

The Concept of Cholelithiasis as Per Ayurvedic Text

Review Article

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Abstract

Cholelithiasis (gallstone formation) results from a combination of several factors, including super saturation of bile with cholesterol, accelerated nucleation of cholesterol monohydrate in bile, and bile stasis or delayed gallbladder emptying due to impaired gallbladder motility. In India it is more common in women in north, north-east and east as compared to other zones in the country. The disease Gall Stone has not been described directly in Ayurvedic classics. The word *Ashmari* in Ayurveda stands for stone which is described only in the context of *Bastigat Ashmari* (urinary calculi). After analyzing the Ayurvedic texts it was found that the bile secreted from gall bladder can be correlated with *Accha Pitta* mentioned in Ayurveda due to the similarity in location and function. The pathogenesis of the disease occurs due to the abnormal formation of *Kapha* during the process of digestion and its vitiation due to *Vata*. The present article deals with description of formation of gall stone from the Ayurvedic perspective. Along with this the specific remedy for gall stone according to Ayurveda is also described.

Keywords: Cholelithiasis, *Pttashmari*, *Bigol*, *Shashwat*

Introduction:

There are several diseases which arise in gall bladder and one among them is gall stones (cholelithiasis). The prevalence of gall stone disease is more common in the western society. In India it is more common in women in north, north-east and east as compared to other zones in the country. In children the gall bladder stone found in approximately 5%, between 30 – 69 years of age the prevalence is up to 10% in male and 19% in females and increase in 70 – 80 year old people to 30 – 40 %. (1)

There are two types of gallstones, among them approximately 80 percent of gallstones contain cholesterol and the remaining 20 percent are pigment stones, which consist mainly of calcium bilirubinate. Cholesterol-containing gallstones are divided into two subtypes: cholesterol stones (which contain 90- to 100-percent cholesterol) and mixed stones (which contain 50- to 90-percent cholesterol). (2)

Cholelithiasis (gallstone formation) results from a combination of several factors, including bile supersaturation with cholesterol, accelerated nucleation of cholesterol monohydrate in bile, and bile stasis or delayed gallbladder emptying due to impaired gallbladder motility. Cholesterol super saturation can result from an excessive concentration of cholesterol in bile, a deficiency of substances that keep cholesterol in solution (i.e., bile salts and

phospholipids), or a combination of these factors. The phenomenon of Accelerated nucleation of cholesterol is not well understood. Gallbladder hypomotility may occur during pregnancy, due to the use of oral contraceptives, after surgery or burns, and in patients with diabetes. However, in many cases, the cause is not clear.

The disease Gall Stone has not been described directly in Ayurvedic classics. The word *Ashmari* in Ayurveda stands for stone which is described only in the context of *Bastigat Ashmari* (urinary calculi). (3) Gall bladder stores *Pitta*, hence the organ gall bladder is considered as *Pittashaya* in Ayurveda and the stone formed in it can be considered as *Pttashmari*. Hence the present study was undertaken with the aim to describe the concept of cholelithiasis as per Ayurveda

Causes of gall stone formation (4):

- High caloric and high fat diet
- Obesity - normal bile acid pool and secretion but increased biliary secretion of cholesterol.
- Weight loss - prolonged fasting causes gall stone formation. Mobilization of tissue cholesterol leads to increased biliary cholesterol secretion while enterohepatic circulation of bile acids is decreased.
- Female sex hormones –
 - a. Estrogen stimulates hepatic lipoprotein receptors, increased uptake of dietary cholesterol and increased biliary cholesterol secretion.
 - b. Natural estrogens, other estrogens and oral contraceptives lead to decreased bile salt secretion and decreased conversion of cholesterol to cholesterol esters.
- Increasing age – increased biliary secretion of cholesterol, decreased size of bile acid pool, decreased secretion of bile salt.
- Gallbladder hypo motility leading to stasis and

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formation of sludge, which is due to

- a. Prolonged parenteral nutrition
 - b. Fasting
 - c. Pregnancy
 - d. Drug such as Otreotide
- Drug induced - Increased biliary secretion of cholesterol due to Clofibrate therapy.
 - Genetic factors - as per modern science genetic factors accounted for 25%.

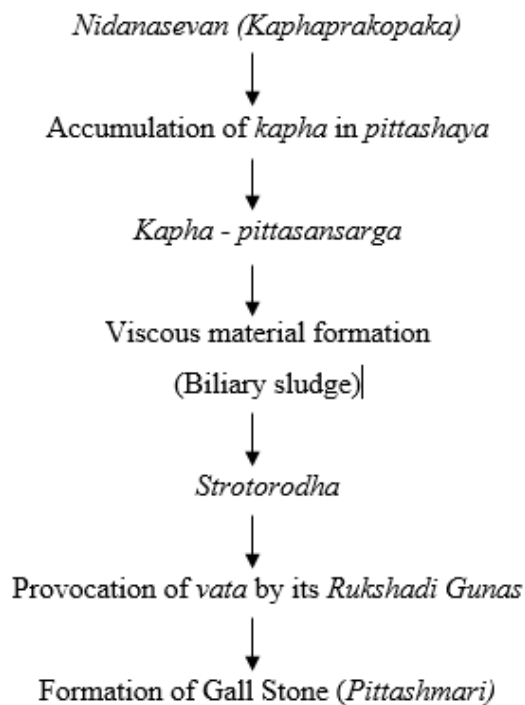
Signs and Symptoms of cholelithiasis:

- Dull aching pain in right hypochondriac region
- Heaviness in right hypochondriac region
- Ultrasonographically visualized gall stone

Probable Samprapti as per Ayurveda:

While considering the pathogenesis of gall stone on Ayurvedic parlance, it can be said that the *kaphaprakopaka Nidanasevan* (causative factors) leads to accumulation of *Kapha* at first, which produces the symptoms like *Alasya* (lethargy), *Gaurav* (heaviness), *Mandoshmata* (decreased digestive fire). In *Pittashaya* (gall bladder) quantitatively accumulated *Kapha* mixes with the *Pitta* already present in it. The mixture of *Kapha* and *Pitta* in *Pittashaya* leads to the formation of viscous material (biliary sludge) causing obstruction in the passage of *Vayu*. Hence the *Vayu* gets vitiated by its *Rukshadi gunas* and converts the viscous material into dry and solid form (*Vartaswarupa*) called as *Pittashmari* (gall stone).

Table no. 1 – Probable Samprapti of Pittashmari



Accha Pitta vis-à-vis bile:

The *Accha Pitta* generated in the second stage of digestion bears striking similarity with bile which is stored in gall bladder. Hence the gall bladder can be named as '*Pittashaya*'. (5) Daily basal secretion of

hepatic bile is around 500 – 600 ml (6) which promotes digestion and absorption of dietary fat, eliminate certain catabolites (including bilirubin), emulsify the fat soluble vitamins to enable their absorption, acts as bacteriocides destroying many of the microbes that may be present in the food. According to Ayurveda, all these functions are similar to *Pachan Karma* of *Accha Pitta*. Moreover, the two enzymes produced from bile viz. stercobilin and urobilin gives the normal colour to the faeces and urine respectively. This function is nothing but the *Ranjan Karma* of *Pitta* i.e. to give the *Prakrit Varna* to *Purisha* and *Mutra*. (7) *Acharya Sushruta* has mentioned '*Pitavabhasata*' as one of the symptom of *Pittasanchaya* (accumulation of *Pitta*). (8) *Pitavabhasata* indicates the yellowish appearance of the body which according to modern science is due to the increased secretion of bile. Hence the *Achha Pitta* can be considered as bile on the basis of similarity in location, functions and abnormality. This *Achha Pitta* is generated from liver and stored in gall bladder; hence the gall bladder is considered as *Pittashaya*.

Mechanism of gall stone formation

According to modern science there are 3 stages of gall stone formation which can be explained from Ayurvedic point of view as below

Bile Super Saturation with cholesterol (*Vikrita Kaphasanchiti*)

The most important factor in gall stone formation is increased biliary secretion of cholesterol. This may occur in association with

- Obesity
- High caloric and cholesterol rich diets
- Increased hepatic uptake of cholesterol from blood (9)

Kayagni is mainly concerned with chemical processes involved in gastrointestinal digestion. Generally digestion of food materials in the *Amashaya* and *Pachyamanashaya* corresponds to the gastric and intestinal digestion. Special digestion relates to humoral or hormonal mechanism located in duodenal mucosae which are responsible for exciting the secretion of the digestive juices – gastric, pancreatic and hepatic – necessary for insuring intestinal digestion. This correlation will become further amplified by taking into consideration few more observations made by Charaka. He has made a pointed reference of digestion process as *Awasthapaka*. (10) According to *Awasthapak*, in the first stage of digestion the food becomes *Madhura* which causes the stimulation and formation of *Kapha*. If a person having hypofunction of *Kayagni* consumes more *Kaphaprakopak Ahara* then ultimately the *Kapha* production in the first stage will be more. The *Kapha* having more quantity and abnormal consistency here can be considered as *Aam Kapha* (abnormal *Kapha*). This *Aam Kapha* then mixes with the *Ahararasa* and circulates throughout the body with the help of *Vyana Vayu*. (11) Such *Ahararasa* produces impediment (*sanga*) in the *Srotasas* due to the presence of *Aam Kapha* in it, leading to ailment. If there is *Khavaigunya* in *Pittashaya* then this *Aam kapha* gets stuck (*chaya*) in

it. By virtue of this the nourishment to subsequent *Dhatu* is ceased. Acharya Sushruta has mentioned 'Mandoshmata' as one of the symptom of *Kaphasanchaya* (amassing of *Kapha*). (12) *Mandoshmata* indicates the reduced digestive function at both levels i.e. *Jatharagni* and *Dhatwagni*. So, it might indicate the impaired fat metabolism in the biliary system due to which there is saturation of cholesterol.

Nucleation of cholesterol monohydrate with subsequent crystal retention and stone growth (*Kapha-pitta sansarga*).

While super saturation of bile with cholesterol is an important prerequisite for gall stone formation, it is generally not sufficient by itself to produce cholesterol precipitation in vivo. Most people with super saturated bile do not develop stones because the time required for cholesterol crystals to nucleate and grow is longer than the time bile spends in the gall bladder. (13)

As per *kalasamprapti* (14) mentioned in Ayurvedic texts, a prolonged and abnormal second stage of digestion (*Dwitiya Avasthapaka*) accelerate the nucleation of cholesterol monohydrate crystal due to which bile spends more time in gall bladder allowing the *Aam Kapha* to concentrate, supersaturate and nucleate leading to the cholesterol crystal formation.

In human lithogenic Bile, the nucleation of cholesterol monohydrate crystals is greatly accelerated. This acceleration of cholesterol monohydrate in bile may be due to deficiency of anti-nucleating factors.

As mentioned earlier, as there is a formation of *Aam kapha* in the first stage of digestion, subsequently the second stage is also affected in which the *pitta* produced is unable to perform its normal functions as it comes direct in contact with *Aam kapha*. This phenomenon is somewhat similar to the deficiency of anti-nucleating factors and accelerated nucleation of cholesterol monohydrate crystal.

Abnormal gall bladder motor function with delayed emptying and stasis (*Margavarodhajanya Vataprakopa*)

A third important mechanism in cholesterol gall stone formation is gall bladder hypo motility. The stone will not be able to grow, if the gall bladder empties all super saturated or crystal containing bile. A high percentage of patients with gall stones exhibit abnormalities of gall bladder emptying. It correlates with *Vataprakopa*.

At the end of second mechanism *Pittasansargita Kapha* which is in abnormal consistency is similar to biliary sludge. This sludge becomes obstacle in the passage of *vayu* leads it's provocation. When *Vayu* gets vitiated and provoked, it produces the symptoms like *Sransa*, *Vyasa*, *Vyadha*, *Sanga* etc. (15) In the present context of gall stone the term *Sransa* can be taken as functional lethargy of gall bladder whereas *Vyasa* can be considered as dilatation of gall bladder leading to increased gall bladder volume. *Vyadha* and *Sanga* can be correlated with pain and obstruction causing improper emptying of gall bladder respectively. All these lead to increase in the residual volume.

As pathogenesis goes on, because of increased residual volume, *Vayu* gets provoked due to the

obstruction in its passage. Hence the *Ruksha*, *Khara*, *Vishad* and *Laghu Gunas* of vitiated *Vayu* convert the sludge into *Varta swarup* (dry form) called as gall stone.

Conclusion:

The *Accha Pitta* can be considered as bile on the basis of similarity in location, function and abnormality. This *Accha Pitta* is generated from liver and stored in gall bladder, hence the gall bladder is considered as *Pittashaya*. The most important factor in gall stone formation is bile super saturation with cholesterol which can be correlated with *Vikrit Kaphasanchiti* in *Pittashaya* as per Ayurveda. The phenomenon of deficiency of anti-nucleating factors and accelerated nucleation of cholesterol monohydrate crystal is somewhat similar to *Kapha-pitta Samsarga*. The third mechanism i.e. gall bladder hypo motility can be correlated with *Margavarodhajanya Vataprakopa*.

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