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REVERSAL OF FATTY LIVER THROUGH AYURVEDIC MANAGEMENT: A CLINICAL SUCCESS WITH KIRATATIKTA, TAMALAKKI AND PIPPALI EXTRACTS

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ABSTRACT

Over the past couple of decades, it has become increasingly clear that non alcoholic fatty liver disease (NAFLD) and Non-Alcholic Steato hepatitis (NASH) are the significant causes of liver disease. NAFLD is an umbrella term for a range of liver disorders characterized by macro vesicular hepatic fat accumulation (steatosis), signs of hepatocyte injury, mixed inflammatory cell infiltrate and variable hepatic fibrosis leading to cirrhosis. NAFLD itself has benign prognosis, but Non Alcoholic Steato-Hepatitis (NASH) is a potentially serious form of NAFLD, marked by liver inflammation, which may progress to scarring & irreversible damage. The current study has been performed with an objective to discover the effective Ayurvedic management of Non Alcoholic Fatty Liver in a 45 year old Female patient who approached Ayurveda Mahavidyalaya and Hopital, Hubli with complaint of abdomen distension, increased body weight, Burning sensation in upper abdomen, generalized weakness since 6 years. Diagnostic ultrasound report confirmed grade 1 fatty liver in both lobes. She was managed with oral medicine - *Kiratatikta*, *Tamalaki* and

Pippali Extract filled two tablet given twice a day for 90 days. The clinical improvement in the patients Signs and Symptoms, haematological parameters was observed and no fatty tissue was reported sonologically. This case highlights the potentiality of Ayurvedic Principles and Practice in managing fatty liver disease by addressing the root cause of the condition and promoting holistic healing approach.

KEYWORDS: NAFLD, NASH, *Kiratatikta*, *Tamalakki* and *Pippali* Extract.

INTRODUCTION

Lifestyle disorders have emerged as a major global health concern due to rapid urbanization, sedentary habits, unhealthy dietary patterns, and increasing metabolic stress. Conditions such as obesity, type 2 diabetes mellitus, dyslipidemia, and hypertension often coexist and collectively contribute to metabolic dysfunction. Among these, non-alcoholic fatty liver disease (NAFLD) represents a hepatic manifestation of lifestyle-related metabolic imbalance and is increasingly diagnosed even in young and asymptomatic individuals.

The liver plays a central role in lipid and glucose metabolism, making it particularly vulnerable to fat accumulation when metabolic regulation is disturbed.

Over the past couple of decades, it has become increasingly clear that non alcoholic fatty liver disease (NAFLD) and Non-Alcholic Steato hepatitis (NASH) are the significant causes of liver disease. Global prevalence of NAFLD is estimated at 24% with higher rates in the Middle East and South America and lowest in Africa.[1] Fatty liver is reversible condition wherein large amount of fat accumulate in liver cells via the process of Steatosis. When fat content exceeds 5% of total weight of liver or more than 30% of liver cells in a liver lobule are with fat deposit, this condition is called as Fatty Liver. Etiology of Fatty Liver mainly falls under two categories (Table No.1 First category comprises the conditions with excess fat which imparts increased work load to liver for metabolizing fat. Second category involves conditions of liver cell damage in which fat cannot be metabolized due to liver cell injury.

Table No.1

CONDITIONS WITH EXCESS FAT	LIVER CELL DAMAGE
Obesity	Alcoholic liver Disease
Diabetes Mellitus	Starvation
Congenital Hyper Lipidemia	Protein calorie malnutrition
	Chronic illness (e.g. Tb)
	Acute fatty liver in late pregnancy

	Hypoxia (anemia, cardiac failure)
	Hepatotoxins (carbon tetrachloride, chloroform, ether, aflatoxin)
	Drug induced liver cell injury

Conditions with excess fat usually manifest as Non Alcoholic Fatty Liver Disease (NAFLD) It is the Hepatic complication of Metabolic Syndrome which occurs when fat is deposited in the liver due to causes other than excessive alcohol use. NAFLD is an umbrella term for a range of liver disorders characterized by macro vesicular hepatic fat accumulation (steatosis), signs of hepatocyte injury, mixed inflammatory cell infiltrate and variable hepatic fibrosis leading to cirrhosis.[2] NAFLD itself has benign prognosis, but Non Alcoholic Steato-Hepatitis (NASH) is a potentially serious form of NAFLD, marked by liver inflammation, which may progress to scarring & irreversible damage. Epidemiological Studies suggest the Prevalence of NAFLD is around 9% to 32% of general population in India with a higher prevalence in those with obesity and Diabetes.[3] These is no direct reference to NAFLD in Ayurvedic Literature but based on etiopathogenesis,signs and symptoms it can be considered as *Santarpanajanya Vyadhi* with *Nidana* and *Samprapti* similar to *sthoulya*.Hence ,it can be correlated to *kaphaja yakritodara.*

Liver is compared with *Yakrit* in Ayurvedic classics. *Acharya Bhavamishra* defined- *Yakrit* is situated on the right side underneath the *Hridaya*, it is formed from *Shonita* and is the seat of *Ranjaka Pitta.*[4] *Yakrit* is derived from the *Matruja Bhava.*[5] and is the *Mulasthana of Raktavaha Srota.*[6] which transforms *Rasa Dhatu* to *Rakta Dhatu*. It is an important *Koshtanga*, that's intimately related to *Rasa, Rakta* and *Mamsa Dhatu* and plays an important role in *Dhatu Parinama.* It is the *Sthana* of *Pittadosha, Rakta dhatu* and *Bhutaagni. Acharya Bhavamishra* was the first to introduce the term "*Yakritvikara"* with its type in his treatise *Bhavaprakasha.*[7]

According to *Ayurveda,* the consumption of *Pitta-Kaphavardhaka -Vidahi* and *Abhishyandi Ahara and Vihara* are liable for the *Dushti of Annavaha, Udakavaha, Rasavaha, Raktavaha, Medovaha* and *Pureeshavaha Srotas*. *Ajirna, Sthoulya* and *Prameha* acts as *Nidanarthakara Rogas* which might also result in the manifestation of *Yakritodara.* Initial pathology lies at *Agni vikruti* which leads to the formation of *Apakva Anna Rasa* which in turn results in *Kapha Dosha Dushti* and unequal formation and deposition of *Meda in Yakrit*. This condition is called as Fatty Liver. Vitiated *Kapha* and *Meda* results in *Srotoavrodha* which provokes *Vata*. Vitiated *Vata* again results in *Agnivikruti a*nd this cycle repeats. when *Pitta* gets

concerned in the pathogenesis, hepatocytes have inflammatory modifications and the disorder progresses to the next stage i.e. Non Alcoholic Steatohepatitis (NASH). when *Vata* gets involved, Fibrosis takes place the condition may also progress to its drastic end levels Cirrhosis, Ascites, Hepato cellular Carcinoma and also paveway to different metabolic complications. Important factors responsible for the etiopathogenesis of NAFLD encompass vitiation of *Samanavayu, Apanavayu, Pachakapitta, Ranjakapitta, Kledaka Kapha, Rasa, Rakta, Medo Dhatu and Pureesha*. lt will manifest symptoms like *Dourbalya, Arochaka, Avipaka, Mala-Mutragraha, Angamarda, Chardi* and so forth.

Non Alcoholic Steatohepatitis (NASH) has no FDA (food & Drug Administrative employer) authorized therapeutics.[8] Regardless of the first-rate advances made in contemporary medication, nevertheless there is need of effective and safe hepatoprotective drug treatments. consequently, it is the need of the hour to search an effective and safe hepatoprotective ideal remedy from Ayurvedic treasure of therapeutics for the welfare of mankind.

Case History

Chief complaint: C/o abdominal distension, heaviness of abdomen after small amount of food intake since 6years.

Associated complaints: Generalised weakness, burning sensation in the stomach, fullness of stomach after small amount of food intake and occasionally abdominal pain since 6years.

History of chief Complaint

A female patient aged 45year, Known case of DM since 6years, HTN since 7years, Fibroid uterus since 1 year, Not known case of Thyroid Dysfunction was apparently normal 6years back then observed distension of stomach, generalized weakness, burning sensation in the stomach, fullness of stomach after small amount of food intake, occasionally stomach pain. she visited many local clinics for the treatment of above said complaints but didn't find satisfactory result. later visited our hospital for further management.

❖ ***Vayaktika Vruttanta***

Mixed Diet with more of *Amla, Lavana and Katu rasa* ahara, Irregular and untimely. Having Sedentary lifestyle with more of mental work and less physical activity. *Agni vishama, Krura koshta, Ama mala pravrutti*, constipated once daily.

❖ ***Rajo vruttanta***

Menarche : At age of 15years

No. Delivery /Abortion/Miscarriage -G_2 P_2 A_0 L_2 D_0

Menopause : Not attained

Menstrual cycle is irregular and LMP is Sep, 2025.

❖ ***Ashtasthana Pariksha***

Nadi : 78bpm *Shabda : Prakruta*

Mutra : 3-4times/day,1-2 times /night *Sparsha : Prakruta*

*Mala :*Once daily,Constipated *Drik : Prakruta*

Jihwa : Liptata *Akruti : Sthoola*

❖ ***Dashavidha Priksha***

Prakruti – Kapha-vata

Vikruti – Pitta-Kapha pradhana tridosha

Sara, samhanana, pramana, satmya, satwa, Ahara Shakti (Abhyavarana and Jarana Shakti), Vyayama shakti and Vaya– Madhyama

Local Systemic Examination

Gastrointestinal System

Inspection - Abdominal distension, No visible veins/scars

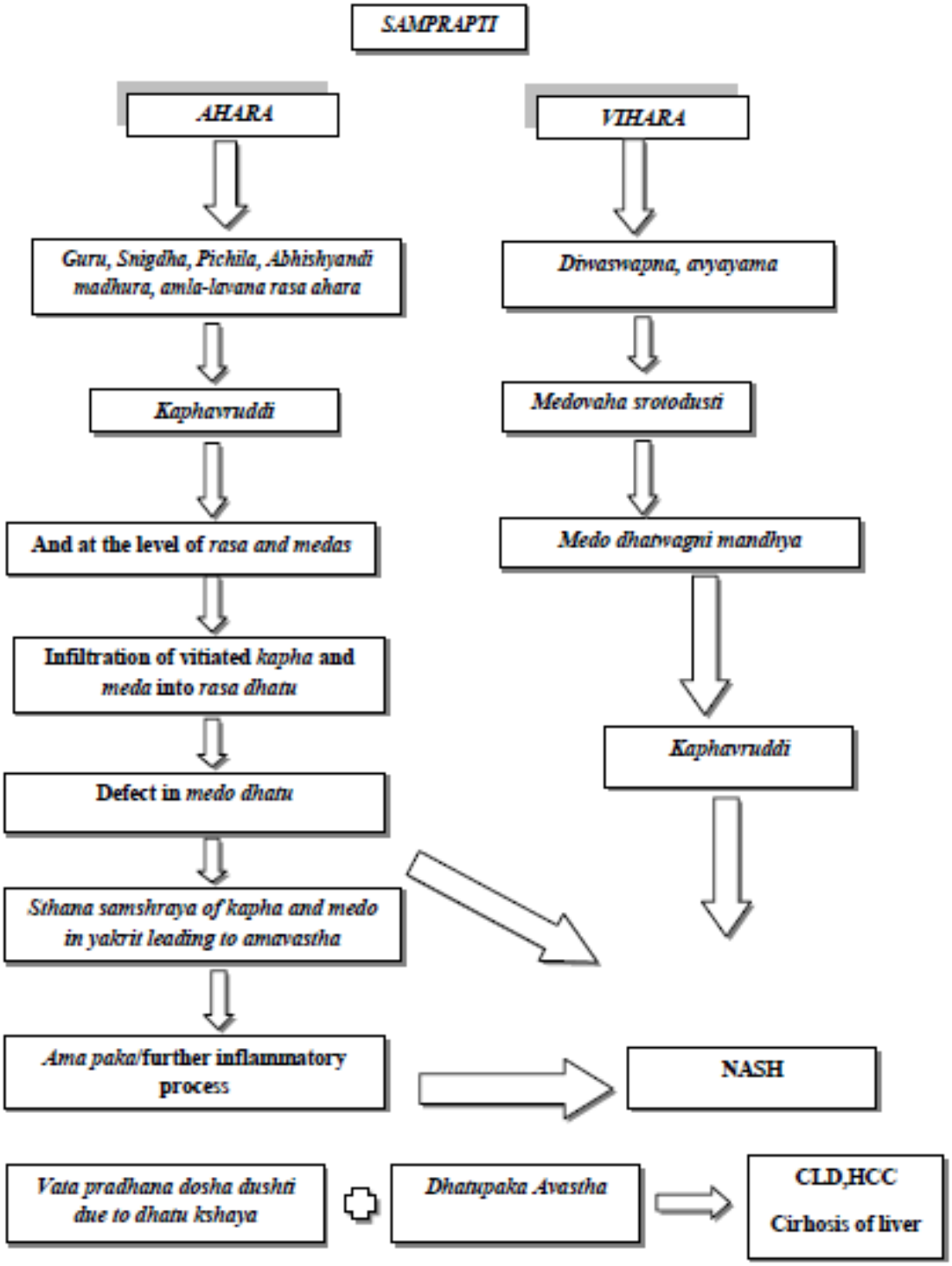
Palpation – Rigidty in abdomen, tenderness in epigastric region

Percussion – Dullness in right hypochondriac region

Auscultation – Bowel sounds – 3-4/min.

Roga Parikshaa

- *Nidana : Atikatu-amla-lavana rasa ahara, Adhyashana, Vishamashana, Atichinta, Akala Bhojana*
- *Poorvarupa : Ajeerna*
- *Rupa : Udgara, Adhmana, Dourbalya, Udara shula, Uro-daha*
- *Upashaya/Anupashaya : Laghu Bhojana, Takra Sevana/Guru, Atikatu ahara, Ratri jagarana, Diva swapna*



Samprapti Ghataka

- *Dosha-Tridosha -Samanavayu, Apanavayu, Pachakapitta, Ranjokapitta, Kledaka kapha*
- *Dushya - Rasa Rakta Meda*
- *Agni - Jataragni, dhatvagni*
- *Ama-Jataragni, dhatvagnimandhyajanya ama*

- *Srotas - Rasavaha, Raktavaha, Medovaha, Annavaha, Pureeshivaha*
- *Sanchara - Rasayani*
- *Sroto dushti prakara - Sanga*
- *Udbhava sthana –Amashayodbhava*
- *Vyaktha sthana - Udara (Dakshina parshwa)*
- *Adhishtana -Yakrit*
- *Marga – Abhyanthara*

Chikitsa Krama

Kiratikta, Tamalakki and Pippali extract filled 500mg, 2 Tablet –twice daily after food with ushnodaka as anupana.

Duration of Treatment: 90days

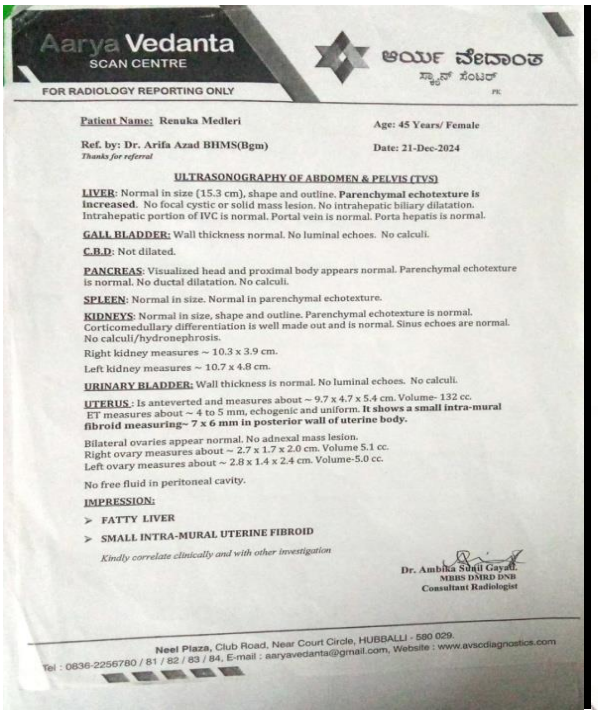
SL.NO	SUBJECTIVE PARAMETERS	REVIEW				
		BT 0th Day	31st Day	61st Day	AT 91st Day	105th Day
1	Indigestion	+	+	-	-	-
2.	Fatigue	++	++	-	-	-
3.	Nausea	-	-	-	-	-
4.	Beltching	-	-	-	-	-
5.	Vomiting	-	-	-	-	-
6.	Itching	-	-	-	-	-
7.	Burning Abdomen	+	+	+	-	-
8.	Burning Chest	-	-	-	-	-
9.	Abdomen pain	+	+	-	-	-
10.	Heaviness and Distension of abdomen	++	+	-	-	-
11.	Flatulence	-	-	-	-	-
12.	Diarrhea	-	-	-	-	-
13.	Constipation	+	+	+	-	-

Observation during treatment

Assessment criteria and Schedule OBJECTIVE PARAMETERS		REVIEW	
		BT(13/06/2024)	91ST (11/09/2024)
	BMI	25.6	23.2
	LFT		
1.	SGOT	39	36
2	SGPT	37	35
3.	ALP	71	65
4	GGT	51	16
5	Serum Bilirubin total	1.01	0.73

6.	Direct Billirubin	0.68	0.72
7.	Indirect Billirubin	0.72	0.53
8.	Total Protein	7.9	7.5
9.	Albumin	4.3	4.5
10.	Globulin	2.7	1.9
LIPID PROFILE		BT	91ST
1.	Total Cholestrol	212	168
2.	Triglycerides	207	153
3.	HDL	49	55
4.	LDL	127	103
5.	VLDL	41	39
FATTY LIVER INDEX		BT	91ST
1.		52	21

Before Treatment **After Treatment**



Aarya Vedanta
SCAN CENTRE
FOR RADIOLOGY REPORTING ONLY

Patient Name: Renuka Medleri Age: 45 Years/ Female
Ref. by: Dr. Arifa Azad BHMS(Bgm) Date: 21-Dec-2024
Thanks for referral

ULTRASONOGRAPHY OF ABDOMEN & PELVIS (TVS)

LIVER: Normal in size (15.3 cm), shape and outline. Parenchymal echotexture is increased. No focal cystic or solid mass lesion. No intrahepatic biliary dilatation. Intrahepatic portion of IVC is normal. Portal vein is normal. Porta hepatis is normal.

GALL BLADDER: Wall thickness normal. No luminal echoes. No calculi.

C.B.D: Not dilated.

PANCREAS: Visualized head and proximal body appears normal. Parenchymal echotexture is normal. No ductal dilatation. No calculi.

SPLEEN: Normal in size. Normal in parenchymal echotexture.

KIDNEYS: Normal in size, shape and outline. Parenchymal echotexture is normal. Corticomedullary differentiation is well made out and is normal. Sinus echoes are normal. No calculi/hydronephrosis.
Right kidney measures ~ 10.3 x 3.9 cm.
Left kidney measures ~ 10.7 x 4.8 cm.

URINARY BLADDER: Wall thickness is normal. No luminal echoes. No calculi.

UTERUS : Is anteverted and measures about ~ 9.7 x 4.7 x 5.4 cm. Volume- 132 cc. ET measures about ~ 4 to 5 mm, echogenic and uniform. It shows a small intra-mural fibroid measuring– 7 x 6 mm in posterior wall of uterine body.

Bilateral ovaries appear normal. No adnexal mass lesion.
Right ovary measures about ~ 2.7 x 1.7 x 2.0 cm. Volume 5.1 cc.
Left ovary measures about ~ 2.8 x 1.4 x 2.4 cm. Volume-5.0 cc.

No free fluid in peritoneal cavity.

IMPRESSION:

- FATTY LIVER
- SMALL INTRA-MURAL UTERINE FIBROID

Kindly correlate clinically and with other investigation

Dr. Ambika Sunil Gayal
MBBS DMRD DNB
Consultant Radiologist

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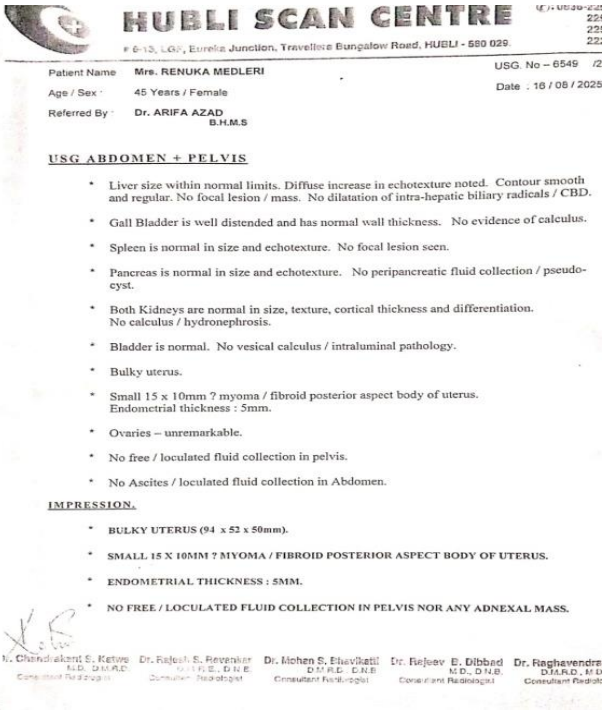

HUBLI SCAN CENTRE
#6-13, LGP, Eureka Junction, Travellers Bungalow Road, HUBLI - 580 029.

Patient Name Mrs. RENUKA MEDLERI USG. No – 6549
Age / Sex 45 Years / Female Date : 16 / 08 / 2025
Referred By Dr. ARIFA AZAD B.H.M.S

USG ABDOMEN + PELVIS

- Liver size within normal limits. Diffuse increase in echotexture noted. Contour smooth and regular. No focal lesion / mass. No dilatation of intra-hepatic biliary radicals / CBD.
- Gall Bladder is well distended and has normal wall thickness. No evidence of calculus.
- Spleen is normal in size and echotexture. No focal lesion seen.
- Pancreas is normal in size and echotexture. No peripancreatic fluid collection / pseudo-cyst.
- Both Kidneys are normal in size, texture, cortical thickness and differentiation. No calculus / hydronephrosis.
- Bladder is normal. No vesical calculus / intraluminal pathology.
- Bulky uterus.
- Small 15 x 10mm ? myoma / fibroid posterior aspect body of uterus. Endometrial thickness : 5mm.
- Ovaries – unremarkable.
- No free / loculated fluid collection in pelvis.
- No Ascites / loculated fluid collection in Abdomen.

IMPRESSION.

- BULKY UTERUS (94 x 52 x 50mm).
- SMALL 15 X 10MM ? MYOMA / FIBROID POSTERIOR ASPECT BODY OF UTERUS.
- ENDOMETRIAL THICKNESS : 5MM.
- NO FREE / LOCULATED FLUID COLLECTION IN PELVIS NOR ANY ADNEXAL MASS.

Dr. Chandrakant S. Ketwa M.D., D.M.R.D | Dr. Rajesh S. Revenkar D.M.R.E., D.N.B. | Dr. Mohan S. Shevikatti D.M.R.D., D.N.B. | Dr. Rajeev B. Dibbad M.D., D.N.B. | Dr. Raghavendra D.M.R.D., M.D

DISCUSSION

Medodushti affecting *Yakrit*

Due to continuous intake of *Vaaruni*[9] (alcohol) *guru, snigdha and madhura ahara*, lack of exercise and day sleep, *Kapha and Meda* increase, leading to *Jatharagni mandya* and formation of *Ama*. This *Ama* circulates with *Rasa* and causes *Meda Dhatvagni mandya*, resulting in improper formation of *Meda* and accumulation of *Abaddha Meda*. Excess *Meda along with Ama* causes *Srotorodha of Medovaha and Raktavaha srotas*, especially at the level of *Yakrit*, which is the main organ of *Meda* metabolism. *Kapha avarana* suppresses *Ranjaka Pitta in Yakrit*, impairing its metabolic functions and leading to *Yakrit Meda Vriddhi*. The

vitiated *Yakrit* further fails to metabolize *Meda* properly, creating a vicious cycle that results in *Medoroga*, *Sthaulya* and *Yakrit Vikara*. This *Ayurvedic* pathogenesis closely correlates with modern fatty liver disease, where excess fat intake and insulin resistance cause triglyceride accumulation in hepatocytes (hepatic steatosis), impaired lipid metabolism, and progressive inflammation as seen in NAFLD and NASH.

Effect of *Prameha* on *Yakrit*

Prameha is a *Santarpanajanya.*[10] disease dominated by *Kapha and Meda*, and its pathogenesis directly involves *Yakrit*, which is the main organ of *Meda and Rakta* metabolism. Due to continuous intake of *madhura, snigdha and guru ahara* along with sedentary habits[*Aasya sukham, swapna sukham], Kapha, Meda, Kleda and Mutra* increase, leading to *Jatharagni mandya and formation of Ama*. This causes *Meda Dhatvagni mandya* and excessive production of *Abaddha Meda*, which accumulates in *Yakrit* and *obstructs Medovaha* and *Raktavaha srotas. Kapha avarana in Yakrit* suppresses *Ranjaka Pitta*, impairing metabolic and detoxifying functions of the liver. As *Prameha* progresses, *Pitta* and *Vata* also get vitiated, leading to further *Yakrit dusti*, inflammation and functional derangement. Thus, *Yakrit* becomes both a site of pathology and a contributing factor in *Prameha*, and this condition correlates with modern observations where diabetes and insulin resistance are commonly associated with fatty liver disease and progressive hepatic dysfunction.

***Rasa panchaka of Kiratatikta, Tamalakki and Pippali* in reversing Fatty Liver**

A] *Kiratatikta*[11] (*Swertia chirata*) possesses ***Tikta rasa***, ***Laghu and Ruksha guna***, ***Ushna virya***, *and* ***Katu vipaka***, which together make it a potent hepatoprotective and fat-reducing herb. Its ***Tikta rasa and Ushna virya*** stimulate *Agni*, promote *Ama pachana*, and enhance ***Yakrit-uttejaka* (liver function)**, while the *Ruksha guna* helps reduce *Meda* (fat) accumulation in the liver. By improving bile secretion, correcting *Pitta* imbalance, and purifying *Rakta*, *Kiratatikta* aids in **reducing fat deposits, detoxifying the liver, and restoring normal metabolic function**, making it particularly effective in conditions like fatty liver (*Medo Yakrit*).

B]*Tamalakki*[12] (*Phyllanthus niruri*)possesses a Rasa Panchaka that is especially relevant in the reversal of fatty liver (*yakrit medovṛddhi*), with particular importance of its ***sara guna*** (mobilizing, flow-promoting quality). Its ***rasa*** is *tikta* and *kashaya*, which help scrape excess *kapha* and *meda* accumulated in the liver. The ***gunas*** are *laghu*, *ruksha* and notably ***sara***, by

which *Tamalakki* facilitates the mobilization and drainage of stagnated fat(*Kleda*) and toxins from hepatic channels (*yakritvaha srotas*), aiding de-fatting of the liver. Its ***virya*** is *sheeta*, calming inflammatory *pitta* involvement in fatty liver, while the ***vipaka*** is *madhura*, supporting balanced tissue metabolism without aggravating dryness. The ***prabhava*** *of Tamalakki* as *yakṛut-shodhaka* and *pittasara* enhances bile flow and metabolic clearance, and the presence of ***sara guna*** specifically contributes to reversing fatty infiltration by promoting proper circulation, lipid mobilization, and restoration of normal liver function .

C]*Pippali*[13] (*Piper longum*), through its *Rasa Panchaka*, plays a supportive role in fatty liver (*yakrut medovruddhi*) by correcting impaired metabolism and *agnimandya*. Its ***rasa*** is predominantly katu (pungent), which helps break down accumulated *kapha* and *meda* in the liver. The ***gunas*** are *laghu* (light), *tikshna* (sharp) and *snigdha* (slightly unctuous), enabling deep penetration into tissues while preventing excessive dryness, thus improving hepatic metabolism. Its ***virya*** is *ushna* (hot), which kindles *jatharagni* and *dhatvagni*, essential for correcting lipid accumulation in fatty liver. The ***vipaka*** is *madhura*, supporting tissue nourishment and long-term metabolic balance. The ***prabhava*** of Pippali as *Agnivardhaka* and *Yogavahi* enhances digestion, bioavailability, and liver function, making it useful in reversing fatty changes of the liver.

Mode of Action of *Kiratatikta, Tamalakki* and *Pippali* in reversing Fatty Liver

***Kiratatikta* (*Swertia chirata*)** acts in the reversal of fatty liver by correcting the underlying *Kapha–Meda* dominance and impaired *Agni* that lead to fat accumulation in the liver. Its *Tikta* (bitter) rasa has a *Lekhana (*scraping) effect, which helps reduce excess *Meda dhatu* deposited in liver tissue, while its *Deepana–Pachana* action improves digestive and metabolic fire at both the digestive and tissue levels, especially *Medodhatvagni*. By digesting Ama (metabolic toxins) and clearing *srotorodha* (blocked liver channels), *Kiratatikta* supports proper fat metabolism and prevents further lipid deposition. It also pacifies vitiated *Pitta and Kapha*, enhances bile secretion, and stimulates normal liver function, thereby promoting detoxification and regeneration of hepatocytes. Through these combined actions, *Kiratatikta* helps restore normal liver metabolism and supports the gradual reversal of fatty liver changes.

Tamalakki (Phyllanthus niruri)acts in the reversal of fatty liver by primarily correcting vitiated *Pitta* and supporting normal liver detoxification and metabolism. In fatty liver, impaired bile secretion, inflammation, and accumulation of metabolic toxins contribute to fat

deposition in hepatocytes. *Tamalakki*, with its *Tikta and Kashaya rasa* and *Pitta-shamana* properties, enhances bile flow, promotes *Yakrit shodhana* (cleansing of the liver), and facilitates the removal of *Ama* from liver channels. Its *Deepana and Pachana* actions help normalize *Agni*, improving fat metabolism and preventing further accumulation of *Meda* in the liver. Additionally, *Tamalakki* exhibits hepatoprotective and antioxidant effects, which reduce oxidative stress and support regeneration of liver cells. Through these actions, *Tamalakki* helps restore normal liver function and contributes significantly to the gradual reversal of fatty liver.

Pippali (Piper longum)acts in the reversal of fatty liver by correcting impaired *Agni* and faulty fat metabolism, which are key underlying factors in the development of the condition. In fatty liver, *Mandagni* leads to improper digestion and formation of *Ama*, resulting in excess *Meda* accumulation in liver tissue. *Pippali*, with its strong *Deepana and Pachana* properties, stimulates *Jatharagni and Dhatvagni*—particularly *Medodhatvagni*—thereby enhancing lipid metabolism and preventing further fat deposition in the liver. Its *Ushna and Laghu gunas* help reduce *Kapha* dominance and clear *srotorodh*a (blockage of liver channels), improving circulation and metabolic activity within the liver. Additionally, *Pippali* exhibits hepatoprotective, antioxidant, and insulin-sensitizing effects, which reduce inflammation and oxidative stress while supporting hepatocyte recovery. By improving digestion, metabolism, and bioavailability of nutrients and medicines, *Pippali* plays a crucial role in restoring normal liver function and aiding in the reversal of fatty liver.

Together, these three drugs work synergistically to improve digestion, normalize fat metabolism, eliminate toxins, and restore healthy liver function, thereby contributing significantly to the gradual reversal of fatty liver.

CONCLUSION

The Present clinical observation highlights the potential of Ayurvedic management in the reversal of fatty liver disease through the judicious use of *Kiratatikta (Swertia chirata), Tamalakki (Phyllanthus niruri), and Pippali (Piper longum)*. The selected formulation acted synergistically to address the core *samprapti* of fatty liver by improving Agni, correcting Ama, and normalizing *Yakrut karma. Kiratatikta* contributed significant *tikta rasa*–predominant hepatoprotective and *pitta-shamaka* actions, *Tamalakki* supported hepatocellular regeneration and detoxification, while *Pippali* enhanced bioavailability, metabolism, and lipid mobilization through its *Dipana-Pachana and Yogavahi* properties.

Clinically, the intervention demonstrated marked improvement in symptoms, biochemical liver parameters, and ultrasonographic findings, indicating reversal rather than mere symptomatic control. This study reinforces the role of *Ayurveda* in offering a safe, holistic, and disease-modifying approach to fatty liver disease. However, larger controlled clinical trials are warranted to further validate these findings and establish standardized treatment protocols.

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