Chapter 5

Discussion
The doctrine of bodily humors was first set forth by Hippocrates in modern medicine. In developing the idea he borrowed from the philosophy of Empedocles, who held that the universe was made up of four basic elements; earth, air, fire and water. When these were combined in one way or another, all known substances could be explained corresponding to the four elements were the four qualities. Warm and moist (earth), cold and dry (air), warm and dry (fire) and cold moist (water). When applied to the human body they assumed the form of the four humors; blood, black bile, yellow bile and phlegm. These humors for Hippocrates constituted the body and could cause both disease and health, depending on their balance, excess, or deficiency.

All aspect of medical care, under its all forms, costs about obviously disease is still a heavy economic burden. Its importance in modern life is incalculable.

Medicine is far from having decreased human sufferings as much as it endeavors to make us believe. Indeed, the number of deaths from infectious diseases has greatly diminished. But we still must die, and we die in a much larger proportion from degenerative diseases. The years of life which we have gained by the suppression of diphtheria, smallpox, typhoid fever e.t.c. are paid for by the long sufferings and the lingering deaths caused by chronic affections, an especially by cancer, diabetes and heart disease. In addition, man is liable as he was in former times to chronic nephritis brain tumours, arteriosclerosis, syphilis, cerebral hemorrhages, and hypertension and also to the intellectual, moral and physiological decay determined by the maladies.

The lack of equilibrium and the neurosis of the visceral nervous system bring about much affection of the stomach and the intestines.

Another glorious chapter in the history of preventive medicine is the discovery of synthetic insecticides such as DDT, HCH, Malathion and others. They have brought about fundamental changes in the strategy in the control of vector borne diseases (e.g., malaria, leishmaniasis, plague, rickettsial diseases) which have been among the most important worldwide health problems for many years. Despite insecticide
resistance and environmental pollution mishaps (e.g., Bhopal tragedy in India in 1984, some of the chemical insecticides such as DDT still remain unchallenged in the control of disease.

Despite spectacular biomedical advances and massive expenditures, death rate in the developed countries have remained unchanged and also life expectancy. Today, a great skepticism surrounds medical care. Like so many other institutions in contemporary society medicine has come under heavy fire. Medicine, as practiced today, has begun to be questioned and criticized. Some critics have even described modern medicine as a threat to health.

The subject of modern medicine is an ever-changing science and growing at an impercidented pace. Remarkable contribution has been made at present time both in understanding as well as in developing the science of Ayurveda, the backbone of rational therapeutics.

One of the important aims of the present research programme is to find an active drug on Pittakosagata ashmari, a disease which is considered to be common in female around 40 years of age. Pittakosa is anatomically important organ & the site for the disease of pittakosagata ashmari.

Details description of Pittakosa not available in Ayurvedic texts. Description of the disease pittaosagata ashmari is not also available. Medical management has been given more importance in Ayurveda according to special dosic involvement and surgical management is indicated when medical management fails.

According to modern medicine etiology & actual mechanism of the disease is very clear. Some factors are known to help the stone formation but stones are not always formed even when such factors are present. As such these factors are multiple, complex and interrelated, not really single, direct or simple. Bile is highly complex solution of salts & organic matters remain in non precipitation but due to some special condition the precipitation occurs or sedimentation are found. Protective colloids, crystalloids concentrated, nidus (may be a plaque, desquamated epithelium, bacteria etc.) are responsible factors for formation of the stone. Anatomical, physiological & metabolic disorders even infection are responsible for the disease.

Various factors age diet habit, living condition etc are responsible.Preventive role of any drugs, diet and regimen included biochemical procedure.
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Unfortunately even today no effective treatment other than surgical manipulation is available. There are the scopes for Ayurvedic scholars to have a clue for correction of metabolic errors, dissolution of stones or prevention of stone formation & recurrences. No configuration is still made clinically experimentally.

Keeping all these facts an effort has been made & find out the drug for effective management of Pittakosagata ashamari.

Allopathic medicine which have been defined as treatment of disease by the use of a drug which produces a reaction that itself neutralizes the disease\textsuperscript{171}.

Environmental Ethics and Resource use

Resource consumption by developed countries is far more than required for good reasonable living. They also degrade the global environment quite seriously. People in developing countries, though requiring small resources are also destroying their resources recklessly due to exploding population and imitating the western countries in quickly upgrading their living standards through increased consumerism. There is, therefore, a need for environment ethics. The moral basis of human responsibility towards environment is called environmental ethics. It is rooted in our civilization. \textit{Atharva-Veda} recognizes permanent enduring relations of humans to mother earth. Hindus worship earth in all their ceremonies. \textit{Isha-Upaished}\textsuperscript{172} says that Whole universe along with its creatures belong to the lord. No one species encroach over the rights and privileges of the other species. One enjoys nature only by giving up greed. All organisms including humans are integral part of nature. They are formd of five matters- soil (Khsiti), water (jal), Energy (Pawan), air (Samira) and space (Gagan). After death they are returned to earth. Old scriptures stress that resources should be used judiciously and not wasted. \textit{Kautilya’s Arthashastra} differentiates forest for different functions- elephant domestication, hunting, timber and commerce reserve. It is due to wisdom of the ancients that despite having agriculture and rearing herds of cattle for the past about 10,000 years, our resource depletion has not been as in other countries. \textit{Ahimsa puromo dharma}, compassion for other living beings as well as nonliving being, considering greed to be sin and other tenets of our civilization recognize our responsibility to conserve earth’s resources for future generations.
Pollution of Panchamahabhut

According to Ayurveda the whole universe is panchabhutik. It means everything of the universe is created and developed from five basic elements i.e. khiti, apa, tej marut, akash. So human body is also made up of panchamahabhut. This is also developed and maintained by panchabhutic diets. e.t.c. any disturbance in the panchmahabhutic components of this world will bring undesirable effects in the human body. Tridosha are responsible for health and disease. The Tridosha theory of Ayurveda is nothing but the biological application of Panchamahabhuta. Therefore gradual increase pollution of the panchamahabhuta will give birth of new diseases in the human body. Pittakosagata ashmari is one of such diseases. Its origin has been not traced before 16th century. It may also be predicted that Prevalence of this pathological condition will be increased day by day in parallel with the advancement of civilization due to the increase pollution of the panchamahabhuta as follows: khiti, apa, teja, marut, akash.

Abstract Samples of kidney stones and gallstones obtained from patients who were workers at a steel plant, or residents of the steel plant township area and those unrelated to the steel plant and steel plant township area were analysed for the presence of toxic metals (Zn, Cr, Ni, Co, Cu, Pb, Hg, Cd and Mn) by atomic absorption spectrophotometry. Other constituents (moisture, organic matter, oxalate, phosphate, fluoride and calcium) were also determined in each sample. In most of the samples the highest occurrence of toxic metals was found in the samples obtained from workers of the steel plant who were also residents of the steel plant township area. In samples obtained from patients who were non-workers of the plant but residents of the steel plant township area, the concentrations of the toxic metals were smaller, but higher than in those cases that were unrelated to the steel plant environment.

Khiti pollution: Pollution means contamination. It is due to the presence of undesirable or toxic materials in the environment. It is evident that so many diseases
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have been produced due to the industrial civilization. That is why Rabindra Nath Tagore one of the greatest poets of this world asked “before the civilization to take him back to the primitive life with drawing all these development of this human society named a civilization”

Human beings have altered 55% of earth’s surface and considerably changed 20% of total land through (i) Reclamation of culturable wasteland. (ii) Digging canals, ponds, lakes, dams, etc. (iii) Quarrying. (iv) Building of roads and railway lines through mountains, pastures, forests, etc. (v) Clearing of forests and grasslands for human settlements and croplands. (vi) Disposal of sewage and industrial effluents spoil quality of water and soil. (vi) Excessive pumping of ground water, use of fertilizers and pesticides has caused aridity, acidification, salination and desertification. (viii) Over-exploitation of forests has resulted in deforestation that is accompanied by excessive soil erosion, floods, change in rainfall and climate. (ix) Excessive use of fossil fuels has given rise to acid rain (Destructive to vegetation and buildings) and global warming.

Progress of this civilization raises the burning question—whether this civilization is a blessing or curse?

The food which grow in this polluted soil the food substances do not contain the same nutritive ingredients as before. Huge production by modern scientific methods changed the components of our food substances though they retained their external appearances. The fertilizers which have been frequently used to-day for mass production of the food substance definitely bring alter the food value of those articles, besides the pesticides which have been sprayed on the field are absorbed to some extent into the cereals, grains and vegetables. These toxic substances gradually derange our Vyadhikshamatwa (Immunity) of our body. Similarly mass production of meat, milk, egg, fish e.t.c., has been modified. Their composition retaining their apparent appearance. They have, thus contributed to the weakening of our body & mind causing different type of maladies.

Research proved that women who eat more plant protein may be less likely to develop gallstones that require surgical removal of the gallbladder\textsuperscript{173}. Rich sources of plant-
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retaining their apparent appearance. They have, thus contributed to the weakening of our body & mind causing different type of maladies.

Research proved that women who eat more plant protein may be less likely to develop gallstones that require surgical removal of the gallbladder. Rich sources of plant-derived protein include legumes (such as soybeans, peanuts, black beans, and peas), buckwheat, nuts, and seeds but we do not maintain the *sastika ahar* habit which mentioned in *Gita*. We take more animal protein than plant protein now a day. App pollution: pollution of water is the presence of some foreign organic, inorganic, biological, radiological or physical substances in water. Pollutants contaminate water by degrading its quality which may cause health hazard or decrease the utility of water. Sewage: a main source of pollution is raw or partially treated sewage discharged into rivers, lakes and streams. The main factor of water pollution is industrial wastes like printing, electroplating, soap manufacture, rubber, plastics, etc. now-a day massive use of fertilizers and pesticides in the corn fields cause water pollution. This pollutant produces crippling and often fatal diseases. Tej pollution: various industries require water for cooling. Thermal pollution is the discharge of hot water into rivers and estuaries from power plants. This type of pollution raises the temperature of water, thereby increasing the metabolic rate and oxygen consumption of micro-organisms. Marut pollution: Air pollution is also known as atmospheric pollution. Release of any foreign materials or gases which are harmful to man, animals, vegetation or building into atmosphere. The most dangerous and common problem for those living in big congested, industrialized cities with heavy vehicular traffic is air pollution. Automobiles exhausts include the compounds like carbon monoxide, nitrogen oxides and unburnt hydrocarbons. The greenhouse effects are also a harmful condition of human health. the chief source of greenhouse by burning of fossil fuels like coal, petroleum and natural gas and it is related to “Global warming” the ill effect of the noxious agent are impaired homoeostasis of the human body inducing new diseases like gallstone.
It is noteworthy that abdominal pain is among the most common reasons for visits to emergency departments and a new study suggests air pollution could play a role, especially among young women. The study builds upon previous research linking air pollution to adverse health effects. "The study adds to the body of evidence that air pollution exposure negatively affects health," Akash pollution: Most of ozone reside in the atmosphere 10 to 50 kms above earth. Ozone absorbs most of the ultraviolet radiation. So it shields earth against biologically harmful solar radiation. The ozone layer in the upper atmosphere is destroyed by Chlorofluorocarbons, methane and NO₂. UV radiation is non-ionizing type is lethal due to inactivation of proteins, pigments and nucleic acids. The ultimate environmental hazard to mankind is "Nuclear winter"

Mental Stress: The lack of equilibrium and the neurosis of the visceral nervous system bring about various affection of gall bladder and liver diseases etc.

Moral Decay: the day by day increasing suicide, homicide, other acts of violence and other crime, juvenile delinquency, alcohol and drug abuse, smoking, consumption of tranquilizers, to these may be added family violence, battered baby and battered- wife all are the stage of moral decay. For prevention Ayurveda laid great stress on sadvritta, achar rasayana, practice of yoga, e.t.c. Lack of aforesaid procedure are increasing the prevalence of gallstone.

Insufficient physical exercise and/or overwork develop many diseases. Although modern sciences have made human existence safer, longer and more pleasant, but disease and decay have not been mastered. They have simply changed their (Nature) manifestations.

In advancement of civilization many diseases are controlled specially infectious diseases. Emergency management of acute diseases is also developed with the advancement of medical technology. But our unhappiness is not removed. Yet we shall travel as a tourist in the Space, Moon within short period. Some diseases with their increased prevalence are the threat to the medical researchers. The cholelithiasis is one of them whose prevalence is increased and now 11% of the population is affected though it is varies country wise. Western countries are more
vulnerable to this disease, though the incidence is gradually increasing in Asian countries specially in India. **Pima Indians in southern Arizona are an example of an extremely high-risk population in which 70% of the women have gallstones after the age of 25 years**\(^{174}\).

Cholesterol stones predominate in North and South America, Northern Europe. Pigments stones tend to occur in Orientals. The prevalence of gallstones rose significantly in a century from mean 1-2% to 11.3%; \(P<0.001\)\(^{175}\).

**PITTAKOSA GATA ASHMARI** (cholelithiasis) has not been described in any ancient literature. It indicates that the disease was not prevalent in that period. Perhaps due to the environmental purity, fresh food, food habit, lifestyle, healthy mind etc. prevented this disease in the past. On the other hand presence of gallstone in the Mummy of Royal members, Egyptian family indicates that they had been suffering from this disease perhaps due to the diet habit of elite family and the then environment etc. of Egypt.

Before clinical study findings of USG, lipid profile, liver function test, serum urea and creatinine of the patients were recorded. After completion 3 & 9 months of treatment again all the investigations were recorded to observe the effects of the drugs.

Gallstones are the most expensive biliary pathology than other gastrointestinal problems. The present study showed that highest incidence of this disease was observed between the age group of 31-40 years (26.67%), other higher incidence in the age group of 41-50 years (22.22%). Other age groups between the 51-60 years (20%). 15.56% were observed between the age group of 21-30 years. Age groups of 61-70 and 10-20 years were 13.33% and 2.22% respectively (Table-5).

In this study maximum patients were between 31-40 years of age due to the increased biliary cholesterol secretion causing cholesterol super saturation in the bile.

In this series maximum patients (77.78%) (Table-6) were female subjects and the ratio of the male and female subjects were 2:7. This is due to some factors
related to hormones, pregnancy and proneness to obesity. It is well documented that estrogen increases cholesterol secretion in the bile and progesterone inhibits gallbladder contraction, which result super saturation of cholesterol, the main cause of gallstone formation.

Maximum patients belong to Hindu community (91.12%). This finding does not prove that the Hindu community is likely to develop gallstones than Muslim community. Because patient enlisted in this present work were mostly from Hindus community (Table- 7). The other community was not enlisted as they did not attend our hospital.

The study reveals that housewives (66.67%) were more prone to develop gallstones than the other occupations. Overall occupations were included in this study were business(female) 8.88%, service(female) 2.23% agriculture (male) is 10%, business (male) 6.66%, service (male) 5.56% (Table- 8).

Higher incidence in housewives is due to the factors related to sex & as well as irregular diet habit mainly.

This study revealed that 72.22% patients belonged to the moderately working group. 18.89% and 8.89% patients belong to hard working group and sedentary habit group respectively. Here maximum patients were from moderately working group cause of which is not clear. (Table- 9).

Concept of PRAKRITI (constitution) is very important in Ayurveda. Consideration of DOSA- PRAKRITI (somato-constitutional) in this series showed that 57.78%, 26.67% & 15.57% patients were Kaphapitta, Kaphavata & Vatapitta Prakriti respectively. Hence this study proves that Kapha predominant Prakriti is prone to develop gallstone. (Table- 10).

Though gallstones disease is not mentioned in classical Ayurvedic text but its formation has been revealed by the fundamental concept of Ayurveda. According to Auyrveda Kapha is the predominant factor for formation of Ashmari. In this work an attempt had been made to explore the possibilities of an ideal treatment depending on Ayurvedic views as well as drugs. Two drugs were selected
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here viz. Katuki *(Picrorhiza kurroa Royle-ex-Benth)* and Talishpatra *(Abies webbiana. Lindl)* for this study having no reference in classical *Samhitas* for its action on cholelithiasis (gallstone). Drugs like Katuki *(Picrorhiza kurroa Royle-ex-Benth)* were selected not only for its *kaphanasak* (*kapha* pacifier) & *kaphanihsaraka* (expectorant) action but also for *yakriduttejaka* (hepatostimulant), *pittasamak* (*pachifer of pitta*), *rakta sodhak* (blood purifier) and *lekhana* (attenuating).

30 Patients of group A were treated with Katuki *(Picrorhiza kurroa Royle-ex-Benth)*. The powder of dried rhizome of katuki was given in the dose of 3 gms. twice daily for a period of 9 months. 26 patients of group B treated with Talishpatra *(Abies webbiana. Lindl)*. The powder of dried leafs talishpatra was given in the dose of 3 gms. twice daily for a period of 9 months. 34 patients of group C treated with both the drugs at separate dose 3 gms. twice daily for the period of 9 months. The effect of treatment was observed on subjective features and few objectives features. Importance given for the dissolved the stone. Though the stones were not dissolving but other features were improved after treatment.

The clinical features of all the patients were recorded before and after treatment. All the clinical features were given a shape of grade for statistical analysis. Severe, moderate, mild and absent of symptoms are graded as 4, 3, 2 and 1 respectively.

The study showed that the clinical features like biliary colic were present in maximum patients (78.88%) as a common problem. Other features were nausea (73.33%), vomiting (60%), abdominal distension (60%), belching (62.22%), Murphy’s sign (71.11%) and Boas’s sign (64.44%)

Biliary colic was significantly decreased in Group A (P<0.001) treated with Katuki and Group C (P<0.001) treated with Katuki and Talishpatra in combination but Group B showed less significant (Table-12).

All other clinical features i.e. nausea (P<0.001), vomiting (P<0.001), feeling of distension (P<0.001), postprandial belching (P<0.01), positive Murphy’s
signs (P<0.001), Boas’s sign (P<0.001) were also significantly decreased in Group A and Group C. (Table 13-18).

Thus present study proves that Katuki (Picrorhiza kurroa Royle-ex-Benth) has a significant action on relief of clinical feature in the patients of gallstone. Generally the acute features of gallstone like biliary colic, nausea, vomiting etc. are due to development of acute cholecystitis. Katuki being anti inflammatory, hepatoprotective, antispasmodic, antiviral, antibacterial, cholangi and antioxidant acts nicely on the pathological condition of gallbladder

A significant difference (P<0.01) on serum bilirubin was found before and after treatment of group A and group C (Table 19).

Serum S.G.O.T. level significantly reduced (P<0.01) in Group A and Group C (Table 20). Before and after treatment of serum S.G.P.T. level also significantly decrease (P<0.01) in Group A and Group C (Table 21). Serum alkaline phosphatase was significantly decreased (P<0.01) by Katuki (Picrorhiza kurroa Royle-ex-Benth) in Group A and Group C (Table 22). Total protein was also increased (P<0.05) by Katuki in Group A and Group C (Table 23). Serum albumin level was also elevated (P<0.05) in Group A and Group C (Table 24).

So Katuki (Picrorhiza kurroa Royle-ex-Benth) has definite therapeutic value for reduction of serum bilirubin, serum alkaline phosphatase, SGPT, SGOT, and increased serum total protein, serum albumin of L.F.T. as it is tikta rasa; sita virya; pacifier of pitta; yakridutteja, pittanasaka and raktashodhak, so obviously reduced all abnormal conditions of blood and bile.

A significant difference (P<0.01) of serum cholesterol before and after treatment was observed in Group A and Group C (Table 27). Action on serum triglyceride also showed significant change in Group A and Group C (P<0.01, Table 26). Serum L.D.L. cholesterol level was significantly reduced (P<0.01) in Group A and Group C (Table 28). A significant elevation (P<0.01) of serum H.D.L. cholesterol before and after treatment in Group A and Group C (Table 29)
was observed. Serum V.L.D.L. cholesterol level also significantly decreased in Group A and Group C (P<0.01) (Table 30).


In respect to liver function test, lipid profile *Talishpatra (Abies webbiana, Lindl)* is not significant even after treatment of 9 months but it improved acute cholecystitis for it anti-inflammatory action. It does not show significant action for breaking calculus, though it was selected by considering its pharmacodynamics in ancient literatures.

In respect of all the biochemical parameter it was found that *Katuki (Picrorhiza kurroa Royle-ex-Benth)* alone was more effective than *Talishpatra (Abies webbiana, Lindl)*. But administration of both drugs also showed similar effect like Katuki.

Repeated estimation of blood urea and creatinine did not show and alteration during the administration of the drugs which proves no nephro toxicity of the drugs.

These drugs may prevent obstruction of biliary channels by maintaining the physiological function of the bile.

Though before adolescences gallstone are uncommon but Biliary pathology in congenital conditions like biliary atresia may predispose the disease.

In this study we don’t observe clinically any adverse effect of drugs in the patients.