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CASE STUDY

A Case Report on Management of Non-alcoholic Grade 2 Fatty Liver WSR *Yakrit Vikara* through Ayurvedic Intervention

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ABSTRACT

One of the most prevalent liver conditions in the world, fatty liver, is typically brought on by lipid build-up, primarily triglycerides in hepatocytes. Although the liver naturally contains fat, fatty liver can develop if the amount of fat exceeds 5–10% of the liver's total weight. *Yakrit* (liver) is considered as a crucial organ responsible for digestion, metabolism, detoxification in body. In *Ayurveda* non-alcoholic grade 2 fatty liver disease can be related with *Yakrit Vikara* primarily caused by imbalance of *Pitta Dosha* leading to conditions such as jaundice, fatty liver, liver cirrhosis and hepatitis etc. this case study examines the clinical presentation, diagnosis and treatment of a male patient aged 60 years with complaint of gaseous abdomen, increased body weight, pain in right side of abdomen, and incomplete bowel evacuation since last 2 months. Diagnostic ultrasound report confirmed grade 2 fatty liver in both lobes. He was managed with oral medications including *Purnanava Mandoor* two tablets twice a day, *Arogyavaradhini Vati* two tablets twice a day, *Capsule Kalamegha* one tablet twice a day, *Medohara Guggulu* two tablets twice a day, *Makoi Arka* 10 mL once daily (Empty stomach). This case underscores the potential of *Ayurveda* in managing Grade 2 fatty liver disease by addressing the root cause of the condition and promoting holistic healing approach.

1. INTRODUCTION

In *Ayurveda,* the phrase*"Yakrut Dalyodara"* refers to the expansion of the liver (*Yakrit Vridhi*). When the size of the liver increases due to the rise in the *Kapha Dosha* then it called as *Kaphja Yakrit Dalyodara*. Then the *Meda* is increased inside the liver and results in the formation of *Medaja Yakrit Dalyodara*. In *Bhavprakash Samhita*, *Acharya Bhavmishra* is the first *Acharya* which describe the term *Yakrit Vikar* with its classification and *Chikititsa*.[1] It describes *Yakrit Vikar* are of four types *Vataj*, *Pittaj*, *Kaphaj*, *Raktaj*. *Vataj Yakrit Vikara* has symptoms of *Nitya Mandaddha Bkostha*, *Nityadarvarta Peedita*: *Pitta* has features of *Jwar*, *Pipasa*, *Daha*: *Kaphaj* have lakshan of *Manda Vyatha*, *Shola*, *Kathina*, *Gaurava,* and *Raktaj* have *Klama*, *Bhrama*, *Vidaha*, *Vaivarnya*, *Gatra Gaurava*.[2] The incomplete description of *Nidan*, *Poorvaroopa, Rupa Lakshan Chikitsa* of *Yakrit Vikar* is also available in *Charak Samhita*, *Susrut Samhita*, *Ashtang Hridya* And *Madhav Nidana*. According to *Acharya Sushruta*, ten *Raktavaha Sira* are connected to *Yakrit* and *Pleeha*.[3] *Sushruta* also noted that *Raktadhara Kala* is especially found in *Sira*, *Yakrit, And Pleeha*. *Yakrit* is site for *Ranjak Pitta*. After absorption, *Rasa Dhatu* goes to the metabolism with the help of *Agni* and *Ranjak Pitta*, some part of this *Rasa Dhatu* converts into *Rakta Dhatu. Yakrit* mainly functions upon the nourishment of *Rakta*.

Like *Sthaulya*, fatty liver disease is a *Santarpanajanya Vyadhi* (overeating disease) with *Samprapti* (pathogenesis) and *Nidana* (aetiology). The vitiation of *Kaphadosha* and the uneven formation and deposit of *Meda* (fat tissue) in *Yakrit* are caused by *Agnivikruti* (Vitiation of the Digestive System), which results in the production of *Apakva Anna Rasa* (Improperly formed digestive end product). The medical term for this condition is fatty liver. Vitiated *Kapha* and *Meda* generate *Srotorodha* (channel obstruction), which in turn encourages *Vata*. The cycle repeats when vitiated Vata leads to *Agnivikruti*. When *Pitta* is linked to the pathophysiology, hepatocytes experience inflammatory changes, and the disease progresses to the next stage, non-alcoholic steatohepatitis (NASH). Fibrosis arises when *Vata* enters the equation, and the illness may worsen to its most severe stages. When *Pitta* is involved in the pathophysiology, hepatocytes undergo inflammatory changes, and the disease progresses to the next phase. Fibrosis, which arises when *Vata* enters the equation, can result

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in cirrhosis, ascites, hepatocellular cancer, and other metabolic issues. Key factors in the etiopathogenesis of fatty liver include vitiation of *Samanavayu*, *Apanavayu*, *Pachakapitta*, *Ranjakapitta*, *Kledaka kapha*, *Rasa Rakta Medo dhatu*, *and Pureesha*.[4] The *Srotas Annavaha*, *Udakavaha*, *Rasavaha*, *Raktavaha*, *Medovaha*, and *Pureeshavaha* are linked to the aetiology and manifestation of fatty liver disorder.

Non-alcoholic fatty liver disease (NAFLD), is made up of two conditions: non-alcoholic fatty liver and NASH. Steatosis is the build-up of fat in the liver, while steatohepatitis is an inflammatory condition. NAFLD is a growing epidemic worldwide due to unhealthy lifestyle and obesity, with a prevalence rate in the population ranging from 11.2% to 37.2%. In India, it has been rapidly rising in very recent years with the prevalence of NAFLD varying from 8% to 35%. With a higher frequency among individuals who are obese and overweight, and those who are diabetic or pre-diabetic.

NAFLD is a benign type of disease where deposition of fat occurs (steatosis) in >5% of the hepatocytes histologically.[5] Lifestyle changes, increased fatty cell deposition, insulin resistance are the major factors for this disease. In the absence of excessive alcohol intake, NAFLD ranges from simple steatosis to non-alcoholic steatosis with or without cirrhosis.[6]

2. CASE REPORT

A 60-year-old non-alcoholic, married male patient, relatively obese (body mass index = 30.2) from an urban area, came for Ayurveda treatment in Ayurvedic practitioner's outpatient department at Ch. Brahm Prakash Ayurved Charak Sansthan Khera Dabar, Najafgarh. The patient was coming with the complaint of gaseous abdomen, weight gain, and loss of appetite. These symptoms have been persisting in the patient for the past 6 months.

2.1. Case Findings

The patient's pulse rate was 80/min, blood pressure was 140/84 mm of Hg, and respiratory rate was 16/min. The body temperature was 98.7 F. No abnormal clinical findings found at the time of examination in cardiovascular and respiratory examination. His abdomen was distended and tympanic due to a gaseous abdomen. On palpitation, tenderness was found in the right upper quadrant and the umbilical region. During the percussion dull sound was found in the right upper quadrant, and bowel sound was increased and normal. No past history of any surgical intervention and psychological illness. No family history of any genetic disorder.

Dashvidha Pariksha (tenfold examination of the patient) was done for patient assessment. The patient has: Vata-Kaphaja in Prakriti, Vikriti Pitta - Kaphaja, Vishama Pramana (anthropometry), Madhyama Sara, Madhyam Satva, Madhyam Satmya, Avara Aahar Shakti, Madhyam Vaya, Avara Vyayam Shakti, and Avara Bala (strength).

2.2. Assessment Criteria

The patient was already diagnosed with grade 2 fatty liver in both lobes. The diagnosis with Ayurveda perspective was *Yakrit Dalyodara* (liver disease) associated with *Medodushti* (obesity). Liver measures 12.9 cm in craniocaudal span, and both lobes show grade 2 fatty liver with normal sized biliary and vascular channel. There was no sign of fluid accumulation, abnormal increase in temperature.

2.3. Therapeutic Intervention

Therapeutic intervention is mentioned in table 1.

2.4. Timelines

Timelines are mentioned in table 2.

2.5. *Pathya-Apathya*

Patient was advised to follow below *Pathya-Apathya*[7,8] diet regimen in Table 4:

3. RESULTS

The outcome was evaluated based on improvements in the patient's overall health, including weight gain, loss of appetite, gaseous abdomen, and heaviness in the abdomen. Also change in the ultrasonographic image from grade 2 fatty liver to mild fatty infiltration [Table 3].

4. DISCUSSION

The presented patient is *Kapha Pittaj* in *Prakriti,* and other parameters shown *Kapha* predominant. Therefore, in Ayurvedic texts patients' symptoms were matched with *Yakrit Dalyodara* for NAFLD. The above-mentioned drugs are *Tikta* in nature that provides relief by its *Strotas Shodhak* properties (micro channel cleaning). This case study proves that in above treatment plan can significantly improve the symptoms of disease as well as changes in the ultrasound reports from grade 2 fatty liver to mild fatty infiltration. Above treatment may correct the metabolic dysfunction by increasing *Agni* and digesting the *Ama*. There were no adverse signs and symptoms observed in patients by above treatment. The patient was kept in observation for 3 months without medications and advised to do exercise, and low saturated fat and deep-fried items with low carbohydrate diet to prevent from recurrence of disease.

4.1. Probable Mode of Action of *Arogyavardhini vati*

Arogyavardhini[9] *Vati* balances the three *Doshas*, which enhances general health. The medication has no discernible toxicological effects on the kidney, liver, or brain. This treatment is often referred to as fatty liver remedies and natural liver cleansing. It maintains a healthy digestive system, encourages equilibrium, and supports liver function. The Shoshan (assimilation) of various surplus *Snigdha Dravyas* (unctuous substances) in the body is performed by *Arogyavardhini vati*. In addition, it performs the *Raktavardhana* (blood purification) and the *Pachan* (digestion) of *Drava* (liquid) and *Kleda* (clammy). It lowers *Snigdhatva* and *Dravatva* in *Meda Dhatu*. To get the intended effect, the medication must be taken with a variety of adjuvants. To prevent any negative effects, self-medication of the drug should be rigorously avoided. *Haritaki* (Terminalia chebula), an astringent and laxative, is one of the drug's components. It is helpful in treating fatty liver and liver cirrhosis and is efficient in treating liver problems. The herb *Bibhitaki* (Terminalia belerica) is an excellent anthelmintic, a laxative, and a useful treatment for digestive issues. Because of its styptic properties, it can be used to stop bleeding. *Amalaki* (Emblica officinalis), another component, has antibacterial, carminative, hypoglycemic, stomachic, hypotensive, and astringent properties. It has immune-modulating, antioxidative, and anti-hepatotoxic qualities. One useful substance for reviving vigor is the mineral *Shuddh Shilajit*. It contains strong antioxidant qualities and functions similarly to nectar, delaying the aging process. It helps with mental illness, liver disease, kidney disease, and digestive issues. *Guggulu* (Commiphora mukul), an oleo-gum-resin, aids in the elimination of cholesterol by turning it into bile. It is a useful treatment for regulating cholesterol levels and eliminating excess fat. *Chitrak* (Plumbago zeylancia) is a herb that effectively treats a variety of liver problems, worms, piles,

indigestion, loss of appetite, and colitis. Picrorrhiza kurroa, another crucial component, is a potent treatment for liver conditions. It works well for liver damage brought on by substances like alcohol, paracetamol, and carbon tetrachloride.

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4.2. Probable Mode of Action of *Punarnava Mandura*

Punarnava Mandura provided a significant improvement on all subjective parameters of *Garbhini Pandu,* due to its *Pitta-Kapha Shamaka*, *Pandughna*, *Rasayana* (rejuvinative), *Deepana-Pachana* (digestive), *Raktavardhaka*, and *Anulomana* (laxative) properties which leads to the correction of metabolism, increase iron absorption, and improves blood formation *Punarnava Mandura* contains the *Katu*, *Pittakapha Shamaka*, *Ruksha* (dry), *Shita* (cold), *Laghu* (light), and *Kashaya* (astringent). *Anulomana*, *Mutrala*[10] (diuretic), and *Punarnava* have been shown to have hepatoprotective and antioxidant properties. *Mandura Bhasma* has strong hepatoprotective, cytoprotective, and haematinic properties. *Triphala* is an Ayurvedic *rasayana* that has anti-oxidant and anti-anemic properties. Rochana, *Deepana*, and *Anulomana*, which are found in *Amalaki* (Emblica officinalis Gaertn.), are involved in the motility, absorption, and digestion of digestive contents in the gut. It directly affects *Rasavaha* and *Raktavaha Srotas* because it is *Hridya*, *Yakrututtejaka*, and *Shonita Sthapana*. It has been regarded as a powerful *Rasayana* that elevates the essence of each and every *Dhatus*. Iron and vitamin C are abundant in *Amalaki*. One well-known bioavailability booster is *Trikatu*.

4.3. Probable Mode of Action of Kalmegha Capsule

Kalmegha plant (*Andrographis peniculata*) is also known as “king of bitters.” It has anti-microbial, anti-protozoan, anti-oxidant, immune stimulant, anti-diabetic, anti-infective, hepato renal safe, liver modulator properties.[11] It has *Tikta Rasa* with *Katu Vipaka* and *Ushna Veerya*. It is *Kapha Pitta Doshahara* properties so it is used in *Yakrutroga*, *Krimiroga*, *Krimiroga*, *Kustha* and *Jwara*. Traditionally, it is used in common cold, diarrhoea, fever, jaundice, and health tonic for the liver. It is proven to possess anti-inflammatory, antibacterial, anti-thrombotic, hepato-protective properties. It also acts as antihepatotoxic, anti-cancerous and hypoglycemic, and hypotensive activity.

4.4. Probable Mode of Action of Medohara *Guggulu*

Medohara Guggulu contains drugs like *Shunthi*, *Marich*, *Pippali*, *Chitraka*, *Haritaki*, *Vibhitaki*, *Amalaka*, *Musta*, *Vayavidanga*, and *Shudha Guggulu*, which is in the highest concentration in the combination. Approximate all the drugs having *Katu Rasa*, *Laghu Ruksha Guna*, *Katu Vipaka* with *Kapha Vata Shamaka* properties.[12] With these properties, it acts as *Deepana* (enlight digestive fire), *Pachak* (enhances digestion), *Meda-Kleda Shoshak*(scraps excessive *Meda* and *Kapha*), *Strotos Vishodhaka*(cleaning of micro channels), and *Lekhniya* property. A crucial transcriptional regulator for the preservation of cholesterol and bile acid balance in bodily systems in gugglusterone, the bioactive component of *Guggulu*. Through the enterohepatic circulation, it transforms excess cholesterol into bile acid, which is the body’s main method of eliminating excess cholesterol and prevents from hepatic-steatosis.

4.5. Probable Mode of Action of Makoi *Arka*

Makoi (black Night Shade), an herb is extensively used in traditional medicine to treat liver disorders and many more health problems. *Acharaya Charak* mentioned this drug under Tikta *Skanda*.[13] *Acharya Shusruta* has mentioned it under *Sursadi Gana*.[14] It contains *Tikta* (Bitter) *Rasa*, *Laghu* (light) *Snigdha* (slimy) *Guna*, *Anushan* (not too hot) *Virya*, *Katu* (pungent) *Vipaka*, *Tridoshaghana* (pacified all three doshas). It has properties to cure all liver disease.

5. CONCLUSION

Changes in the human habits and environmental variation is the major causative factor for all illness, including metabolic syndrome, which caused by poor nutrition and unhealthy lifestyle fatty liver is a progressive disease which may converts into end-stage liver disease such as liver cirrhosis, chronic liver disorder. No single or effective treatment for liver disease present in any medicine field which is cost-effective. Hence, we need some different modalities which are safe and cost-effective in nature. Some medications like *Arogyavardhini Vati*, *Punarnava Mandoor*, *Arka Makoi*, *Kalmegha* preparations are safe and effective in the case of *Yakrit Dalyudara* (NAFLD).

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7. AUTHORS’ CONTRIBUTIONS

All the authors contributed equally in design and execution of the article.

8. FUNDING

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9. ETHICAL APPROVALS

This study not required ethical approval as it is a case study.

10. CONFLICTS OF INTEREST

Nil.

11. DATA AVAILABILITY

This is an original manuscript and all data are available for only review purposes from principal investigators.

12. PUBLISHERS NOTE

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Table 1: Therapeutic intervention

S. no.	Drug	Dose and frequency	Route of administration
1	*Arogyavardhini Vati*	500 mg twice a day	Oral
2	*Punarnava Mandoor*	500 mg twice a day	Oral
3	*Cap. Kaalmegha*	250 mg twice a day	Oral
4	*Medohara Guggulu*	500 mg twice a day	Oral
5	*Makoi Arka*	10 mL once a day (empty stomach)	Oral

Table 2: Timeline of events

Time line	Clinical presentation	Medication
Before February 2024	Heaviness in the abdomen, gaseous abdomen	Allopathic medication
February 19, 2024	Patient come to OPD of Kayachikitsa department of CBPACS with complaints of gaseous abdomen, weight gain, loss of appetite for 6 months. The patient came with an ultrasound report as mentioned in Figure 1. Then, patient was treated on OPD basis	*Arogyavardhini Vati, Medohara Gugglu, Makoi Arka*
February 26, 2024	Improvement present in gaseous abdomen	*Arogyavardhini Vati, Medohara Gugglu, Makoi Arka*
March 11, 2024	Mild improvement present in gaseous abdomen and loss of appetite	*Arogyavardhini Vati, Medohara Gugglu, Makoi Arka*
March 26, 2024	Mild improvement present in gaseous abdomen	*Arogyavardhini Vati, Medohara Gugglu, Makoi Arka*
April 08, 2024	No improvement present in loss of appetite and gaseous abdomen	*Arogyavardhini Vati, Medohara Gugglu, Makoi Arka, Punarnava Mandoor*
May 08, 2024	No improvement present in loss of appetite	*Arogyavardhini Vati, Medohara Gugglu, Makoi Arka, Capsule Kalmegha*
June 08, 2024	Improvement present	*Arogyavardhini Vati, Medohara Gugglu, Makoi Arka, Capsule Kalmegha*
June 22, 2024	Improvement present	Advised ultrasound whole abdomen
June 25, 2024	Improvement present	USG findings: - Liver is normal in size and show diffusely increased echogenicity, consistent with mild fatty infiltration.

OPD: Outpatient department

Table 3: Before and after treatment

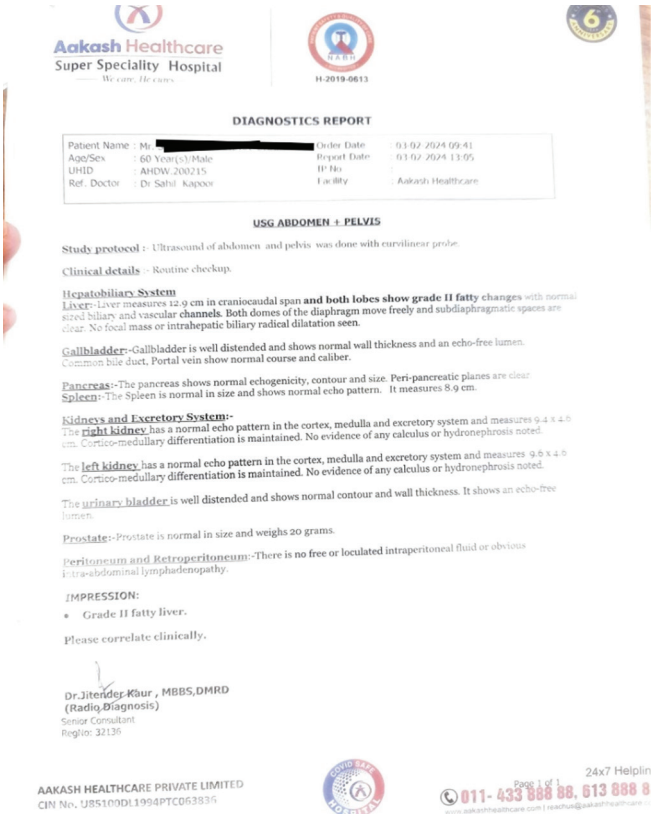
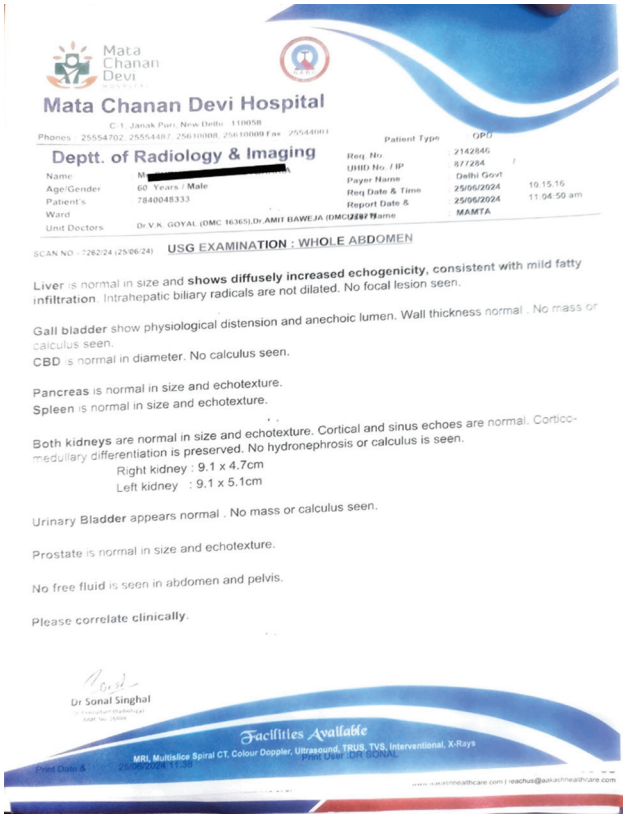
Before treatment	After treatment
	

Table 4: *Pathya-Apathya* diet regimen

Name	*Pathya* (wholesome diet)	*Apathya* (unwholesome diet)
Cereals	*Shashtika, Yava, Gudhuma, Laja Manda*	Rice flour, *Tila*, drugs having *Ushna, Lavana, Amla, Vidhai Gunas*
Pulses	*Mugda*	Masa
Fruits	*Draksha*, Apple, Pomegranate, Ripened Kiwi.	Orange, Lemon, Mango, Watermelon
Vegetable	Potato, Snake Guard, Beans, *Shigru*, Brinjal, Potato, *Jeevanti*, Raddish	Chilly, Bitter Guard, Pickle, Pumpkin, All Leafy Vegetables (Saka)
Milk products	Ghee, Milk, *Takra*	Curd
Non veg	*Mamsa Rasa* with *Dashmoola*	All fishes
Others	*Gomootra, Asava, Arsihta.*	*Sura, Madya*, water <1,000 mL, Salt