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Effectiveness of Yogic Intervention in Non-Alcoholic Fatty Liver Disease: Case Series

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ABSTRACT

Background: Non-Alcoholic Fatty Liver Disease (NAFLD) is most prevalent and projected as the state of disease and associated with metabolic syndrome high treatment cost. Regular exercise especially 'Yoga' is a preferable and economical preventive and curative measure in the management of NAFLD because there are no licensed drugs available for NAFLD and people embracing a sedentary lifestyle. Transient elastography (TE) provides the Liver stiffness measurement (LSM) used here as a marker of fibrosis in these NAFLD cases.

Objectives: The objective of this case series was to evaluate the role of yoga in NAFLD patients without any medication.

Methods: Three NAFLD patients identified retrospectively who had been prescribed yogic intervention without any medication.

Result: This retrospective case series showed *Kapalabhati Pranayama*, *Ardha matsyendrasana*, *Gomukhasana*, *Dhanurasana*, *Balasana* and *Dhyana* (Meditation) are effective yogic interventions practised for 20 minutes in three NAFLD patients. This intervention can be corrected of blood sugar, blood lipids, elevated liver enzymes and liver fibrosis in studied three NAFLD patients

Conclusion: This preliminary case series showed yogic intervention can useful in NAFLD. More studies are recommended.

Key Words: NAFLD, *Kapalabhati Pranayama*, *Ardha matsyendrasana*, *Gomukhasana*, *Dhanurasana*

INTRODUCTION

Non Alcoholic Fatty Liver Diseases (NAFLD) represents a spectrum of diseases from simple steatosis to fibrosis and is thought to be present in up to 70% of people with type 2 diabetes and obesity. The prevalence of NAFLD is to be around 9-32% in the general Indian population, with a higher incidence amongst overweight/obese and diabetic/ pre-diabetic patients.¹ NAFLD is projected as the state of disease and associated with a doubling health care cost, need for liver transplantation; including raised death risk from cardiovascular disease, hepatocellular cancer, and other non-cancer causes like liver Cirrhosis.² Ayurveda medication is excellent, but limited evidence.³ Regular exercise especially 'Yoga' is a preferable and economical preventive and curative measure in the management of NAFLD because there are no licensed drugs available for NAFLD and people embracing a sedentary lifestyle.⁴

Yoga and Ayurveda are interlinked and yoga is one of the Indian philosophies that mean for self-improvement by gaining

full potential of one's body, mind and soul. Over ten years, *Pranayama* (breathing exercise), *Asana* (yogic posture), and *dhyana* (meditation) are very popular in clinical medicine for Non-pharmacological approaches in many non-communicable diseases. Yoga therapy has proven efficacy in obesity,^{5,6} prediabetic⁷ and can also correct liver function.⁸ Yoga therapy is beneficial in Alcoholic liver disease⁹ and Cirrhosis of the Liver¹⁰. The efficacy of *Surya namaskar* (sun salutation) on NAFLD is well studied with inconclusive result¹¹. *Surya namaskar* (sun salutation) is quite difficult to practice, therefore the efficacy of other yogic practices like- *Kapalabhati Pranayama*, *Ardha matsyendrasana*, *Gomukhasana*, *Dhanurasana*, *Balasana* and *Dhyana* (Meditation) in NAFLD is to be tested.

Kapalabhati Pranayama is the type of rapid breathing technique to maintain homeostasis and well being. It can correct the functions of abdominal organs, purify blood and tone the abdominal muscle.^{12,13} *Ardha matsyendrasana* (seated spinal twist) squeeze and twisting the intestines and liver, helpful in

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healing any damage caused by fibrosis, inflammation, and stress. It can correct the function of the *Annavaahasrotas* (gastro-intestinal tract) and is thought to be an effective liver¹⁴. *Dhanurasana* (Bow pose) is a type of back bending posture to reduce belly fat and power to reverse the biological age and stimulate the abdominal organs.¹⁵ *Gomukhasana* (Cow face pose) is mentioned in *Ghernda Samhita* and Hatha Yoga pradiipika, which can induce relaxation and alleviate fatigue. It stimulates the liver, pancreas and Kidney and prevents diabetics, low back pain. This pose can be practised for 30 seconds to one minute depending on the individual capacity for best therapeutic benefits and it can be increased gradually.¹⁶ *Balāsana* (Child's pose) is one of the counter postures of *dhanurasana* (Bow pose) and maintain quality of life.¹⁷ *Dhyana* is the uninterrupted connection between the mind and the object chosen for meditation.¹⁸

The objective of the study- The objective of this case series was to evaluate the role of yogic techniques in NAFLD patients without any medication.

MATERIALS AND METHODS

We retrospectively identified three NAFLD patients who had been prescribed yogic intervention without any medication. The patients between the ages of 30-50 years were included and patients taking any medication were excluded from the study.

- A. Patient Information & clinical finding-** Three patients were diagnosed sonographically. Among three patients, two were male and one female. All three patients were non-vegetarian. All patients complained of anorexia, indigestion and distension of the abdomen for more than three months. All patients having central obesity, overweight and BMI is more than 27 (Table no-1). Their viral hepatitis screening was negative antinuclear antibody, smooth muscle antibody, α_1 -antitrypsin, ceruloplasmin, and thyroid-stimulating hormone levels were within normal limits. All patients had elevated blood sugar, triglyceride and slightly elevated liver enzymes (SGOT & SGPT). The other liver enzymes and Platelet count were normal (Table no-2). All patients have elevated glucose levels.
- B. Timeline-** The Specific Yoga asana and pranayama were practised under the guidance of a Yoga expert. The assessment was taken after 30 days and after the completion of 90 days of intervention.
- C. Diagnostic assessment-** The diagnosis of NAFLD requires evidence of hepatic steatosis by imaging or by histology. Ultrasound is very effective in diagnosis steatosis where more than 33% of hepatocytes are stenotic. Transient elastography (TE) provides the Liver stiffness measurement (LSM) using pulse-echo ultrasound as a surrogate marker of fibrosis. The Spe-

cific Yoga asana and pranayama for 90 days under the guidance of a Yoga expert. The important parameters before the commencement of the Yoga exercises (baseline values) and after the Yoga therapy were recorded.¹⁵⁻¹⁸

- D. Yogic intervention-** All the subjects within the yogic techniques were taught *Kapalbhathi pranayama*, *Yogasana* and *dhyana*. The duration of practice was for 20 minutes from 7 A.M. to 8 A.M. It was advised to keep bowel and bladder emptied before yogic practice. The duration of *Kapalbhathi pranayama* was 9 minutes approximately, that of *asana* was 9 minutes and *dhyana* 3 minutes approximately. *Kapal bhathi pranayama* should be practised on an empty stomach. These studied patients were advised to sit comfortably with crossed leg position with straining of the back and hands should be rested on knees. *Kapalavati* is the exercise of contraction of the abdomen with forceful exhalation and inhalation. One stroke was completed with the completion of exhalation with inhalation. The patient begins with 30 strokes and ended with hundred eighty strokes. After completing such 30 strokes inhale and exhale deeply and take a rest-pause of about 30 seconds. The patients were advised to keep their bodies steady without any movements of the head, shoulder and legs. This *kapalabhathi* can be done for nine minutes. Two sitting asana like *Ardha matsyendrasana* and *Gomukhasana*, two lie position of opposite body movement as *Dhanurasana Balāsana* and *Dhyana*, at last, were practised with a standard protocol (Table 3)
- E. Follow up and Result-** The patient was followed up in 30 days and 90 days. The three patients have improved clinically and the radiological and biochemical parameters gradually developed during the period. After 30 days of treatment, their appetite appeared normal and got relieved abdominal discomfort, but no significant change in weight. The blood sugar and other parameter were slightly changed and significant change after three months of practice. The Ultrasound report of two patients became normal and change Midline stiff in fibro scan. There was a significant change in biochemical and radiological findings in all patients after three months (Table no-4)

RESULT & DISCUSSION

This present case series is a retrospective evaluation of 90 days of yogic intervention in a special protocol of *kapalabhathi*, two sitting *asana*, two lay down *asana* and *dhyana* in three NAFLD patients. After 30 days of treatment, their appetite appeared normal and got relieved abdominal discomfort, but no significant change in weight. The blood sugar and other parameter were slightly changed and significant change after three months of practice. The Ultrasound report of two patients became normal and

significant change in Midline stiffness in the fibro scan report. This yogic intervention is a preliminary report of the correction of liver fibrosis and elevated liver enzymes in three NAFLD patients. Although earlier two case reports were suggested that yogic intervention can stabilise SGOT and SGPT.¹¹ This yogic intervention also corrected metabolism for which blood sugar, total cholesterol and serum triglyceride reduced significantly. Similar studies were found that yogic interventions have decreased fasting plasma glucose, postprandial blood sugar, total cholesterol, triglycerides and reduce weight. *Kapalbhati pranayama* and *dhyana* are correct metabolic functions and heals the mind by reducing stress and anxiety respectively.¹⁹⁻²² *Kapalbhati Prayanam* (Breathing exercise) is aimed at pushing (exhaling) out air from the stomach as if it is pumping out toxins/negativity from the body. In NAFLD, oxygenation and blood flow are prevented by scar liver tissues. The liver becomes unable to filter toxins and perform its other vital functions leading to cirrhosis, liver failure, liver cancer. By practising the said yoga protocol, the liver gets stimulated, thereby ensuring that oxygen and blood flow freely through it. Management of weight and stress is quite important while dealing with any chronic illness like liver disease.²³

CONCLUSION

This preliminary retrospective study reveals that yogic intervention can correct blood sugar, blood lipids, elevated liver enzymes and liver fibrosis of NAFLD patients. It will attract more Clinical trials in a high sample size. These Non-pharmacological interventions have more priorities and the potential to improve future clinical trials in NAFLD. This study will provide a more informative guide to patients and practitioners regarding Yogic intervention and Fatty liver. Widespread dissemination of this study will optimise the usefulness of yogic intervention in Fatty liver diseases.

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Consent of patients: Obtained

Conflict of Interest: Nil

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Author's contribution

AKP and DP conceived the idea of this case study and plan the study design. RKM, DPS and PSS have finalised the yogic intervention and guided the patients. All authors are involved

in the study and drafting of the manuscript, revising and providing final approval for publication.

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Table 1: Demographic data three NAFLD patients

S.N	Age	Sex	Diet	Clinical symptoms	Height	Weight	BMI
1	44	M	Non Veg	Distention of abdomen	165cm	74	27.2
2	32	M	Non Veg	Anorexia, indigestion	170	85	29.2
3	40	F	Non Veg	Indigestion, constipation	158	66	27.2

Table 2: Baseline biochemical and radiological parameters of three NAFLD patients

S.N.	FBS	PPBS	HbA _{1c}	TC	TG	SGOT	SGPT	USG	Fibro scan
1	140	198	7.1	140	267	60	49	Mild fatty liver	7.8
2	176	220	7.8	220	380	64	52	Moderate fatty	10.9
3	148	180	6.8	128	185	45	40	Mild fatty liver	6.2

FBS- fasting blood sugar, PPBS- post prandial blood sugar, Tc-total cholesterol, TG-Triglyceride,

Table 3: Detailed yogic intervention in three NAFLD patients

Yogic intervention	Execution time	Frequency	Recovery time	Total time
Kapalabhatipranayam	30 strokes per min 1stoke in 2 min	6 repeats	30srest in between	9 min
Ardhamatsyendrasana	2 times both side	4 repeats	30s rest in between	2.5 min
Gomukhasana	2 times both side	4 repeats	30s rest in between	2.5
Dhanurasana	1 min in One time	-		1.5
Balasana	1 min one type	-	--	1.5
Dhyana	3 min	-	-	3 min
TOTAL				20 min

Table 4: Biochemical and Radiological findings of three NAFLD patients

Lab Parameter	Case No1		Case no-2		Case no-3	
	After 30 days	After 90 days	After 30 days	After 90 days	After 30 days	After 90 days
BMI	27.00	25.2	29.2	28.0	27.2	27.00
FBS mg/dl	126	108	162	103	118	86
PPBS	150	136	202	142	148	116
TC	140	134	226	158	128	130
TG	220	152	358	270	170	142
SGOT	62	42	65	45	38	38
SGPT	48	36	50	42	40	36
USG	----	normal	-----	mild	-----	normal
Fibroscan	-----	6.00	-----	8.4	-----	6.00