RESEARCH PAPER

Comparative Efficacy o*f Ruksha Purva* and *Sneha Purva Siravedhana* Combined with *Nitya Virechana* in the Management of *Yakrutodara* (Non-Alcoholic Fatty Liver Disease): A Randomized Clinical Trial

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Abstract

Background: Non-alcoholic fatty liver disease (NAFLD) is a common chronic liver disorder associated with obesity, insulin resistance, and metabolic syndrome. In Ayurveda, its clinical manifestations may be correlated with Yakrutodara, characterized by Mandagni, Kapha-Pitta Dushti, Meda Dhatu Vriddhi, and Srotorodha. Ayurvedic interventions such as Siravedhana, Udvartana, and Nitya Virechana are traditionally employed to address these pathological changes.

Objective: To evaluate and compare the efficacy of Ruksha Purva Siravedhana and Sneha Purva Siravedhana, each combined with Udvartana and Nitya Virechana, in the management of Yakrutodara (NAFLD).

Materials and Methods: An open-label, randomized comparative clinical trial was conducted in 30 patients diagnosed with Yakrutodara (NAFLD). Participants were randomly allocated into two groups of 15 each using a computer-generated randomization sequence. Group A received Ruksha Purva Siravedhana along with Udvartana and Nitya Virechana, whereas Group B received Sneha Purva Siravedhana, preceded by Sadhyo Snehapana with Murchhita Go Ghrita, along with the same treatment regimen. Subjective parameters, including Ajirna, Aruchi, Adhmana, Chhardi, Atilalasrava, and Vibandha, and objective parameters, including serum SGPT, SGOT, and Fatty Liver Index (FLI), were assessed before and after treatment. Statistical analysis was performed using IBM SPSS Statistics.

Results: All 30 participants completed the study without treatment-related adverse events. Both groups showed significant improvement in major subjective symptoms and a significant reduction in FLI. Group B demonstrated significantly greater improvement in Vibandha compared with Group A. Group A showed no significant changes in SGPT or SGOT, whereas Group B demonstrated a statistically significant increase in both liver enzyme levels after treatment.

Conclusion: Both treatment protocols improved clinical manifestations and reduced hepatic steatosis. *Sneha Purva Siravedhana* was more effective for *Vibandha*, while *Ruksha Purva Siravedhana* maintained stable liver enzyme levels. Further studies with larger samples are warranted.

Keywords: *Yakrutodara*; Non-Alcoholic Fatty Liver Disease; *Siravedhana; Ruksha Purva; Sneha Purva; Nitya Virechana;* Fatty Liver Index.

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Introduction

Non-alcoholic fatty liver disease (NAFLD) is one of the most prevalent chronic liver disorders worldwide and has emerged as a major public health concern owing to its close association with obesity, insulin resistance, type 2 diabetes mellitus, dyslipidaemia, and metabolic syndrome. It encompasses a spectrum of hepatic disorders ranging from simple steatosis to non-alcoholic steatohepatitis (NASH), fibrosis, cirrhosis, and hepatocellular carcinoma. The prevalence of NAFLD has increased substantially over the past two decades, particularly in developing countries such as India, where rapid urbanization, sedentary lifestyles, and unhealthy dietary habits have contributed to the growing burden of metabolic liver disease. Despite advances in understanding its pathophysiology, effective pharmacological treatment remains limited, and lifestyle modification continues to be the cornerstone of management.

In Ayurveda, the clinical features of NAFLD can be correlated with Yakrutodara, one of the eight types of Udara Roga [1] . The disease is primarily attributed to Mandagni, resulting in the formation of Ama, vitiation of predominantly Kapha and Pitta Dosha, Meda Dhatu Vriddhi, and Srotorodha [2] . These pathological changes impair hepatic metabolism and ultimately lead to structural and functional derangement of the liver. Therefore, management should focus on restoring Agni, eliminating vitiated Doshas, correcting metabolic dysfunction, and re-establishing normal physiological function [3] .

Among the Panchashodhana procedures, Siravedhana (Raktamokshana) is traditionally indicated in disorders involving Rakta and Pitta Dushti . According to Ayurvedic classics, elimination of vitiated blood helps restore physiological equilibrium and improve tissue function [4] . Udvartana, owing to its Lekhana and Kapha-Medohara properties, is recommended to reduce excessive Meda and improve metabolism [5] , whereas Nitya Virechana facilitates elimination of accumulated Pitta and Ama [6] . Administration of Murchhita Go Ghrita as Sneha Purva Karma before Siravedhana is expected to promote Dosha Vilayana and facilitate more effective elimination of vitiated Doshas [7] .

Although previous studies have investigated the individual roles of Siravedhana [8] , Udvartana [9] , and Nitya Virechana [10] in metabolic disorders, comparative clinical evidence evaluating the influence of Ruksha Purva and Sneha Purva Siravedhana in the management of Yakrutodara (NAFLD) remains limited. Furthermore, there is a lack of evidence regarding their comparative

effects on both clinical symptoms and biochemical parameters. Therefore, the present randomized comparative clinical trial was undertaken to evaluate and compare the efficacy of Ruksha Purva Siravedhana and Sneha Purva Siravedhana, each combined with Udvartana and Nitya Virechana, in patients with Yakrutodara (NAFLD).

2. Materials And Methods

2.1 Study Design and Ethical Approval

This study was designed as an open-label, randomized, comparative clinical trial conducted at the Department of Panchakarma, Parul Institute of Ayurved, Parul University, Vadodara, Gujarat, India. The study protocol was approved by the Institutional Ethics Committee (IEC Approval No. PU/PIA/IEC/11/2025/476, dated 01 February 2025) and prospectively registered with the Clinical Trials Registry–India (CTRI No. CTRI/2025/03/082679). Written informed consent was obtained from all participants before enrolment.

2.2 Participants

Thirty patients aged 18–60 years with a clinical diagnosis of Yakrutodara corresponding to Grade I–III Non-Alcoholic Fatty Liver Disease (NAFLD) were recruited from the Panchakarma Outpatient and Inpatient Departments. Patients with liver cirrhosis, hepatocellular carcinoma, ascites, severe anaemia, HIV infection, ischemic heart disease, malignancy, pregnancy, or lactation were excluded from the study.

2.3 Randomization

Eligible participants were randomly allocated into two equal groups (n = 15 each) using a computer-generated randomization sequence. The study was conducted in an open-label manner; therefore, neither the investigators nor the participants were blinded to the treatment allocation.

2.4 Intervention

Table 1. Intervention of the study

Parameter	Group A (Ruksha Purva)	Group B (Sneha Purva)
Udvartana	Yava and Triphala Churna [11] (Days 1–5)	Yava and Triphala Churna (Days 1–5)
Nitya Virechana	Patola Katu Rohinyadi Kashaya [12] (20 ml BD, Days 1–11)	Kashaya (20 ml BD, Days 1–11)
Snehapana	Not Performed	Murchhit Go Ghrita (100–160 ml, Days 6–7)
Siravedhana [13]	Performed (Days 7 and 12)	Performed (Days 7 and 12)
Follow Up	20th Day	20th Day

2 .5 Outcome Measures

Clinical assessment was performed before treatment and after completion of therapy. Subjective outcome measures included Ajirna (indigestion), Atilalasrava (excess salivation), Chhardi (vomiting), Aruchi (loss of appetite), Adhmana (flatulence), and Vibandha (constipation) [14] . Objective outcome measures included serum glutamic-pyruvic transaminase (SGPT/ALT), serum glutamic-oxaloacetic transaminase (SGOT/AST), and Fatty Liver Index (FLI) [15] .

2.6 Statistical Analysis

Data were analysed using IBM SPSS Statistics for Windows version 25.0 (IBM Corp., Armonk, NY, USA). Continuous variables were expressed as mean ± standard deviation (SD). Within-group comparisons of subjective parameters were performed using the Wilcoxon signed-rank test, whereas paired t-tests were used for objective parameters. Between-group comparisons were performed using appropriate parametric or non-parametric statistical tests according to data distribution. A p-value of <0.05 was considered statistically significant.

2.7 Safety Assessment

Participants were monitored throughout the study for treatment-related adverse events and procedure-related complications. No adverse events or serious adverse events were observed during the study period.

3. Results

Participant Flow

A total of 36 patients were screened for eligibility. Six patients did not meet the inclusion criteria or declined to participate. The remaining 30 eligible participants were randomly allocated into two treatment groups using a computer-generated randomization sequence. Fifteen participants were assigned to Group A (Ruksha Purva Siravedhana) and fifteen to Group B (Sneha Purva Siravedhana). All randomized participants completed the study and were included in the final analysis. No dropouts, protocol deviations, or treatment-related adverse events were recorded during the study.

Effect on Subjective Parameters

Both treatment groups demonstrated improvement in the majority of subjective parameters after completion of therapy.

Table 2. Within-group comparison of subjective outcome measures before and after treatment (Wilcoxon signed-rank test)

Outcome Measure	Group	Before Treatment (Mean ± SD)	After Treatment (Mean ± SD)	Z value	P value
Ajirna	A	2.93 ± 0.70	1.47 ± 0.64	-3.535	<0.001
	B	3.00 ± 1.41	1.60 ± 1.18	-3.25	0.00
				0	
Atilalasrava	A	0.13 ± 0.35	0.07 ± 0.26	-0.577	0.564
	B	0.53 ± 0.74	0.27 ± 0.59	-2.000	0.045
Chhardi	A	0.40 ± 0.83	0.07 ± 0.26	-1.633	0.102
	B	0.67 ± 0.90	0.33 ± 0.62	-1.667	0.096

Aruchi	A	3.13 ± 0.92	1.53 ± 0.52	-3.482	<0.001
	B	2.73 ± 1.22	1.87 ± 1.19	-2.498	0.013
Adhmana	A	2.47 ± 0.83	1.67 ± 0.90	-2.362	0.018
	B	3.13 ± 0.99	1.40 ± 0.83	-3.473	<0.001
Vibandha	A	1.60 ± 0.74	1.13 ± 0.64	-1.941	0.052
	B	1.87 ± 0.83	0.47 ± 0.64	-3.391	<0.001

Table 3. Between-group comparison of subjective outcome measures after treatment (Mann–Whitney U test)

Outcome Measure	Mean Rank (Group A)	Mean Rank (Group B)	U value	Z value	P value
Ajirna	15.17	15.83	107.5	-0.221	0.825
Atilalasrava	14.47	16.53	97.0	-1.089	0.276
Chhardi	13.97	17.03	89.5	-1.473	0.141
Aruchi	14.93	16.07	104.0	-0.388	0.698
Adhmana	16.30	14.70	100.5	-0.540	0.589
Vibandha	19.37	11.63	54.5	-2.616	0.009

Both treatment groups showed a statistically significant reduction in the Fatty Liver Index (FLI) following treatment, indicating improvement in hepatic steatosis. The reduction in FLI was statistically significant in both groups, with a greater numerical reduction observed in Group B.

Serum SGPT (ALT) and SGOT (AST) levels remained statistically unchanged in Group A, indicating stable liver enzyme levels throughout the treatment period. In contrast, Group B demonstrated statistically significant increases in SGPT and SGOT following treatment. Although these biochemical changes reached statistical significance, their clinical relevance requires further evaluation.

Overall Therapeutic Outcome

The findings indicate that both treatment protocols were effective in improving the clinical manifestations of Yakrutodara and reducing hepatic fat accumulation, as reflected by the significant reduction in the Fatty Liver Index. While Sneha Purva Siravedhana demonstrated superior efficacy in relieving constipation, Ruksha Purva Siravedhana maintained stable liver enzyme levels throughout the study. No adverse events or serious procedure-related complications were reported in either treatment group.

In Group A, statistically significant improvement was observed in Ajirna, Aruchi, and Adhmana ($p < 0.05$). Although reductions in Chhardi, Atilalasrava, and Vibandha were also observed, these changes were not statistically significant.

In Group B, statistically significant improvement was observed in Ajirna, Aruchi, Adhmana, and Vibandha ($p < 0.05$). Improvement in Chhardi and Atilalasrava did not achieve statistical significance.

Between -group comparison demonstrated comparable improvement in most subjective symptoms. However, Group B showed significantly greater improvement in Vibandha (constipation) than Group A, suggesting an additional beneficial effect of Sneha Purva Karma on bowel function.

Effect on Objective Parameters

Table 4. Within-group comparison of objective outcome measures before and after treatment (Paired t-test)

Outcome Measure	Group	Before Treatment (Mean ± SD)	After Treatment (Mean ± SD)	t value	P value
SGPT (ALT)	A	29.18 ± 9.64	29.80 ± 10.15	-0.330	0.746
	B	42.07 ± 32.64	49.99 ± 31.15	-3.012	0.009
SGOT (AST)	A	29.62 ± 7.83	30.68 ± 7.76	-0.496	0.627
	B	41.96 ± 19.27	49.62 ± 20.73	-3.257	0.006
Fatty Liver Index (FLI)	A	2.27 ± 0.88	1.80 ± 0.86	3.500	0.004
	B	2.67 ± 0.49	2.07 ± 0.80	4.583	<0.001

Discussion

The findings of the present study are consistent with previous reports demonstrating that Ayurvedic interventions aimed at correcting Agnimandya, reducing Kapha-Meda Dushti, and restoring Srotas patency can improve metabolic disorders associated with fatty liver disease. Earlier studies evaluating Udvartana, Virechana, and Siravedhana have similarly reported improvements in digestive function, lipid metabolism, and anthropometric parameters. The present study extends these observations by directly comparing Ruksha Purva and Sneha Purva Siravedhana, thereby providing preliminary comparative evidence regarding the

influence of different Purva Karma protocols on clinical and biochemical outcomes in patients with Yakrutodara (NAFLD). These findings contribute to the growing body of evidence supporting the role of Ayurvedic Shodhana therapies as complementary approaches in the management of metabolic liver disorders.

One of the major strengths of this study is its randomized comparative design, which enabled direct comparison of two clinically relevant treatment protocols under similar conditions. The use of both subjective clinical parameters and objective biochemical markers, together with the Fatty Liver Index, provided a comprehensive assessment of therapeutic outcomes. Prospective registration with the Clinical Trials Registry–India and adherence to a predefined treatment protocol further strengthen the methodological quality of the study. Additionally, no treatment-related adverse events or serious complications were observed, suggesting that both treatment protocols were well tolerated during the study period.

Nevertheless, certain limitations should be considered while interpreting the findings. The study included a relatively small sample size and was conducted at a single centre, which may limit the generalizability of the results. The duration of treatment and follow-up was short, restricting evaluation of long-term clinical outcomes and sustained biochemical changes. Furthermore, assessment of treatment response primarily relied on clinical parameters and the Fatty Liver Index, while advanced imaging modalities, histopathological assessment, inflammatory biomarkers, and oxidative stress markers were not evaluated. These limitations should be addressed in future investigations to provide stronger evidence regarding the effectiveness and mechanism of the proposed interventions.

The observed difference in liver enzyme responses between the two treatment groups deserves further investigation. Although participants receiving Sneha Purva Siravedhana demonstrated a transient increase in SGPT and SGOT immediately after treatment, this finding should not be interpreted as evidence of hepatic injury based on the present study alone. The short duration of observation and absence of additional hepatic biomarkers limit definitive conclusions regarding its clinical significance. Future studies with serial biochemical assessment, imaging-based evaluation, and longer follow-up are required to clarify the physiological basis and long-term implications of these changes.

Overall, the present study suggests that both Ruksha Purva Siravedhana and Sneha Purva Siravedhana, when combined with Udvartana and Nitya Virechana, are effective in improving the clinical manifestations and metabolic parameters associated with Yakrutodara (NAFLD). While Sneha Purva Siravedhana demonstrated greater benefit in relieving constipation, Ruksha Purva Siravedhana maintained stable liver enzyme levels throughout the treatment period. These findings support an individualized treatment approach based on the patient's clinical presentation and provide a foundation for larger multicentre randomized controlled trials to further establish the role of these Ayurvedic interventions in the management of NAFLD.

5. Conclusion

The present randomized comparative clinical trial demonstrated that both Ruksha Purva Siravedhana and Sneha Purva Siravedhana, when combined with Udvartana and Nitya Virechana, were effective in improving the clinical manifestations of Yakrutodara (Non-Alcoholic Fatty Liver Disease). Both treatment protocols produced significant improvement in subjective symptoms and significantly reduced the Fatty Liver Index (FLI), indicating improvement in the metabolic status associated with hepatic steatosis. Sneha Purva Siravedhana demonstrated greater efficacy in relieving Vibandha (constipation), whereas Ruksha Purva Siravedhana maintained stable liver enzyme (SGPT and SGOT) levels throughout the study period. These findings suggest that the selection of Purva Karma may be individualized according to the patient's clinical presentation and therapeutic objectives.

Although the study demonstrated encouraging short-term clinical and metabolic benefits, its findings should be interpreted considering the relatively small sample size, short duration of treatment, and single-centre design. Therefore, larger multicentre randomized controlled trials with longer follow-up and advanced imaging and biochemical assessments are warranted to further establish the efficacy and safety of these treatment protocols in the management of NAFLD. The present study provides preliminary clinical evidence supporting the integration of Ruksha Purva and Sneha Purva Siravedhana, along with Udvartana and Nitya Virechana, as complementary Ayurvedic treatment approaches for patients with Yakrutodara (NAFLD).

Ethics Approval and Consent to Participate

The study protocol was approved by the Institutional Ethics Committee of Parul Institute of Ayurved, Parul University (IEC Approval No. PU/PIA/IEC/11/2025/476, dated 01 February 2025). The trial was prospectively registered with the Clinical Trials Registry–India (CTRI No. CTRI/2025/03/082679). Written informed consent was obtained from all participants before enrolment.

Consent for Publication

Not applicable.

Availability of Data and Materials

The datasets generated and analysed during the current study are available from the corresponding author upon reasonable request.

Competing Interests

The authors declare that they have no competing interests.

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Authors' Contributions

Author 1: Conceived and designed the study, conducted the clinical trial, collected and analysed the data, interpreted the findings, and drafted the manuscript.

Author 2: Supervised the study, contributed to the study design and interpretation of results, critically revised the manuscript for important intellectual content, and approved the final version for publication.

All authors have read and approved the final manuscript.

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