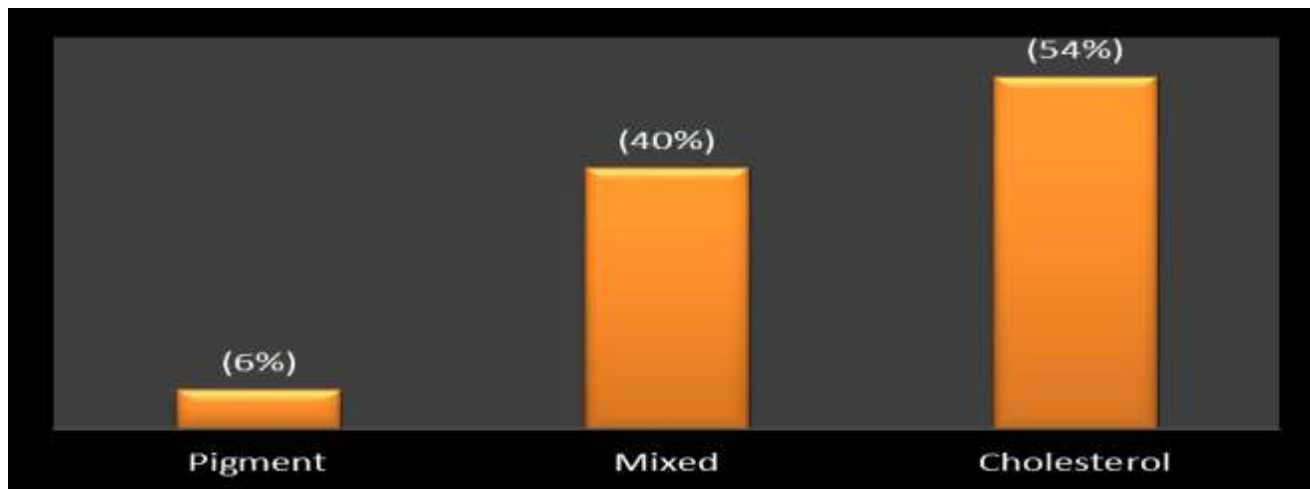
Figure 2: Sample Gender

**Table 2: Distribution of study sample by their Gallbladder Component**

Component	No.	%
Cholesterol	27	54
Mixed	20	40
Pigment	3	6

This table depicts that the (45%) of gallbladder composition were composed of cholesterol and the remaining proportion

were mixed (40%) and only (6%) were pigment.



**Figure 3: Gallbladder Component**

**Table 3: Distribution of the presentation of the patients according to the age**

	Acute cholecystitis	Chronic cholecystitis	Asymptomatic
Less than 30 years	4	1	2
30-40	20	3	3
More than 40	7	3	6

This table shows that there is no any relationship between composition of the stone and the presentations of the patients.

**Discussion**

Main components convoluted in the materialization of individuals cholesterol, bile pigment and calcium composed of the gall stone. This substances found normally in blood. These studying shown the female more exposure for Cholelithiasis compared males, the modifier of female: male (5.3: 1). While the incidence 5 becomes equal in both sex in adult age group. Great prevalence of cholelithiasis in female agreement with works, Rains described that females had a more danger of gall stone diseases perhaps abiding hormonal variances among males with females, the variances that influence to common expression of gender hormone receptors.

In the gall bladder of together gender, also, below the effect of female sexual characteristics muscle, the hormones may repose, bile duct passageway increases and small intestinal relaxed of the pancreatic excretion throw up inside gall bladder &

support environments which kindness the formation of gall stones [15].

The consequences of this study shown that the highest of Cholelithiasis is incidence in the age group 40-50 (23 cases) some of them present with acute cholecystitis and others either chronic or asymptomatic followed by 13, 9 and 5 cases for age groups 30-39, 51-61 and 62 and more correspondingly. Cholesterol gallstones are further public than mixed and pigmented gallstones and may present with acute cholecystitis, chronic or asymptomatic. Cholesterol is insoluble in water, so to continue with fluid it need be elated within clusters of bile salts called micelles.

If there is a difference the results of this study were consisting with the crash that confirmed the females are at greater danger of cholelithiasis increase than males, in a ratio of female: male (5.3:1) [20] and with the results indicated that the highest incidence of gall stones in the age group 40-49 [16].

Our research study concluded that among the cholesterol and bile salts, and then the bile fluid goes to sludge. This condensed fluid consists of a secretion gel having cholesterol and calcium bilirubinate. If the inequity worsens, cholesterol crystals will be made owing to the super-saturation which can finally form gallstones. As a result of several irregularities over-saturation and cholelithiasis can occur. These results are consistent with the study of Salam and others [17]; Schafmayer et al [18].

Our results are compatible with the revisions approved out in Al-Jouf government [19] that raises the occurrence of cholesterol gall stones is high as related to mixed and pigment gall stones. Acute cholecystitis is the most common problem of cholelithiasis. Conversely, about 62% of patients with cholelithiasis have acute cholecystitis. When a stone becomes influence in the Hartman's poacher bile duct and persistently obstructs it.

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