

Steatohepatitis in Ayurveda

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ABSTRACT

Steatohepatitis is a disorder in which accumulation of excess fat occurs in the liver. It is a metabolic liver disease which can be alcoholic or non-alcoholic in nature. Considering the basic concepts of Ayurveda, it may be related to Dhatwagni vikara which may arise from santarpanotha or apatarpanotha nidana. The concept of Steatohepatitis may be related to raktavahasrotomoola medavridhhi, pittasthane kaphameda vridhhi, pittasthane dhatwagni dushti, pitta stane medasanchaya. The non-alcoholic causes include synthetic estrogens, amiodarone, patients on parenteral nutrition and in industrial workers exposed to volatile petrochemical products. The various stages of steatohepatitis include Simple steatosis, Steatohepatitis (inflammation), Advanced Fibrosis (hardening), Matrix deposition (Sanga), Matrix removal from its place (Ashayapakarsha), Cirrhosis (Shrinking) and Primary Liver Carcinoma. Usually the early stages of Steatohepatitis are asymptomatic and maybe diagnosed accidentally when checked for some other issues. All the dravyas having the property of ushna, kaphamedohara properties and which are antioxidant in nature may help in the condition of Steatohepatitis. The diagnosis of Steatohepatitis if done in an earlier stage can be treated in an efficient way by the plentiful of medicines in Ayurveda.

KEYWORDS: Steatohepatitis, NASH, Dhatwagni vikara, Snehapana

INTRODUCTION

Steatohepatitis is a metabolic liver disorder in which accumulation of excess fat occurs in the liver. It refers to a specific form of hepatic injury characterized by steatosis, hepatocellular ballooning, Mallory body formation, inflammation and pericellular fibrosis, sometimes progressing to Cirrhosis¹. Considering the basic concepts of Ayurveda, it may be related to Dhatwagni vikara which may arise from santarpanotha or apatarpanotha nidana. The Steatohepatitis may result from the alcoholic causes or non-alcoholic causes. The non-alcoholic causes include synthetic estrogens, amiodarone, patients on parenteral nutrition and in industrial workers exposed to volatile petrochemical products². The Causes of Non-Alcoholic Steatohepatitis clearly resembles the Kaphaja Udara Hetu. The pathology also gives hint regarding the nutritional disorders involving carbohydrates, fat, proteins.

Common Causes of Steatohepatitis³

➤ Alcoholic Liver disease

- Hepatitis C
- Inborn errors of metabolism
- Industrial exposure to petrochemicals
- IBD
- Lipodystrophy
- Bacterial overgrowth
- Starvation
- TPN
- Surgical procedures (bypass small bowel resection)
- Rye's Syndrome
- Fatty liver of Pregnancy
- HELLP syndrome
- Drugs causing Steatosis- Cytotoxic and Cystostatic drugs- L asparaginase, bleomycin, azacytidine, tetracyclines and puromycin, Metals-Sb, Barium salts, chromates, Thallium and uranium compounds, Amiodarone, estrogen, glucocorticoids, ethyl bromide, Hydralazine, orotate, safrole

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Avasthabheda of Steatohepatitis:

1. Simple steatosis
2. Steato-hepatitis (inflammation)
3. Advanced Fibrosis (hardening)
 - A. Matrix deposition (Sanga)
 - B. Matrix removal from its place (Ashayapakarsha)
4. Cirrhosis (Shrinking)
5. Primary Liver Carcinoma (1%)

Concept of Dhatupaka in Steatohepatitis: Hepatic Stellate Cells gets activated in response to any infection or pathology. Necro-inflammation of hepatic cells in fibrosis. In Dhatupaka, a particular dhatu will undergo degeneration. In the present context, Normal hepatic cells are not formed or hepatic stellate cells are activated.

Pathophysiology⁴ of Steatohepatitis:

- Increased delivery of fatty acids to liver
 - Vyana vata karma
 - Fat from meda sthana to liver (Ashayapakarsha)
- Obesity and Starvation
 - Steatohepatitis may occur as an upadrava of obesity
 - Due to langhana, there will be heavy work load to liver. Fatty acids converted to glucose on starvation by liver.
- Increased synthesis of fatty acids in liver (Dhatwagni vriddi) – excess carbohydrate.
- Increased mitochondrial beta-oxidation of fatty acids
 - Creatinine deficiency (mamsa dhatwagni dushti)
 - Mitochondrial dysfunction (dhatwagni mandya)
- Decreased incorporation of triglycerides into functional VLDL (hina paka or avarapaka). For its compensation liver will make more fatty acids
- Impaired lipoprotein synthesis (impaired medodhatwagni)
- Impaired cholesterol esterification (function of jataragni/bile juice)
 - choline deficiency (vata)
 - Protein malnutrition (kapha)
- Insulin Resistance (dhatwagni vyapara blocked by avarana)
 - Increased lipolysis – medadhatwagnipaka

Clinical Features and Diagnosis:

Usually the early stages of Steatohepatitis are asymptomatic and maybe diagnosed accidentally when checked for some other issues. The uncommon symptoms include vague abdominal pain, fatigue, malaise and the uncommon signs include spider angioma, palmar erythema and ascites. The laboratory findings may include 2 to 4 folds elevation of serum

ALT and AST, elevated serum ferritin and in some cases, serum alkaline phosphatase also. The diagnosis maybe done incidentally as more than half of the patients are asymptomatic. One third of the patients have normal physical examination and hence requires the evidence of Hepatic steatosis by imaging or histology⁵. The other investigations for steatohepatitis include

- Transient Elastography (Fibroscan) measures -Liver Stiffness (Vata /vata-kapha/ sama)
- LFT
- Plasma Insulin
- Lipid Profile
- USG Abdomen
- Persistent Cryptogenic elevation of ALT and Glutamyl transferase
- Keratins 8 and 18 are epithelial cytoskeletal proteins released into blood by hepatocytes

Classification of Steatohepatitis:

1. i) Macrovesicular
ii) Microvesicular
2. i) alcoholic
ii) non-alcoholic
3. i) Diabetic
ii) Non-diabetic
4. i) Obesity
ii) Starvation

Treatment of Steatohepatitis:

The management goal includes primarily the avoidance of causative factors like Alcohol. Further the co-morbidities of Non-Alcoholic Fatty Liver Disease like Insulin Resistance, Diabetes, Dyslipidemia has to be treated.

Lifestyle modifications: including daily physical activities, dietary recommendations purely individualized aimed to achieve energy deficit of 500-1000 kcal/day depending on the patient's BMI. Proper food in the required quantity at the right time serves a lot for this purpose.

Pharmacological Agents: No agents are FDA approved for treatment because steatohepatitis is strongly associated with metabolic syndrome and Type 2 Diabetes Mellitus. Trials of Metformin and Pioglitazones have been evaluated in which Metformin does not improve liver histology while the other one reduces AST/ALT and some histological features also. Vitamin E administration is favorable as the oxidative stress is considered to be a key mechanism of hepatocellular injury and disease

progression in subjects with Non-Alcoholic Steatohepatitis. Vit-E 800IU/day decreases aminotransferases in subjects with Non-Alcoholic Steatohepatitis, and improvement in steatosis, inflammation, ballooning and resolution of steatohepatitis in adults with NASH, but does not have any effect on hepatic Fibrosis.

Ursodeoxycholic acid (UDCA): To improve Amino-transferases and Steatosis in patients with NASH

Betaine: Metabolite of Choline, decreases cellular oxidant damage and raise SAM level, but no histological benefit.

The probable treatment for Steatohepatitis in Ayurveda includes:

“ushnam kaphamedoharam vyasaharam rasayanam”

All the dravyas having the property of ushna, kaphamedohara properties and which are antioxidant in nature may help in the condition of Steatohepatitis. Drugs like Pippali vardhamana rasayana, Bhallataka (samprapthi vighatanameva chikitsa), Pramehahara dravyas, Kumaryasava, Pippalyasava, Ajamamsa rasayana, Rohitakarisham, Maricha, Navayasa loha, Varunadi ghritam, Patoladi kashayam etc may be used. The treatment protocol maybe designed as:

- Dipana-pachana-rukshana
- Snehapana
- Vamana
- Virechana
- Basti
- Rasayana prayoga

Discussion:

The concept of Steatohepatitis may be related to raktavahasrotomoola medavridhhi, pittasthane kaphameda vridhhi, pittasthane dhatwagni dushti, pitta stane medasanchaya. The Snehapana is a topic of interest in case of Steatohepatitis owing to the fatty composition. The proposed hypothesis was- when a bolus of sneha given to a patient of steatohepatitis, the intracellular fat will come to extracellular fat, by which the koshtagamana of fat occurs. The polyunsaturated fatty acids form the liquid portion of

every cell's phospholipid membranes which sensitizes the insulin. There will be disruption in the insulin sensitivity if the PUFA is decreased in the cells. The high amount of insulin thus formed in the body stimulate the adipose tissue to produce adipokins, resistin etc leading to Insulin Resistance. The Adipose tissue also stimulate the formation of free fatty acids which are the lipid species. The flux of free fatty acids thus formed in obesity may inhibit the esterification of exogenous cholesterol leading to the decrease in HDL. When it reaches the Liver via portal circulation, it increases the hepatic free fatty acid esterification leading to the increase in LDL and triglycerides. Snehapana when given with samskaritha ghrita having unsaturated fatty acids maintain the PUFA in the cell phospholipid membrane by which the flux of free fatty acids from the adipose tissue can be controlled resulting in the reduction of endogenous cholesterol esterification and accelerating the exogenous cholesterol esterification.

Conclusion:

The diagnosis of Steatohepatitis if done in an earlier stage can be treated in an efficient way by the plentiful of medicines in Ayurveda. Since there is no definite FDA approved treatment for steatohepatitis, it is the area where more focus has to be laid by the research scholars. Ayurvedic system can promise the effective management of steatohepatitis by the dipana,pachana, rukshana, snehapana, vamana, virechana, basti, and Rasayana oushadhi. However, this field is open for research in every aspect for the upcoming research scholars.

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