

Gallstones Disease “Cholelithiasis”, Reasons and Solutions

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Abstract

Gallstones disease is well known over the world. It causes death for about 5% of Al-Maghreb people. Whereas Missan city showed a lot of cases for new born babies which they born with gallstones in their gallbladders. These unusual cases lead this research to study the reason of this disease and its right treatment. Results of this research based on atomic absorption technique that indicated that gallstones of different samples contain: 0.386, 0.75, 1.17 and 1.283% of aluminum ions. While references indicated that there is no aluminum in gallstones in the world. These stones are mainly developed from cholesterol, bile salts, phospholipids (lecithin), bilirubin, calcium, and estrogen (for women). Gallstones disease is another disease that mainly caused by civilization and its treatment according to this research is by eating different food with so little cholesterol content comparing with very high other lipids such as triacylglycerol or different fatty acids in relatively limiting time etc. Although gallstones disease was well studied by many scientists during the last hundred years, its reason is not clear because it needs chemists touch.

Keywords: Gallstones; Cholesterol; Lecithin; Civilization

Introduction

Gallstone disease is very common in the western world with an estimated prevalence of 10% to 15% in white adults, leading to significant morbidity, mortality, and considerable health care costs. In the western world, approximately 70% of gallstone carriers exhibit cholesterol gallbladder stones (cholesterol content >50%), and 30% exhibit black pigment gallbladder stones. In East Asia, there is a high prevalence of brown pigment stones residing in the bile ducts, and causing potentially devastating cholangitis. Nevertheless, also in these countries, prevalence of cholesterol gallstones increases, supposedly caused by the introduction of western diet [1]. Because of increased prevalence of overweight or a higher proportion of elderly subjects in the population, the prevalence of gallstone disease may further increase in the near future [2]. In general, cholesterol gallstones are distinguished from bilirubin gallstones which it forms if the ion product of unconjugated bilirubin and calcium in gallbladder bile exceeds the solubilisation capacities of mixed micelles and vesicles. Cholesterol gallstones develop if the amount of cholesterol in gallbladder bile exceeds the maximum concentration that is soluble at the given concentration of bile salts and phospholipids [3]. Cholesterol crystal nucleation is considered the earliest step in cholesterol gallstone formation. Various conditions affecting the crystallization process, such as biliary cholesterol supersaturation, excess pronucleating proteins, or shortage of nucleation-inhibiting proteins, and factors related to the gallbladder, such as hypo motility [2].

Experimental Part

This section including two procedures as follow:

1. Two different gallbladders organs were taken from two different patients, after cutting them they showed that they contain a lot of stones. Four different stones were taken for calculating their content from aluminum ions and this was done by flame atomic absorption apparatus. Result of this apparatus was collected for discussing section.
2. (20 ml) of petroleum ether were putted into two different beakers (50 ml). Add 1 g of Cholesterol to beaker (A) and let beaker (B) stay without cholesterol. Two different gallstones with same weight were

put into both beakers (A) and (B). Leave two beakers overnight. This procedure was repeated for two times for insuring from the result. This procedure results were collected for discussing them.

Results and Discussion

Results of this research were divided into two steps according to above procedures as in the following points:

1. The four stones showed high percent of aluminum ions (0.386, 0.75, 1.17 and 1.283%, g/g) and this is unusual results because references [2-5] indicated that over the world, gallstones do not contain aluminum ions and they contain other different organic molecules or inorganic ions. In addition gallstones disease is considered to be uncommon in infants and children [6], in contrast, missan city showed that new born babies birthed with existing of stones in their gallbladder. These are abnormal facts must produce from specific scientific reason which is that each Iraqi person taking about 8-10 mg/day of aluminum ions and these ions deposit in all body's organs one of them is gallbladder [7,8]. For this new born babies should take aluminum ions from their mothers forming gallstones in their gallbladder, they take aluminum ions from their mothers and these ions form stones.
2. Second results are that after about 19-20 hours stone of beaker (A) still there in its beaker while stone of beaker (B) was dissolved. This because that gallstones forming mainly from cholesterol and it is like molecules so they do not dissolved in solution contain exceeds concentration of cholesterol and dissolved in petroleum ether without cholesterol. This fact can be clarified according to the following chemical equation:

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Cholesterol and like molecules+Bilirubin+Lecithin ←→ Gallstones

Increasing of cholesterol such as in beaker (A) will increase reaction rate of forward reaction forming of stones. While removing of cholesterol or any other reactants will increase reaction rate of backward reaction reducing of stones. This happened in beaker (A) removing of cholesterol by dissolving process in petroleum ether. This is simple chemistry rule. There is another chemistry rule about certain moieties should be activated in basic medium. References indicated that compounds inside gallbladder have basic (pH) media [9] and may be it reach (pH=9) or more [10] which means it is basic or highly basic medium therefore most different body's molecules should be activated in gallbladder by basic medium and these moieties will be like (Table 1).

There are other chemical moieties but above one are enough for illustrating what happening inside the gallbladder at basic pH. Human's body contain several vesicles such as gallbladder but most of them contain one molecule type or at maximum two molecules types such as; insulin in β -cells, vesicles of sexual hormones etc. While gallbladder contain more than seven different molecules in basic medium (activated medium). This is something should be clarified by chemical diagram as in Figure 1 should be noticed that there are another interactions and above figure show only one molecules for each gallbladder different molecules not for all molecules that are truly inside the gallbladder which are thousands or much more. Therefore, according to chemistry science what happened inside gallbladder at basic medium is a chemical battle, each molecule attach another one. It is impossible to predicate what will produce from above battle and nothing can prevent or stop it.

All products that produce from above figure (chemical battle) must form the first step in formation of gallstones. Different techniques of chemicals laboratories indicated that first step in formation of any crystal (stone) is the difficult step. For this there are few known procedures or techniques in crystallization or re-crystallization processes for assisting molecules to form first crystal.

This means chemical battle as illustrated in Figure 1 should definitely produce the first crystal which is the important and difficult step. Then the other easy steps should come by well knowing bindings bonds. Other gallbladder's different molecules should aggregate over the first crystal or over other new forming molecules to form stones in the gallbladder. Size of the stone is depending on how much molecules will aggregate (their concentrations in gallbladder) and the time of this aggregate (enough time is required).

Known bindings are forces make molecules bind each other due to specific properties such as; hydrogen bonds, ionic bonds, hydrophobic and hydrophilic interactions, and van der Waals forces. This indicates that after formation of first crystal by above chemical battle, other molecules must collect each other by above bindings or forces to form big crystals (stones). These are simple chemical rules.

In chemistry's laboratories, most chemists know that in crystallization or re-crystallization processes, four conditions are more important for producing crystals (stones) without these conditions crystals (stones) do not form. These conditions are an appropriate

No.	Not active moieties (Acidic medium)	Active moieties (Basic medium)
1	0	0
2	-COOH	-COO ⁻
3	-OH (specially phenols)	-O ⁻
4	-SH	-S ⁻

Table 1: Effecting of basic medium.

solvent, forming of first crystal, temperature degree mainly crystals prefer cold weather rather than hot weather and last condition is standing of beaker's contents for enough specific time such as overnight.

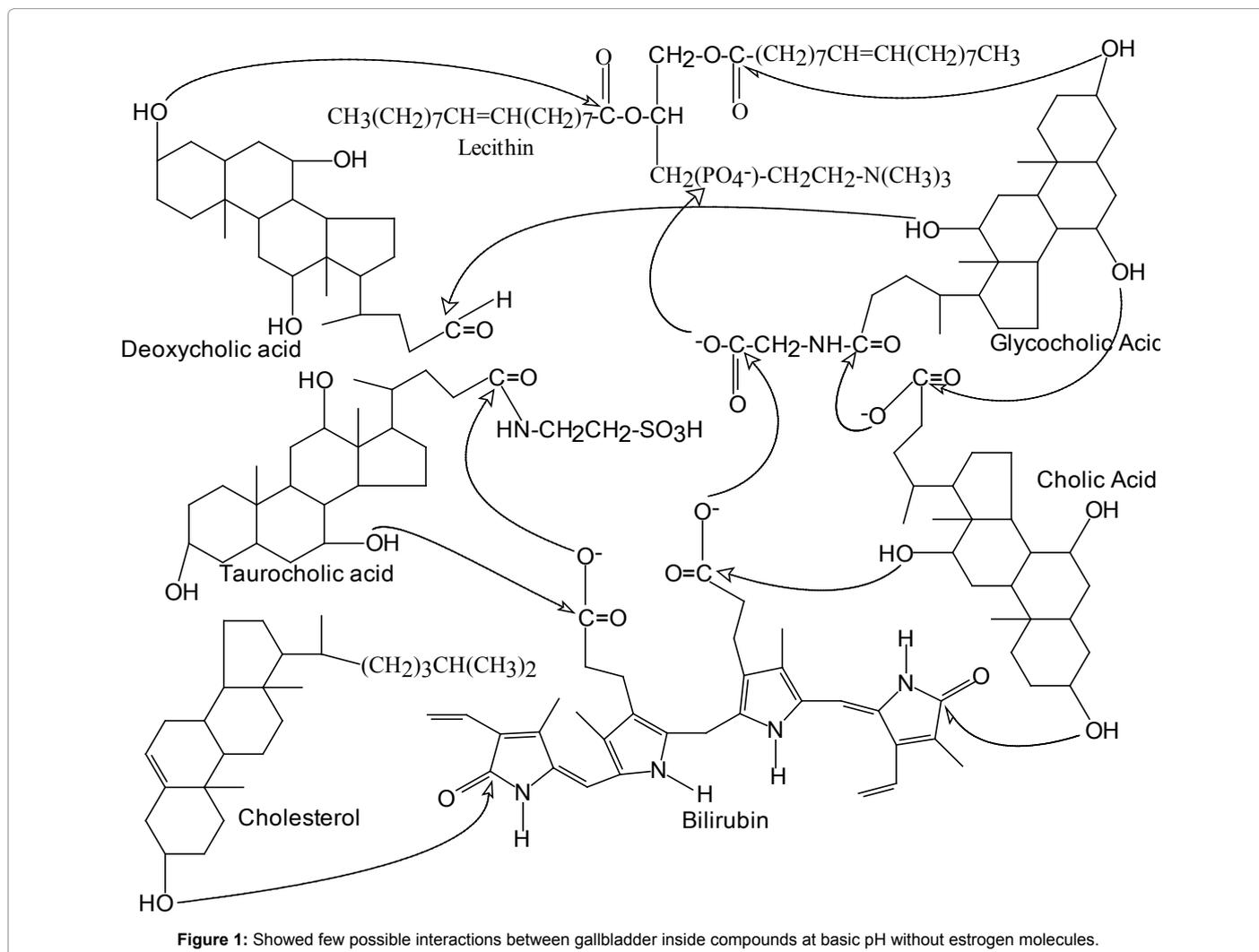
In case of human's gallbladder, three of above conditions are already there, the appropriate solvent (oils), relatively cold temperature 37°C and so easy to form first crystal or forming of crystallization's nuclei as it is described in Figure 1. Stability is the only condition does not exist in gallbladder, this in case of moving person but when somebody eat food with high cholesterol content at the dinner then directly he or she get sleep, this should give molecules all they need to form stones in the gallbladder. As example in crystallization processes firstly heating in limiting time then leaving the solution for enough time more than 10 hours or sometimes more to form beautiful crystals. Firstly assistant process heat or move then long time (sleeping time) for producing stones in gall bladder. This normally happen for each person however these stones should gone after work with long time such as 6 hours because human body must absorb these stones leaving gallbladder clean. It is a fact that older people, pregnant woman etc. do not move enough time so they should find stones in them gallbladder especially if there a good catalyst there such as aluminum ions in case of our people.

A conclusion of this motion is the key of formation of stones in gallbladder as example before about 50 years or more the life was so hard need strong motions nowadays it becomes so easy with less motions then civilization is the reason of stones.

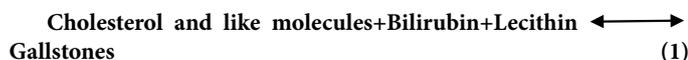
Gallstones disease is not as common as reference indicated [2], it is so normal status inside human body mostly the person know that he or she has a stone by an accident. Most people discovered that they have a stones in them gallbladder when they searching for another symptoms. This truth is well known and it shows that this disease happens normally and according to specific conditions it becomes a problem. Ultra sound apparatus are so common over the world in the last thirty years, this reason why gallstone disease are so common. Gallbladder is just a bio-storage organ in the body; it contains more than seven different molecules as showed in Figure 1. They react each other to form different molecules (products), in the normal condition, whatever these molecules should form in the gallbladder, they should release in the intestine as a response to lipids of food content to join other molecules inside the intestine then the body take what it need and the rest will remove out the body as stool.

Therefore, formation of gallstones is so normal in the body but when they developed as big stones they will affect the body and they become serious problems. This happens if the person does not eat lipids for relatively long time so chemical battle will continue for long time until forming of big stones. Most cholesterol come from animal sources so less amount of cholesterol in the food (Vegetarian people) must leave a good concentrations from other molecules in gallbladder to form stones because vegetarian people do not eat enough lipids cholesterol with other lipids for this them intestinal do not need more bile salts leaving good concentration from them in gallbladder to form stones. This happened and they called it gallstones disease. This what reference indicated vegetarian people do not eat enough lipids so they should form big stones in them gallbladder and also too much eating meat will form gallstones [9].

Gallstones normally formed and eating enough lipids will remove it from the Gallbladder so there is only one solution for gallstone disease which is illustrated in procedure (2) in the experimental section. When gallstones formed the patients should take enough lipids without cholesterol. He should eat other lipids such as neutral lipids saturated



or unsaturated and does not take cholesterol or other like molecules to remove the gallstones step by step. This because eating of cholesterol will increase reactants to from the products (stones) as equation (1) that mentioned before:



Treatment of gallstone disease is by eating other lipids types and as much as they could with preventing eat cholesterol or any like molecules. Patients with hypertension and diabetes do not eat lipids because of these diseases, another people avoid eating lipids because they seek good health as they think etc. These people and other like people must developing of gallstones in them gallbladder because they let different molecules in gallbladder to form first crystal and by avoiding lipids other molecules should aggregate on first crystal forming stones. Sizes of these products (stones) depend on the time that different molecules stay inside gallbladder, this time is so important in formation of big stones inside gallbladder organs.

First big molecules must form from different molecules that illustrated in Figure 1, then other molecules must collect on this molecules to form stones, these product stones have two ways either they remove by the body as stool this is the main way or they stay inside

gallbladder to form bigger stones. These stones stay inside gallbladder because of low food lipids content or less human activity, or old people that they avoid lipids, or diabetes and hypertension patients or vegetarian's people or patients with other diseases that took long time without lipids, etc. All these people will use gallbladder organ as less as they can by avoiding lipids lead to more time for different molecules in gallbladder to react each other to from stones. Therefore, the only treatment for gallstones is by eating lipids without cholesterol step by step to remove gallstones.

Iraqi people have another mechanism because aluminum ion has good affinity toward oxygen and all gallbladder different molecules have many active oxygen atoms as shown in Figure 1. in addition, Aluminum ion have empty (d) orbital make it good metal and gallbladder different molecules are good ligands to form different complexes inside gallbladder forming first step then other molecules aggregate on these complexes to from stones even in new baby gallbladder as it is shown in this research results.

Treatment of Iraqi people gallstones is same as other stones by eating as much as they can lipids without cholesterol to reduce gallstones step by step until they become small molecules easy to remove from the body. Diabetes and hypertension patients can take 5 g/day potassium ion as good experimental treatment for hypertension and diabetes,

and eat as much as they can lipids without cholesterol for removing of gallbladder's stones.

Pregnancy women are another patients that suffering from forming of gallstones during pregnancy time. This come from that pregnancy woman will add new molecules to Figure 1 molecules. She will add high concentration of estrogen or other like molecules to chemical battle of Figure 1. Other molecules adding to more than seven different molecules in basic medium absolutely this will increase rate of chemical interactions inside the gallbladder to produce different gallstones. Pregnancy women normally does not eat a lot of lipids without cholesterol and they eat more cholesterol less lipids as them food. Therefore, the best treatment for these women is by eating as much as they can lipids without cholesterol to reduce gallstones step by step until removing them from the body.

Above treatment for gallstones is by eating enough lipids contain as much as less cholesterol but this may be not enough another action must be with this treatment which is increase body motion. Human motion is so important for its health and one of these is to remove gallstones. Best treatment before surgery for gallstones is by giving patients more additional time for giving those bodies enough time to remove these stones therefore this should be with eating enough less cholesterol and increase main motions. Therefore, best treatment for gallstones is by eating food contain as much as less cholesterol with increase different body motions. Increasing body's motion should increase lipid absorbing by the body for removing gallstones even for healthy people.

Conclusion

Gallstones are so normally happened inside the gallbladder from the beginning and ultrasound apparatuses discover them and make them so common over the world. Gallbladder organ has unique that it is a storage organ mainly contain more than seven active different compounds, them activity come from that they are in basic pH medium.

These different compounds must react with each other to form different products forming first crystal. In normal cases these products should remove to intestinal system then out of the body. These cases make gallbladder work most of the time by eating enough lipids otherwise in abnormal cases which limiting cases over the world above products must binding each other forming first step or first crystal then other molecules aggregate on this crystal to form big stones. Size of these stones totally depends on the time that let above products to aggregate each other to form gallstones.

References

1. Al-Abrahamy A (2014) Gallbladder stones cause death for about 5% of Al-Maghreb people. Assabah Newspaper, Iraq.
2. Niels GV, Karel JE (2010) Pathogenesis of Gallstones. *Gastroenterol Clin N Am* 39: 171-183.
3. Wittenburg H (2010) Hereditary liver disease: Gallstones. *Best Pract Res Clin Gastroenterol* 24: 747-756.
4. William HA, Donald MS (1968) The physicochemical basis of cholesterol gallstone formation in man. *J Clin Invest* 47: 1043-1052.
5. Ujjal P (2010) Gallstone Disease in Children. *Indian Pediatr* 47: 945-953.
6. Al-Darraji AH, Abd-Al-Saheeb YS (2013) Field study about water purification processes and its effect on people's health and all environments in Iraq. *Journal of Missan Researches* 9: 45-49.
7. Al-Darraji AH (2013) Effecting of global water purification processes, humans activities and some facts on human's health and on different environments types of the world. *Scottish Journal of Arts, Social Sciences and Scientific Studies* 15: 23-25.
8. Harvey R, Ferrier D (2011) *Biochemistry*. 5th edn. Lippincott Williams, a Wolters Business. Pennsylvania, United States.
9. Fiona P, David W, McPherson K, Mann J (1985) Effect of vegetarianism on development of gall stones in women. *Br Med J* 291: 11-12.
10. Al-Darraji AH (2013) Diabetes, blood pressure and relating diseases; reasons and solutions. *European Journal of Scientific Research* 104: 53-78.