

# Critical Analysis of Yakrit Vikara in Ayurveda in Relation to Non-Alcohol Fatty Liver Disease (Nafld)

**B. Lekhya Reddy<sup>1</sup>, Geetha Kanchan<sup>2</sup>, Ch.Rama Devi<sup>3</sup>**

<sup>1</sup>PG Scholar Dr.B.R.K.R Govt Ayurvedic Medical College and Hospital, Erragadda, Hyderabad, Telangana, India-500038

<sup>2</sup>Assistant professor Dr.B.R.K.R Govt Ayurvedic Medical College and Hospital, Erragadda, Hyderabad, Telangana, India-500038

<sup>3</sup>I/C Principal and HOD, PG Dept of Ayurveda Samhitha and Siddhanta Dr.B.R.K.R Govt Ayurvedic Medical College and Hospital, Erragadda, Hyderabad, Telangana, India-500038

## ABSTRACT

Liver disorders account for about approximately 2 million deaths worldwide, 1 million due to complications of cirrhosis. Approximately two third of all liver related death occur in men. Particularly the incidence of NAFLD among adults is 32% and is higher in males (40%) than in females (26%)<sup>1</sup>. In recent days NAFLD is named as Metabolic Dysfunction Associated Steatotic Liver disease (MASLD). Since this disease occurs due to metabolic dysfunction that includes predisposing factors such as obesity, diabetes, genetics etc cannot be traced easily and can be detected by chance only through the blood test or USG scan or liver biopsy<sup>2</sup>. Ayurveda addressed liver as yakrit and its illnesses as yakrit vikaras. Eventhough the liver disorders are not explained directly in the ayurveda but the pathophysiology involved in pleeha vikaras (spleen disorders) can be applicable to yakrit vikaras<sup>3</sup>. Hence there is scope of correlating the liver disorders with yakrit vikaras said in classical texts that include yakritodara, kamala, kumbhakamala, halimaka, lagharaka etc for better understanding and can be easily managed at their very initial stages only. The study has been taken to bridge the knowledge gap between ayurveda and contemporary science with sufficient justification and better understanding in diagnosis of NAFLD and keep a check to further progression and ultimately to decline death rate.

**Keywords:** Steatotic, cirrhosis, yakrit vikaras, kumbhakamala, halimaka, contemporary science

## INTRODUCTION

Liver is the largest gland in the body that is present in the right upper quadrant of the abdomen. It has critical activities including filtration, metabolism, storage and many more. Metabolic dysfunction, obesity, diabetes, sedentary life style, and other factors cause liver ailments frequent now-a-days. Ayurveda addressed liver disorders as yakrit vikara. In ayurveda yakrit is developed from matruja bhavas and from rakta dhatu. Susruta in susruta samhitha says that yakrit is primary seat for ranjaka pitta and raktavaha srotas moolasthan. Its special role is to impart colour to rasa dhatu with ranjaka pitta and make in to rakta. Thus it is major blood producing location<sup>4</sup>. There are many liver disorders especially NAFLD passes through various series of stages which include fatty liver (steatosis), inflammation

(steatohepatitis), fibrous tissue development in the cells (fibrosis), and finally death of hepatocytes (cirrhosis) which was also explained in various classical text that includes yakritgata dosha, yakridalyudara as said in Bhavaprakasha, yakritodara in charaka samhitha and ashtanga sangraha, kamala, kumbhakamala, halimaka in charaka samhitha, lagharaka, alasakya in susruta samhitha in a sequential order based on intensity, chronicity and incurability.

### MATERIALS AND METHODS

Ayurvedic compendia such as Brihatrayee and Laghutrayee, published articles available online such as websites, scientific articles and offline like published books were thoroughly screened relevant information is collected, analysed, organised, presented in a systematic manner.

### RESULTS

According to ayurvedic system of medicine, Bhavaprakasha states that sthoulya acts as nidanarthakara roga to prameha and kamala which is a primary symptom in advanced stages of NAFLD. As we see the main causes of NAFLD are obesity (sthoulya), diabetes (prameha), hyperlipidemia (sthoulya), hyperglycerdemia (prameha).

The disease NAFLD passes through stages steatosis (fatty deposition on the liver) steatohepatitis (inflammation of liver cells), fibrosis (development of collagen and forms fibrosis in liver cells), cirrhosis (death of hepatocytes).

#### YAKRIT GATA DOSHA IS COMPARED WITH STEATOSIS STAGE

	Ayurveda	Contemporary science
Causes	Intake of abhishyandi and vidahi ahara leads to vitiation of rakta and along with kapha goes to yakrit and causes yakritgata doshas <sup>5</sup>	The main cause is the insulin resistance that is developed as a result of obesity and sedentary lifestyle. It leads to uptake of free fatty acids by liver
Symptoms	<b>Manda agni, ksina bala, loss of weight, ati pandu, manda jwara, kapha pitta linga</b> are seen <sup>5</sup>	<b>Loss of appetite, loss of weight, feeling low energy, vomiting</b>

#### PITTAJA YAKRITGATA DOSHA IS COMPARED WITH STEATOHEPATITIS

	Ayurveda	Cotemporary science
Cause	When yakrit is vitiated by pitta it leads to pittaja yakrit roga <sup>6</sup>	The free fatty acids damages the mitochondrial function leading to cell death and attracts the neutrophils that causes inflammation
Symptoms	<b>Jwara, pipasa, daha, moha, peetagra</b> <sup>6</sup>	<b>Fever, fatigue, dry mouth, loss of appetite, nausea, vomiting, diarrhoea</b>

Treatment mentioned in classical text for yakritgata doshas<sup>7</sup>

- Taking in either calyx of the sea oyster or powdered pippali along with milk
- Leaves of arka plant along with rock salt is burnt into ash and given along with whey water
- Combined powder of hingu, sunthi, pippali, maricha, kusta, yavakshara, saindhava grinded with juice of matulunga

- Pippali fruits soaked in alkaline water of palasha
- Root bark of sarapunkha plant is grinded fresh and mixed with buttermilk
- Juice of fully ripen mango along with honey
- Flowers of salmalli are steam cooked and stored overnight
- Combined powder of yavani, citraka, yavakshara, vacha, danti roots and pippali may be used along with hot water or whey or meat soup or fermented liquor

**YAKRIDDALDUDARA IS COMPARTED WITH FIBROSIS STAGE**

	Ayurveda	Contemporary science
Pathology	The udara roga in which there is increased liver in the right side of abdomen that leads to break down of liver due to doshic vitiation Yakrit- liver Dala – breaking <sup>8</sup>	Chronic steatohepatitis activates the stellate cells to produce collagen which repair the damage tissue by producing collagen and build up fibrotic tissue in the liver cells and there is significant damage to the liver cells
Symptoms	These symptoms occurs simultaneously <b>Yakritodara</b> <b>Udakodara</b> <b>Kamala</b>	<b>Hepatomegaly, ascitis, jaundice, pain</b>

**YAKRITODARA COMPARED WITH HEPATOMEGALY**

	Ayurveda	Contemporary science
Palpation	It appears as <b>stony hard mass as back of tortoise</b> <sup>9</sup>	Bluntness, rounding or <b>irregularity of liver edges</b>
Symptoms	<ul style="list-style-type: none"> <li>• <b>Swasa, pipasa, daha, chardi, ruk, asyavairasya, arunabham vivarnam, nila haridra raji, kasa, moha, murcha</b><sup>10</sup></li> <li>• <b>Dourbalya, arochaka, avipaka, , tamah pravesha, swasa, anaha, agni nasa, koshtavat shulani, udara aruna varna vivarnam, nila haridra rajimat, asyavairasya, mru du jwara, kasa, kshaya, varcha mutra graham, angamarda, murcha, angasaada</b><sup>11</sup></li> </ul>	<b>Tiredness, fatigue, hypoglycaemia, nausea, spider like blood vessels beneath the skin, thrombocytopenia, shortness of breath, loss of hunger, pain in right upper quadrant, itching</b>

**UDAKODARA CORRELATED WITH ASCITIS**

**If not treated yakritodara (hepatomegaly), it will leads to udakodara (ascitis). Here it emerged as a paratantra disease.**

	Ayurveda	Contemporary science
Inspection	Darshana : Mandala akriti , guru in abdomen	Accumulation of water in the peritoneal cavity
Symptoms	Sparshana : <b>udaka poorna druti sparsha,</b>	<b>Leather filled bag, heaviness in the</b>

	<b>kuksheratimatra vriddhi<sup>11</sup></b> Prasna: <b>swasa</b> , annanakankasha, sula in hrit nabhi vankshana kati guda <sup>11</sup>	<b>abdomen, dyspnea, fatigue</b>
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**KAMALA CORRELATED WITH JAUNDICE**

	Ayurveda	Contemporary science
Pathology	If person consumes pitta aggravating food leads to kamala. Due to this the vitiated pitta burns the rakta and mamsa leads to kamala <sup>12</sup>	If liver cells are damaged it leads to increase in bilirubin level more than 2.5 mg/dl results in hepatic jaundice
Symptoms	<b>Haridra netra, mutra, tvak, sveta varchas tila pishta nibham</b> , parsvarti, jwara, sa atopa vishtambha, guruna hridayena, hikka, swasa, aruchi <sup>13</sup>	<b>Dark urine, whitish discoloration of feaces, rigor, yellowish discoloration of cornea</b> , chills, rigors, hepatomegaly, Weight loss, fatigue, malaise, pruritus, xanthomas

**KUMBHAKAMALA CORELAED WITH ADVANCED STAGE OF FIBROSIS**

	Ayurveda	Contemporary science
Nidana	If kamala is not treated properly, it leads to kumbhakamala <sup>14</sup>	This is the advanced stage of steatohepatitis
Symptoms	<b>Shunascha manavaha, sa rakta akshi mukha chardi vit mutra, daha, trsna, anaha, tandra, moha, nashta sajna, nashta agni, aruchi<sup>14</sup></b>	<b>Dry mouth, increased thirst, vomiting blood, swelling, drowsiness, confusion, fainting, dark bowel movements, mood swings</b> , weight loss, jaundice, red hand/feet, numbness

**ALASAKYA OR LAGHARAKA (SUSRUTA) AND HALIMAKA (CHARAKA) STAGE CAN BE COREALTED WITH CIRRHOSIS**

	Ayurveda	Contemporary science
Pathology	It is the end stage of kamala. It is purely vatapitta predominant (charaka) <sup>15</sup> It is the advanced stage of kamala (Susruta) <sup>16</sup>	Continuous fibrosis leads to damage in the architecture of the liver cells called cirrhosis. It has regenerative nodules, bands of proteins between the cells due to which it has chronic scarring
Symptoms	<ul style="list-style-type: none"> <li><b>Bala utsaha kshaya, tandra, srutishvahrsha, mandagni, mrudu jwara, bhrama, angamarda, swasa, trishna, aruchi (charaka) <sup>15</sup></b></li> <li><b>Kshaya, bhrama, Jwara, angamarda, bhrama, saada, tandra, (susruta) <sup>16</sup></b></li> </ul>	<b>Asterixis, confusion, coma, testicular atrophy, gynecomastia, shrinkage in liver size</b> , spider angiomas, palmar erythema, jaundice, hypoalbuminea, coagulation issues

## DISCUSSION

In NAFLD, the main nidanarthakara rogas are sthoulya and prameha in which there is development of insulin resistance in both the conditions. Due to this there will be increase in release of free fatty acids (FFA) from adipose tissue into blood. This favours the liver to uptake the FFA and combined back into triglycerides which is the major constituent of accumulated fat in the liver<sup>1</sup>. Additionally Bhavaprakasha has also quoted that intake of abhishyandi ahara causes agnimandya (insulin resistance) in the cells which causes vitiation of rakta along with kapha gets into liver (yakrit) and causes steatosis stage (yakrit gata dosha). The next stage is the steatohepatitis (pittaja yakrit gataroga) in which liver (yakrit) gets vitiated by pitta dosha at the cellular level that is there will be mitochondrial dysfunction leading to cell ballooning and cell death by production of reactive oxygen species which attracts neutrophils and causes inflammation<sup>17</sup>. Hence these two stages are comparatively lesser intensity and manageable with the ayurvedic medication. In fibrosis stage there are symptoms like hepatomegaly (yakritodara), ascitis (udakodara), jaundice (kamala). In this fibrosis stage there will be severe damage to the liver cells and gets broken which is explained in the yakriddalyudara said in ashtanga sangraha. It also resembles with the disease kumbhakamala said by charaka in charaka samhitha if kamala is not treated. The ultimate stage is the cirrhosis can be compared with the halimaka stage because vatapitta predominant which suggests that there will be shrinkage and chronic scarring and irreversible damage in the yakrit. The shrinkage of yakrit can be seen in the end stage of kamala that is lagharaka, alasakya explained by susruta.

## CONCLUSION

Liver is one of the organs that play an important role in removal of toxins from the body and synthesis of plasma proteins, glucose, urea, bile, clotting factor. It also metabolises hormones, insulin, protein, fat, medicines. Since it has much important function in the maintenance of the healthy body, there is a need for detailed understanding of liver disorders in ayurveda for diagnosing its ailments at very early stage for effective treatment to prevent complications such as fibrosis, cirrhosis and liver failure. NAFLD is a metabolic function related disorder which needs a prior knowledge as it gets revealed only by chance through blood test and USG scan of abdomen. Hence this study has been undertaken to reveal the treatment for liver disorders in ayurvedic perspective mentioned in ayurvedic classical texts and also paves a way for further research on the efficacy of the treatment in those ailments.

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